The course descriptions listed below were current at the time of printing. Up-to-date course descriptions can be found on the World Wide Web at http://www.uic.edu/depts/grad/courses/.

### Accounting (Actg)


435. Auditing. 4 Hours. Introduction to the audit function; ethical and legal environment; audit standards; objectives and procedures; materiality and audit risk; sampling; auditing in a computer environment; reporting. Extensive computer use required. Prerequisite: Actg 316.

436. Advanced Auditing. 4 Hours. Audit factors affecting the nature of evidential matter, performance of audit procedures, and the auditor's report; special problems in reporting; advanced development of basic concepts. Prerequisite: Actg 335.


446. Federal Income Tax II. 4 Hours. Concepts and provisions of federal income taxation on corporations and partnerships; special problems in reorganization, liquidations, and personal holding companies. Prerequisites: Actg 345 or the equivalent, and declaration of a major.

447. Taxation of Estates, Gifts and Trusts. 4 Hours. Taxation of estates, gifts and trusts, with emphasis on estate planning for federal tax purposes. Prerequisites: Actg 345 and 446 or approval of the Department.

448. Advanced Tax. 4 Hours. Federal tax procedures with emphasis on dealing with IRS assessment and audit procedures. Prerequisite: Actg 345.

449. Special Topics in Taxation. 4 Hours. An in-depth analysis of special topics in federal taxation emphasizing corporations, passive loss rules and pension-retirement plans. Prerequisites: Actg 345 and 446; or approval of the department.

456. Business Law II. 4 Hours. Commercial law for partnerships, corporations, secured transactions, bankruptcy, real and personal property, wills and trusts, SEC regulations, unfair trade activities. Prerequisites: Actg 355 or the equivalent, and declaration of a major.

465. Governmental and Non-Profit Accounting. 4 Hours. Financial transaction analysis and recording system; budget preparation and control; concepts and principles underlying the financial reports of governmental and non-profit organizations. Prerequisite: Actg 316.

474. Accounting Information Systems. 4 Hours. Concepts and principles of designing computer systems to perform accounting functions; applications of microcomputer accounting software packages. Prerequisites: Actg 111 and IDS 100.

475. Database Accounting Systems. 4 Hours. Same as IDS 475. Concepts and principles of designing database systems to perform accounting functions, applications of microcomputer accounting software packages systems design tools, and computerized transaction cycles. Extensive computer use required. Prerequisites: Actg 111 and IDS 100.

484. International Accounting. 4 Hours. Financial accounting for international operations, multinational managerial accounting and control, comparative international accounting, international reporting issues, and international taxation. Prerequisite: Actg 316.

485. Valuation and Analysis. 4 Hours. Financial analysis and valuation of firms. Corporate strategies, financial reporting issues and market perceptions. Extensive computer use required. Prerequisites: One accounting and one finance class or consent of the instructor.

494. Special Topics in Accounting. 1 to 4 Hours. Topics rotate in various areas of accounting, including but not restricted to financial, managerial, governmental and nonprofit accounting, law and business ethics. Explores current issues and proposed alternatives. Prerequisites: Two courses in accounting or finance beyond Actg 111 and Fin 300 or the equivalent.

495. Competitive Strategy. 4 Hours. Multidisciplinary analysis of organization strategy and policy, using case method and/or business simulation. Assignments involve extensive library research and oral and written reports. Prerequisite: Consent of the instructor.

500. Introduction to Financial Accounting. 4 Hours. No credit given if the student has credit in MBA 501. Concepts and principles of financial accounting for preparation and evaluation of external reports and financial statements. Extensive computer use required. Prerequisite: Admission to the MBA or M.S in Accounting program.


503. Financial Accounting II. 4 Hours. Contemporary financial accounting issues, including liabilities, pensions, tax allocation, leases, price level reporting, investments, capital transactions and financial statement analysis. Prerequisites: Actg 500 and 502, or the equivalents.

506. Management Accounting. 4 Hours. Design of cost accounting systems; alternate costing methods; costing for decision making; budget planning and performance evaluation. Prerequisite: Actg 500.

508. Federal Income Tax-Graduate. 4 Hours. Concepts and provisions of federal income taxation as applicable to individual taxpayers. Prerequisite: Actg 500.

509. Business Law-Graduate. 4 Hours. Commercial law of contracts, sales, commercial paper, agency, suretyship, insurance law and liability of management. Prerequisite: Actg 500 or the equivalent.

515. Accounting Theory and Paradigms. 4 Hours. Conventional and regulatory approaches to standard setting and theory construction, conceptual framework and paradigmatic avenues in accounting. Prerequisite: Actg 503 or the equivalent.

516. Financial Statement Analysis. 4 Hours. Use of financial information by decision makers external to the firm; profitability and risk analysis; financial forecasting and equity valuation. Extensive computer use required. Prerequisite: Actg 502; or approval of the department.

517. Financial Accounting Research. 4 Hours. Applies economic, finance theory, quantitative methods to study supply and demand for accounting information, to investors’ assessments of accounting information and statistical analysis of accounting information. Prerequisites: Actg 516 or the equivalent, and admission to the PhD in Business Administration program.

525. Management Control of Strategic Performance. 4 Hours. Contemporary overview of the management control systems measuring technological activities, measuring value added, outsourcing non-core compensation plan and performance measurement. Extensive computer use required. Prerequisite: Actg 506; or approval of the department.

527. Managerial Accounting Research. 4 Hours. Contemporary topics in management accounting research. Includes agency theory and incentive contracts, behavioral research applications, and analytical managerial models. Prerequisites: Actg 525 or the equivalent, and admission to the PhD in Business Administration program.

535. Auditing Theory. 4 Hours. Philosophy of science and ethics, research methods, experimental economics, and capital market research. Special topics in current auditing issues addressed through the case method. Prerequisite: Actg 335.

545. Taxes and Business Policy. 4 Hours. The role of taxes in business decisions. Emphasizes integrating taxes with other variables—behavioral, financial, environmental and other. Also discusses the relationship between taxation and financial and managerial accounting. Prerequisites: Actg 345 and 446.

564. Fundamentals of Governmental and Non-Profit Accounting. 4 Hours. Financial transaction analysis and recording system; budget preparation and control; concepts and principles underlying the financial reports of governmental and nonprofit organizations.

591. Accounting Policy and Practice. 4 Hours. Institutions and processes of setting accounting and auditing standards; managerial responses to and incentives for adopting standards; professional practice and public policy issues. Prerequisites: Actg 515 and 525.

592. Accounting Policy Research. 4 Hours. Objectives of accounting policies; policy formation processes and incentives for adoption; evaluating policies in terms of economic and social consequences; methods of accounting policy research. Prerequisites: Actg 517 and 527.

593. Accounting Research: Methodology and Communication. 4 Hours. Instruction in research methods, issues, and research appreciation and evaluation together with individual practice in planning, conducting, and reporting professional research projects in accounting and capital markets. Extensive computer use required. Prerequisite: Actg 502.

594. Special Topics in Accounting. 4 Hours. Topics rotate in the various areas of accounting, including but not restricted to financial, managerial, governmental and nonprofit accounting, explores current issues and proposed alternatives. Prerequisite: Approval of the department.

596. Independent Study in Accounting—Master's. 1 to 4 Hours. Independent study on an accounting topic chosen with faculty approval; requires a study plan and a paper of length and specification required by a faculty member. Prerequisites: Actg 515 and 525.

599. PhD Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Students may register for more than one section per term. Research on topic of the doctoral dissertation. Prerequisite: Faculty acceptance of thesis proposal.

Administrative Studies in Nursing (NuAS)

515. Advanced Nursing Management in Community-Focused Health Services. 3 Hours. Same as NuPH 515. Theory and research in leadership, management, and community-focused assessment for advanced nursing practice in complex and integrated health systems. Prerequisite: NuSc 528 or consent of the instructor.

516. Evaluation of Health Services Outcomes for Nursing. 3 Hours. Same as NuPH 516. Program planning and evaluation in community-focused health services. Measurement of quality, performance, and impact on health programs and services. Interdisciplinary perspective. Integrated quality improvement systems. Prerequisite: NuAS 515 or consent of the instructor.

517. Budget and Finance of Health and Nursing Services. 3 Hours. Same as NuPH 517. Financial management techniques, supply and demand, cost behaviors, and revenue sources, provider reimbursement and public and private health insurance for health and nursing services will be analyzed. Prerequisite: NuAS 515 or consent of the instructor.

518. Field Study in Health and Nursing Management. 3 Hours. Same as NuPH 518. Field study emphasizing leadership within population-focused nursing management practice including organization and management concepts from public and private perspective. Prerequisites: NuAS 516 and 517, or consent of the instructor.

550. Issues for Research and Practice in Women's Health. 3 Hours. Same as NuSc 550 and NuWH 550. Analysis of gender-related definitions of health and illness in theory issues and research evaluation criteria for women’s health care practice are developed as a basis for research. Prerequisite: Consent of the instructor.

African-American Studies (AASt)

410. Seminar in Black Child Development. 4 Hours. Race, class, and cultural theories of black child development. Examination of socialization process and developmental outcomes, with particular attention to social attitudes and behaviors. Prerequisite: AASt 201 or Psch 100 or consent of instructor.

441. Topics in African History. 4 Hours. Same as Hist 441. May be repeated for credit. Specific topics are announced each term.


470. Reading Black Women Writing. 4 Hours. Same as Engl 480 and WS 470. Examines inscriptions of race, gender, class, and sexuality as they shape the literary and critical practices of nineteenth- and twentieth-century black women writers. Prerequisite: AAS 110 or 111 or 250 or consent of the instructor.

505. Quantitative Morphology. 2 Hours. Same as Path 505. Principles and practice of morphometry and stereology, which are methods for quantitating structure. Specific application to the histological and ultrastructural levels of Anatomy and Pathology. Prerequisites: Path 425 and 504, or Anat 442, or consent of the instructor.

514. The Cytoskeleton: Cellular and Molecular Biology. 1 Hour. Structure and function of microfilaments, microtubules, intermediate filaments, and their associated proteins. Role of the cytoskeleton in various cellular processes such as cell motility and organelle transport. Role of the cytoskeleton in diseases.

520. Concepts of Synaptic Function and Morphology. 2 Hours. Overview of current and classical methods employed in the study of synapses. A review of some of the most interesting aspects of synaptic function, such as sources of synaptic vesicles, synaptic patterns,
521. Plasticity in the Nervous System. 2 Hours. Neural plasticity is the ability to adaptively modify neural structure or function. Topics range from developmental plasticity to aging, including response to injury and neurodegenerative diseases, trophic factors, learning and memory, and neural transplantation. Prerequisite: Anat 403 or consent of the instructor.

526. Advanced Topics in Neuroanatomy. 2 Hours. Selected topics in neuroanatomy are reviewed and updated in terms of changing research methodology and newly emerging concepts in neurobiology.

527. Cellular and Systems Neurobiology. 3 Hours. Same as BioS 527. Molecular and cellular properties of ion channels in neurons and sensory cells and their relationship to brain and sensory systems. Prerequisite: Credit in one neuroscience course or consent of the instructor.

528. Chemical and Molecular Neuroanatomy. 3 Hours. Substantive reviews on topics in molecular neurobiology are presented. Each lecture focuses on the application of data and techniques to the understanding of neural function within intact neuroanatomical systems. Prerequisite: Anat 403 or consent of the instructor.

544. Advanced Craniofacial Anatomy. 3 Hours. Functional and clinical aspects of head and neck anatomy, based on detailed laboratory dissection, original readings, and project work. Prerequisite: Any human gross anatomy course or the equivalent.

554. Neuroendocrinology. 2 Hours. Survey of neuroendocrine integration including neuroendocrine regulation of development, homeostasis, reproduction, and behavior. The hypothalamohypophyseal axis receives special attention from both morphologic and functional viewpoints. Prerequisite: Anat 403 or the equivalent.

555. Sensory Motor Systems. 2 Hours. Introductory and in-depth review of the current original literature covering ensembles of movement generated by CNS intrinsic and/or externally acquired sensory signals. Prerequisite: Anat 403 and PhyB 402 or the equivalent courses, or consent of the instructor.

560. Practicum in the Teaching of Anatomy. 1 to 3 Hours. No graduation credit. Satisfactory/Unsatisfactory grade only. May be repeated for credit. For anatomy and cell biology teaching assistants. Provides an opportunity for supervised discussion and evaluation of materials and methods in teaching the basic anatomical sciences. Prerequisite: consent of the instructor.

585. Cell Biology. 4 Hours. Same as PhyB 585 and Mlm 585. Functional and structural organization of the cell with emphasis on the cellular basis of physiological activity.

586. Cell and Molecular Neurobiology. 3 Hours. Same as BioS 586. Structure and function of voltage-dependent and neurotransmitter-gated ion channels; the role of these ion channels in synaptic transmission, synaptic modification, and neuromodulation. Prerequisite: BioS 442 or consent of the instructor.

595. Department Seminar. 1 Hour. S/U grade only. Oral presentations are made by students each session on timely journal articles, followed by in-depth discussions of the reported research. Presentation of research by invited lecturers.

596. Independent Study. 1 to 4 Hours. Independent study under the direction of a faculty member.

598. Master's Thesis Research. 0 to 16 Hours. S/U grade only. Thesis research under the direction of a faculty member.

599. Research in Anatomy. 0 to 16 Hours. S/U grade only. Independent research, directed by a faculty member.

Ancient Greek (GkA)

498. Advanced Topics in Ancient Greek Literature. 4 Hours. May be repeated for a maximum of 9 hours of credit. Students may register for more than one section per term. Intensive reading of ancient Greek literature. Topics vary. Prerequisite: 4 hours of ancient Greek at the 200 level or the equivalent.

499. Independent Reading. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Individual study under faculty direction. For students qualified by preparation and interest. Prerequisite: 4 hours of ancient Greek at the 200 level or the equivalent.

Anthropology (Anth)

405. Human Growth and Nutrition. 3 Hours. Same as Epid 405. Worldwide variation in human growth and the factors that contribute to differences between populations and individuals in the timing and pattern of growth and development.

410. Peasants. 4 Hours. Comparative study of peasant societies in diverse regions of the world; critical review of the literature and case studies. Prerequisite: Anth 213 or consent of the instructor.

411. Urban Cultural Problems. 4 Hours. A study of the processes of urbanization and of cultural and social adjustments to the city; illustrated by case studies.

412. Literature and Anthropology. 4 Hours. The dialogue between anthropology and creative writing as seen in portraying “the native” and his culture in novel, science fiction, and the traveller’s tale.

413. Social Organization. 4 Hours. Theory and method in the study of kinship and social organization, for advanced undergraduate and graduate students. Prerequisite: Anth 213 or graduate standing or consent of the instructor.

414. Symbolic Anthropology. 4 Hours. The interpretation of cultures through their ritual, religions, culture and other types of symbolism. Prerequisite: Anth 101 or consent of the instructor.

415. Medical Anthropology. 4 Hours. Survey of the history of non-Western medicine; analysis of ecological relationships behind folk medicine; principles and methods of studying ethnomedicine. Prerequisite: Anth 200 or consent of the instructor.

416. Economic Life of Primitive Peoples. 4 Hours. Patterns of production, distribution and consumption in non-Western culture. A study of cultural variation in attitude toward labor; concepts of prestige, property, and wealth.

417. Marxist Approaches to Anthropology. 4 Hours. Issues concerning Marx’s theories on primitive societies, the development of his evolutionary model from Morgan’s work, and current use of Marxist concepts in anthropology.

418. Fieldwork: Ethnographic and Qualitative Fieldwork Techniques. 4 Hours. Same as Soc 408. Practical introduction to the techniques of anthropologists and qualitative sociologists for research in natural social settings; participant observation/nonparticipant observation, interviewing, use of documentary sources. Prerequisite: Anth 213 or Soc 202 or consent of the instructor.

419. Aging, Culture, and Society. 4 Hours. Examination of the ways in which the experience of aging and the social position of elderly persons vary according to cultural context and the social system of which they are a part. Prerequisite: 3 hours of a social science or consent of the instructor.

420. Seminar in Archaeology and Ethnography. 4 Hours. May be repeated for a maximum of 15 hours of credit. Case studies of investigations in archeology using research monographs and other primary sources. Substantive data and related theoretical problems are examined simultaneously.

421. Geomorphology and Archaeology. 4 Hours. Same as Geog 432. Relevance of geomorphic processes and landform development to archaeology; role of geomorphology in archaeological surveys, paleogeographic reconstruction, and archaeological interpretation. Elements of geoarchaeology. Prerequisite: Geog 131 or EaEs 101 or consent of the instructor.

422. Prehistory of the Levant and the Nile Valley. 4 Hours. Detailed analysis of Levantine and Nile Valley prehistory during the Pleistocene and early Holocene. Prerequisite: Anth 221 or 222 or consent of the instructor.

423. Early Civilizations of the Old World. 4 Hours. Early civilization and incipient urbanization in Eurasia and Africa.

424. Violence. 4 Hours. Same as Criminal Justice 423. Explores how men and women have experienced violence historically and in modern times. Students examine how violence is perpetrated through words, pictures, physical harm, and silences. Prerequisites: CrJ 101 and CrJ 200.

425. Field Techniques in Archaeology. 4 Hours. Exposure to field methods in archaeology through participation in an actual research project. Students are instructed in field excavation techniques. Usually offered in summer session. Prerequisites: Anth 102 or the equivalent and consent of the instructor. Concurrent registration in Anth 426 is recommended.
426. Laboratory Techniques in Archaeology. 4 Hours. Exposes students to laboratory methods in archaeology through the analysis of excavated materials. Students are instructed in laboratory techniques including processing, classifying, dating, interpretation, evaluation, and preparation of written reports of archaeological research. Usually offered in the summer. Prerequisites: Anth 102 or the equivalent and consent of the instructor. Concurrent registration in Anth 425 is recommended.

427. Theory and Application in Ethnoarchaeology. 4 Hours. Focuses on the application of scientific experimentation and ethnographic information to enhance our understanding of the archaeological record, material culture, and past human behavior. Prerequisite: consent of the instructor.

430. Seminar in Primate Biology. 5 Hours. Theoretical and substantive issues in the study of nonhuman primates and hominids, as represented in current journals and topical volumes.

437. Bioarchaeology. 5 Hours. Provides an overview of mortuary theory and the bioarchaeological methods used to study health and disease, diet, activity patterns, kinship and cultural practices in archaeological populations. Prerequisite: consent of the instructor.

440. The Experience of Culture Difference: Culture Shock. 4 Hours. Explores experience of different cultures, the process of learning a different culture, and issues arising from the nature of the encounter in fieldwork. Prerequisite: One course in social or cultural anthropology, or experience in another culture.

441. Psychoanalytic Anthropology I: Cross-Cultural Theory. 4 Hours. Introduction for social scientists to psychoanalytic theory and methods including Freud's theories and more recent developments. Cross-cultural tests and applications of psychoanalytic theories. Prerequisite: One course in anthropology or psychology, or consent of the instructor.

442. Psychoanalytic Anthropology II: Cross-Cultural Applications. 4 Hours. Explores ways in which anthropologists and analysts have used psychoanalysis to understand individuals, practices and institutions of other cultures. Prerequisite: Anth 441 or consent of the instructor.

443. Leadership: Psychology, Strategy, Culture. 4 Hours. Psychological and anthropological theories of leadership developed on our culture will be tested against descriptions of leadership in diverse non-Western societies. Prerequisite: One course in anthropology.

444. Dreams, Dreaming, and Dream Beliefs. 4 Hours. The dreaming experience examined from the point of view of psychological interpretation, laboratory experiments, and anthropological study of dreams in other cultures. Prerequisite: One course in anthropology or psychology, or consent of the instructor.

453. Seminar in Cultural Ecology. 4 Hours. Same as Geog 453. Cultural ecology and cultural evolution, emphasizing peasant farming and other subsistence systems. Soil management under shifting and sedentary agriculture. Prerequisite: Anth 101 or Geog 151 or consent of the instructor.

470. Classic Ethnographies. 4 Hours. Analysis of method and theory reflected in selected classic anthropological works, studied in their historical contexts and contemporary uses. Prerequisite: Anth 101 or 213 or consent of the instructor.

471. Spanish Culture and Society. 4 Hours. Same as LALS 471 and Span 471. Introduction to themes in Spanish culture and society based primarily upon the literature in anthropology. Parallel sets of readings in Spanish and English.

472. Problems in European Ethnology. 4 Hours. A reading and research course designed to acquaint students with the ethnology of rural Europe through in-depth study of case materials and analytical approaches. Prerequisite: Anth 213 or consent of the instructor.

474. Urban Cultures of Africa. 4 Hours. A study of the indigenous urban centers of sub-Saharan Africa; the multicultural cities of colonial and contemporary Africa, and the processes of detribalization.

475. Problems in South American Ethnology. 4 Hours. Same as LALS 475. Intensive reading and research in theoretical and ethnographic problems in South American Indian social structures and cultures. Special attention will be given to the influence of Levi-Strauss’s ideas on the formulation of cultural theory in South America. Prerequisite: Anth 213 or consent of the instructor.

479. Culture and Colonialism in South Asia. 4 Hours. Same as AsSt 479 and Hist 479. Examines the emergence of colonial cultures of domination and resistance on the Indian subcontinent from the 18th century to 1947.

480. Sociolinguistics. 4 Hours. Same as Ling 480. Variations in language that correlate with variation in societies and smaller social groups; interactions of languages and societies. Prerequisites: Ling 405 or consent of the instructor.

481. Geographic Information Systems I. 4 Hours. Same as Geog 481. Components and performance properties of geographic information systems. Geographic hierarchies and data structures. Problems and solutions in handling large geographic files. Geocoding. Prerequisites: Geog 100 and one from Geog 278 or 386 or IDS 100, or consent of the instructor.

482. Geographic Information Systems II. 4 Hours. Same as Geog 482. Application of inferential statistical techniques and probability models in geographic research. Topics include use of descriptive parameters in recognizing geographic relationships, tests of significance, and recognition of areal patterns. Prerequisite: Anth 481 or consent of the instructor.

483. Geographic Information Systems III. 4 Hours. Same as Geog 483. Problems encountered in the analysis and portrayal of geographic data. Topics include taxonomy, regionalization, trend surface analysis, time series, Markov probabilities, and computer cartographic procedures for displaying output from analytic procedures. Prerequisite: Anth 482 or consent of the instructor.

484. Mapping with Microcomputers. 4 Hours. Same as Geog 478. Microcomputer applications including computer principles for mapping, alternative design for coordinate files, kinds of devices for mapping, direct control of devices for mapping, characteristics and limitations of mapping programs. Prerequisite: Geog 475 or consent of the instructor.

490. Independent Study. 1 to 6 Hours. May be repeated for a maximum of 8 hours of credit with the approval of the department. Students may register for more than one section per term. Independent reading under the supervision of a faculty member. Prerequisite: Consent of the instructor.

494. Special Topics in Anthropology. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Reading, study, and discussion of selected problems for graduate students and majors in anthropology. Prerequisite: Approval of the department.

500. Social and Cultural Theory I. 4 Hours. Historical survey of approaches to field and library research in anthropology.

501. Social and Cultural Theory II. 4 Hours. Continuation of Anth 500. Prerequisite: Anth 500.

502. Theory and Method in Archaeology. 4 Hours. Middle-range and general theory in prehistoric archaeology: the reconstruction of prehistoric economic, social, and political systems; cultural materialism and its critiques; cultural ecology and systems theory; social evolution.

503. Hominid, Phylogeny, and Adaptations. 5 Hours. Data, methods, and approaches for reconstruction of genealogical relationships of species; interpretation of adaptations of extinct species in an evolutionary context.

509. Seminar in Anthropological Theory. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Issues in the theory and method of anthropology. Prerequisite: Anth 500 or consent of the instructor.

510. Seminar in Social Organization. 4 Hours. May be repeated for credit. Theoretical and substantive issues. Prerequisites: Anth 400 or 410 or consent of the instructor.

511. Comparative Agricultural Systems. 4 Hours. Comparison of lowland tropical and highland agricultural systems, especially in native Latin America. Agricultural origins; ecology and social organization of agriculture; cognitive organization in belief systems; applications of native knowledge. Prerequisites: One course in archaeology or social anthropology and consent of the instructor.

512. Comparative Political Systems. 4 Hours. Structural, dialectical and processual models for the analysis of political action in non-western and preliterate societies; state formation and the question of political change. Prerequisite: One course in anthropology or consent of the instructor.
514. Gender Issues in Cross-Cultural Perspectives. 4 Hours. Same as WS S14. Selected substantive and theoretical issues in the cross-cultural study of gender roles, conceptions, and relations. Prerequisites: Anth 500 or consent of the instructor.

520. Seminar in Archaeological Theory and Method. 4 Hours. May be repeated for credit. Theoretical and substantive issues in the study of prehistory and the recovery and interpretation of the archaeological record. Prerequisite: Anth 402 or consent of the instructor.

521. Analysis of Stone Artifacts. 4 Hours. Analyzing stone objects.

522. Ancient Mesoamerican Calendar Systems. 4 Hours. Study of the ancient Mesoamerican calendar systems.

530. Seminar in Physical Anthropology. 5 Hours. A critical examination of current literature on methods and theories dealing with the evolution of primate biology and behavior.

531. Anthropological Genetics. 4 Hours. Basic overview of genetic theory and techniques, followed by a survey of the contributions of human genetics to human adaptation and evolution. Prerequisite: Grade of B or better in Anth 508; or Grade of B or better in Bios 220; or consent of the instructor.

532. Advances in Ancient DNA. 4 Hours. Basic techniques and special concerns in the application of molecular biology techniques to the study of ancient DNA, followed by a discussion of recent advances and contributions to the field. Prerequisites: Grade of B or better in Anth 531 or Grade of B or better in Bios 220.

533. Lab Methods for Ancient DNA. 2 Hours. Provides students with laboratory training in molecular biology techniques commonly used in studies of ancient DNA. Prerequisite: Consent of the instructor.

570. Regional Application of Anthropology. 4 Hours. May be repeated for credit. The application of a specific theory or the testing of competing theoretical frameworks to data provided by one of the major geographical or cultural areas of the world. Emphasis on deductive reasoning and the derivation and testing of hypotheses with data from several cultures of a single culture area.

590. Developmental Sources of Anthropological Theory. 4 Hours. Seminar on sources relevant to the development of anthropological theory, principally those deriving from interaction among the subfields of anthropology but also from other disciplines.

594. Special Topics in Anthropology. 4 Hours. May be repeated for a maximum of 9 hours credit. Students may register for more than one section per term. Study of selected topic in anthropology.

595. Graduate Seminar in Anthropology. 1 Hour. S/U grade only. Presentations of current research by faculty followed by student discussion. Course is to be taken during student’s first year in the graduate program as one of the core courses. Prerequisite: Admission to the graduate program in anthropology.

596. Independent Study. 2 to 6 Hours. May be repeated for a maximum of 12 hours of credit with the approval of the department. Students may register for more than one section per term. Independent research is done under the supervision of a faculty member. Prerequisites: Consent of the instructor.

597. Project Research. 2 to 6 Hours. S/U grade only. Students may register for more than one section per term. The student will do an independent research project with the aid of a faculty advisor. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Research on doctoral dissertation topic. Prerequisite: Advancement to candidacy for the PhD in Anthropology.

**Architecture (Arch)**

405. Architecture Design Lecture I. 2 Hours. Process of architecture as a synthesis of diverse forces into formal compositions. The struggle to integrate architectural wholes at smaller scales. Prerequisites: Arch 362 and concurrent registration in Arch 406.

406. Architecture Design Laboratory I. 4 Hours. Laboratory case study component of Arch 405. Prerequisites: Arch 362 and concurrent registration in Arch 405.

407. Architecture Design Lecture II. 2 Hours. Process of architecture as a synthesis of diverse forces into formal compositions. The struggle to integrate architectural wholes at large scales. Prerequisites: Arch 405 and 406 and concurrent registration in Arch 408.

408. Architecture Design Laboratory II. 4 Hours. Laboratory case study component of Arch 407. Prerequisites: Arch 405 and 406 and concurrent registration in Arch 407.

410. Development of Architectural Theory. 4 Hours. The relationship of architectural works to their cultural, technical and critical contexts; historical development of architectural thought. Prerequisite: Graduate standing in the MArch Program.

411. Theory and Critical Analysis in Architecture. 4 Hours. Architectural theory and criticism from historical and contemporary examples; development of architectural theory and relationship between architecture and architectural criticism. Prerequisites: Arch 410 and graduate standing in the MArch Program.

412. Women and the Environment. 4 Hours. Same as GWS 412. Women’s place in the built environment; the role of gender in environmental experience including women as users, designers, planners, policy makers, and critics.

430. Computers in Architecture. 4 Hours. The theory, tools and techniques in applications of the computer as a design tool, production and presentation medium of 2D and 3D architectural design and building science. Prerequisite: Graduate standing in the Master of Architecture program.

442. Theory of Architecture and Building Analysis. 4 Hours. Introduction to discipline of architecture considering symbolic and use patterns, compositional, spatial and typological patterns. Prerequisite: Graduate standing in the MArch Program.

443. Professional Practice I. 2 Hours. Legal and ethical considerations in architectural practice; operation and management guidelines. Overview of the history of the professional architectural practice. Prerequisite: Completion of the second plateau or consent of the school.

444. Professional Practice II. 2 Hours. Business and financial considerations in architectural practice; scope of services communications and marketing guidelines. Interrelationship with clients, consultants, collaborators, and the manufacturing and construction industry. Prerequisites: Arch 443 and consent of the school.

451. Introduction to Architectural Design I. 6 Hours. Visual communication of architectural concepts through two and three dimensional methods; orthographic and paraline drawings, perspective and models. Development of architectural concepts and solution of simple architectural problems. Prerequisite: Graduate standing in the MArch Program.

452. Introduction to Architectural Design II. 6 Hours. Architectural design with emphasis on the structural and technical determinants of buildings. Functional analysis of buildings and communication of designs through two and three dimensional techniques. Prerequisite: Arch 451 and 461.

453. Architectural Design I. 6 Hours. Design of housing in an urban context; analysis and theory of urban fabric and infrastructure; emphasis on architectural form and its relationship to societal factors and user needs. Prerequisites: Arch 452, 462, and 471; or approval of the department; or graduate standing in the MArch III with Advanced Standing (two-year) program.

454. Architectural Design II. 6 Hours. Design of a public building as a comprehensive design; emphasis on site, context, zoning, codes, structural/mechanical systems, and materials in relation to aesthetics. Integration with Arch 464 course material. Prerequisites: Arch 453, 493, 472 and 485; or graduate standing in the MArch III with Advanced Standing (two-year) program.

459. Introduction to Building Science I: Ethics in Building. 4 Hours. Requires concurrent registration in Arch 305 and 306. Examines the architect’s role in protecting the health, safety and welfare of the public through responsible and ethical building practices. Prerequisite: Approval of the school.

460. Introduction to Building Science II: Technics in Building. 4 Hours. Introduction to building construction processes, terminology, principles, conventions, standards, applications, restrictions and communications pertaining to construction materials and assemblies. Prerequisite: Arch 459 or approval of the school.

461. Building Science I: Ethics in Building. 4 Hours. Examines the architect’s role in protecting the health, safety, and welfare of the public through responsible and ethical building practices. Prerequisites: Approval of the school and enrollment in the Master of Architecture program.
462. Building Science II: Technics in Building. 4 Hours. Introduction to building construction processes, terminology, principles, conventions, standards, applications, restrictions, and communications pertaining to construction materials and assemblies. Prerequisite: Arch 461.


464. Building Science IV: Theory in Building. 4 Hours. Exploration into the concept of Total Building Performance. Exploration of conceptual and philosophical issues related to the application of advanced technology in the design, construction and use of buildings. Prerequisite: Arch 463.

470. Structures I: Structural Analysis. 4 Hours. Introduction to the analysis of structural elements. Introduction to fundamental structural planning criteria and relevant concepts of tension, compression and bending. Introduction to historical and contemporary structural precedents. Prerequisites: Math 180; and Phys 105 and 106.

471. Structures II: Material Science. 3 Hours. Introduction to material properties; strength characteristics of building materials and material assemblies; stress and strain; rigidity and deformation; temperature effects; torsion effects; combined loading of elements and systems. Prerequisites: Arch 470. and approval of the school.

472. Structures III: Structural Analysis and Material Science. 4 Hours. Advanced analysis of structural elements including: fundamental structural planning criteria; stability and rigid body equilibrium; material properties/ strength characteristics; historical and contemporary structural precedents. Prerequisite: Graduate standing in the Master of Architecture program. Spring of every year.

473. Structures IV: Analysis and Design of Steel and Timber Structures. 4 Hours. Introduction to the planning, analysis and design of structural steel and timber assemblies. Prerequisites: Arch 470 and 471; or 472; and graduate standing. in the Master of Architecture program.

474. Structures V: Analysis and Design of Reinforced Concrete and Masonry Structures. 4 Hours. Introduction to the planning, analysis and design of reinforced concrete and masonry structures. Prerequisites: Arch 473 and graduate standing in the Master of Architecture program.

475. Design of Structural Systems. 4 Hours. Design of structural systems for buildings ranging from high-rise to long-span. Emphasis is placed on conceptual design of systems for gravity, wind and earthquake loads. Prerequisites: Arch 474 and graduate standing in the MArch Program.

476. Advanced Structural Analysis and Design. 4 Hours. Exploration of advanced methods for analysis of structures and foundations, along with associated methods of design. Use of computers in structural engineering is introduced. Prerequisites: Arch 475 and graduate standing in the MArch Program.

485. Theories of Urbanism. 4 Hours. Introduction to the processes shaping the city and the theories of urbanism, urban infrastructure and urban landscape from the middle of the nineteenth century to the present. Prerequisite: Graduate standing in the MArch Program.

486. Urban Ecologies and Infrastructures. 4 Hours. Introduction to dynamic relationship of ecology and infrastructure in the context of contemporary urban landscape. Built and natural environments as inseparable networks of a dynamic process. Prerequisite: Graduate standing in the Master of Architecture program.

491. Architectural Study Abroad. 0 to 17 Hours. May be repeated for a maximum of 34 hours of credit. Lectures, seminars, studio and independent travel/study abroad. Architectural design, planning, structures, history and technology. Prerequisites: Completion of at least one year of architectural graduate course work, 3.00 cumulative grade point average in architecture, and approval of the school.

494. Special Topics in Architecture. 2 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Current problems. Prerequisites: 12 hours of history of architecture and art and graduate standing in the MArch Program.

499. Architecture Elective II. 2 to 6 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Special problems in theory, design, building science, or graphic skills (manual or automated). Prerequisite: Completion of architecture graduate course work, or consent of the instructor.

510. Advanced Architectural Design I. 8 Hours. Design of multiple or complex building types with emphasis on varying topics related to architectural design. Prerequisites: Arch 454 and Arch 464 and Arch 474; or approval of the school.

511. Advanced Architectural Design II. 8 Hours. Design of a comprehensive, single case study with emphasis on varying topics related to architectural design. Prerequisite: Arch 491 or Arch 510 or Arch 512 or Arch 514 or Arch 516 or Arch 551 or Arch 554 or Arch 596.

512. Advanced Architectural Design I: Activist Practice. 8 Hours. Design of multiple or complex building types with an emphasis on the theoretical, technical, political and economic considerations relating to community activism and identity politics. Prerequisites: Arch 454 and Arch 464 and Arch 474, or approval of the school.

513. Advanced Architectural Design II: Activist Practice. 8 Hours. Design of a comprehensive, single case study with emphasis on theory and site planning, interior space, building systems and materials relating to community activism and identity politics. Prerequisite: Arch 491 or Arch 510 or Arch 512 or Arch 514 or Arch 516 or Arch 518 or Arch 551 or Arch 554 or Arch 596.

514. Advanced Architectural Design I: Architectural Technologies. 8 Hours. Design of multiple public buildings with an emphasis on the relationship of aesthetics and construction methods in the making of comprehensive architecture. Prerequisites: Arch 454 and Arch 464 and Arch 474, or approval of the school.

515. Advanced Architectural Design II: Architectural Technologies. 8 Hours. Design of a single public building with an emphasis on the relationship of aesthetics and construction methods in the making of comprehensive architecture. Prerequisite: Arch 491 or Arch 510 or Arch 512 or Arch 514 or Arch 516 or Arch 518 or Arch 551 or Arch 554 or Arch 596.

516. Advanced Architectural Design I: Digital Media. 8 Hours. Design of multiple or complex building types with an emphasis on the theoretical, technical, societal, and economic considerations relating to digital media. Extensive computer use required. Prerequisites: Arch 430 and Arch 454 and Arch 464 and Arch 474, or approval of the school.

517. Advanced Architectural Design II: Digital Media. 8 Hours. Design of a comprehensive, single case study with emphasis on theory and site planning, interior space, building systems, and materials relating to digital media. Extensive computer use required. Prerequisite: Arch 491 or Arch 510 or Arch 512 or Arch 514 or Arch 516 or Arch 518 or Arch 551 or Arch 554 or Arch 596.

518. Advanced Architectural Design I: Landscape Urbanism. 8 Hours. Design of urban landscapes and public spaces as informed by large scale infrastructures, natural environments, and urban systems. Prerequisites: Arch 454 and Arch 464 and Arch 474, or approval of the school.

519. Advanced Architectural Design II: Landscape Urbanism. 8 Hours. Design of public building and/or space including surrounding urban landscape with emphasis on perceptual, phenomenal, and temporal aspects of design. Prerequisite: Arch 491 or Arch 510 or Arch 512 or Arch 514 or Arch 516 or Arch 518 or Arch 551 or Arch 554 or Arch 596.

520. Advanced Elective in Activist Practice. 4 Hours. Study of contemporary theories and practices in community activism and identity politics.

521. Advanced Elective in Architectural Technologies. 4 Hours. Examination and analysis of influences on architecture relating to concept, program, function, location, cost, systems, regulation, materials, assembling, and environmental influences on the resulting building aesthetic.

522. Advanced Elective in Digital Media. 4 Hours. Study of contemporary theories and practices in digital media and its relation to architecture.

523. Advanced Elective in Landscape Urbanism. 4 Hours. Examination of urban landscape projects from historical, theoretical, ecological, and infrastructural points of view.
524. Advanced Elective: Special Topics. 4 Hours. Advanced study in varying topics related to architecture.

596. Independent Study for Graduate Students. 1 to 8 Hours. May be repeated for a maximum of 16 hours of credit. Individual study. Prerequisite: Arch 491 or Arch 510 or Arch 512 or Arch 514 or Arch 516 or Arch 518 or Arch 551 or Arch 554; and approval of the department.

598. Thesis Research. 0 to 16 Hours. May be repeated for a maximum of 6 hours of credit. S/U grade only. Individual research under faculty direction. Prerequisite: Approval of the school.

Art and Design (AD)

400. Foreign Studies in Art and Design. 1 to 16 Hours. Graduate credit only with approval of the director of the school and the director of foreign studies. S/U grade only. May be repeated for credit with the approval of the appropriate major area faculty committee, the director of the school and/or director of graduate studies. Study abroad within approved programs of foreign exchange and/or education. Prerequisites: Graduate standing within a major program within the School of Art and Design and approval of the appropriate major area faculty committee, director of the school and/or director of graduate studies.

401. Overview of Art Therapy. 4 Hours. Principles and practice of art therapy for teachers, mental health workers, prospective art therapy graduate students, and others interested in the field.

402. Design Professional Practice. 3 Hours. Professional practice and management, proposals, contracts, and legal issues for designers. Prerequisites: Admission to the graphic design or industrial design major programs and approval of the school.

403. Design Colloquium. 2 Hours. May be repeated for a maximum of 4 hours of credit. Lectures, presentations, and/or demonstrations related to design issues impacting on the professions of graphic design and industrial design. Prerequisite: 8 credit hours of 200-level graphic design or industrial design major courses or the equivalent.

406. Advanced Special Topics in Art and Design. 2 to 5 Hours. May be repeated for credit. Intensive workshops in specific art and design related topics and techniques directed and announced by the instructor. Prerequisite: Consent of the instructor.

408. Computer Art-Design. 5 Hours. May be repeated for a maximum of 15 hours of credit. The computer as a tool for the artist-designer. The design of interactive computer experiences and the production of computer animations. Prerequisite: AD 205 or high-level programming language experience.

409. Electronic Media Events. 5 Hours. May be repeated for a maximum of 15 hours of credit. Using video production tools and computer graphic systems to produce a public event. Prerequisite: AD 208 or 408.

410. Advanced Special Topics in Graphic Design. 1 to 5 Hours. May be repeated for a maximum of 10 hours of credit. Intensive workshops in specific graphic design related topics and techniques directed and announced by the instructor. Extensive computer use required. Prerequisites: AD 315 and consent of the instructor. Portfolio review required.

411. Graphic Design Professional Practice. 5 Hours. Design projects with real-world clients in the private or public sector. The designer/client relationship. Prerequisites: AD 315 and AD 317 and consent of the instructor.

412. Graphic Design Thesis. 5 Hours. May be repeated for a maximum of 10 hours of credit. Thesis topics chosen in consultation with graphic design faculty. Prerequisites: Credit or concurrent registration in AD 315; and credit or concurrent registration in AD 317; and credit or concurrent registration in AD 411; and consent of the instructor.

414. Interactivity in Graphic Design. 5 Hours. Advanced examination of graphic design in the new media technologies. Extensive computer use required. Prerequisites: AD 315; and credit or concurrent registration in AD 412.

415. Graphic Design Seminar. 5 Hours. Seminars and lectures conducted by faculty, design professionals, and individuals from design-related disciplines. Prerequisites: AD 315 and AD 317; and consent of the instructor.

418. Independent Study in Graphic Design. 1 to 5 Hours. May be repeated for a maximum of 10 hours of credit. Supervised independent study in graphic design. Extensive computer use required. Prerequisites: Consent of the instructor. Taken by faculty invitation only.

419. Typography III. 5 Hours. Advanced experimental typography. Prerequisites: AD 319 and portfolio approval.

420. Industrial Design VI. 5 Hours. May be repeated for a maximum of 10 hours of credit with industrial design faculty committee approval. Students may register for more than one section per term. Planning of advanced product systems with group projects based on international contexts, human/environmental factors analysis, and advanced technological processes. Advanced audio-visual presentations and technical reports. Prerequisites: Completion of 8 hours of AD 320 and 321 or the equivalent and approval of the school.

421. Industrial Design VII. 5 Hours. May be repeated for a maximum of 10 hours of credit with industrial design faculty committee approval. Students may register for more than one section per term. Group projects with planning of advanced product systems based on international contexts, human/environmental factors analysis, and advanced technological processes. Advanced audio-visual presentations and technical reports. Prerequisites: Completion of 8 hours of AD 320 and 321 or the equivalent and approval of the school.

422. Interaction Design II. 5 Hours. Extensive computer use required. Advanced 2-D and 3-D methods in the design of interactive products and art works. Includes human factors, 3-D modeling and design of 3-D virtual products. Prerequisites: AD 325; or consent of the instructor.

423. Industrial Design Senior Project. 5 Hours. Application of the principles of problem-solving and industrial design communication methodology to the organization and presentation of a faculty-approved senior or graduate project. Prerequisites: AD 422 or the equivalent and approval of the school.

424. Industrial Design Independent Study. 4 to 8 Hours. May be repeated for a maximum of 16 hours of credit. Supervised independent study in any area of industrial design activity not covered in the regular curriculum. Prerequisites: Completion of 8 hours of AD 320 and 321 or the equivalent and approval of the school.

425. Design Visualization. 5 Hours. May be repeated for a maximum of 15 hours of credit. Extensive computer use required. Advanced applications of computer-aided design software, including 3-D surface modeling and solid modeling. Applied computer-aided manufacturing, robotics, and expert systems. Prerequisite: AD 325 and consent of the instructor.

432. Painting III: Advanced. 5 Hours. May be repeated for a maximum of 15 hours of credit. Advanced painting: emphasis on individual creative initiative and development, in concert with understanding of contemporary formal, expressive, and conceptual issues. Prerequisites: 8 hours of AD 231; and AD 241 and AD 251 and AD 391; or consent of the instructor with portfolio review.

442. Encyclopedia of Industrial Design. 5 Hours. May be repeated for a maximum of 15 hours of credit for graduate students. Independent projects with faculty supervision. Experimentation and in-depth study of contemporary concepts, processes, and techniques to develop a personal, creative, visual language; primarily self-directed. Prerequisites: AD 231 and AD 241 and AD 251 and AD 391; or approval of the school.

460. Advanced Photography. 5 Hours. Instructor originated projects in any area of photographic activity.

461. Photography Tutorial. 5 Hours. Student generated projects.

470. Documentary Film/Video Production. 5 Hours. Group or individual projects dealing with the communication of fact through motion picture or video media. Prerequisite: AD 272 or consent of the instructor.

471. Advanced Film/Video/Animation. 5 Hours. May be repeated for a maximum of 15 hours of credit. Investigation of contemporary concerns in various areas of film and/or video activity under the direction of an instructor. Prerequisites: AD 272 or 474 and consent of the instructor.

472. Independent Study in Film/Video/Electronic Visualization. 4 to 12 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one four-hour section per term, or repeat the course in four-hour sections in subsequent terms. Supervised independent study in any areas of cinema, video production, or electronic visualization. Prerequisites: 12 hours in any film, video, and/or electronic visualization courses and consent of the instructor.
574. Advanced Animation. 5 Hours. May be repeated for a maximum of 20 hours. Students may register for more than one section per term. Applications of advanced methods in film animation. Creative projects utilizing sound synchronization, computer motion synthesis, and related techniques. Prerequisite: AD 274.

578. Video II. 5 Hours. May be repeated for a maximum of 12 hours of credit. Creative projects using small format video systems. Prerequisite: AD 278.

484. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the school. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the school.

485. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the school. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in AD 484, and approval of the school.

488. Computer Graphics I. 4 Hours. Same as CS 488. Principles of interactive computer graphics. Raster and vector display, techniques, and hardware considerations. Introduction to two-dimensional and three dimensional rendering. Laboratory. Prerequisite: Credit or concurrent registration in CS 370.

492. Studio Seminar III. 4 Hours. Rigorous examination of historical developments in art as the basis for understanding new approaches to the continuum of contemporary art. Prerequisites: AD 231 and AD 241 and AD 251 and AD 391; and credit or concurrent registration in AD 432 or credit or concurrent registration in AD 442; or approval of the department.

494. Special Topics in Art Therapy. 2 to 5 Hours. May be repeated for a maximum of 10 hours of credit. Students may register for more than one section per term. Specializations, new developments in the field, in-depth study of theory, process, application, or independent study. Prerequisite: Consent of the instructor.

499. Cooperative Education. 0 to 4 Hours. May be repeated for credit. S/U grade only. Only 8 hours of credit may be counted toward satisfying requirements for any art and design major. Introduction to professional practice offering students the opportunity to couple academic learning with professional experience in an off-campus placement. Prerequisites: A minimum cumulative grade point average of 3.00 and approval of the school.

500. Art and Design Teaching Internship. 0 to 2 Hours. This course may be repeated. Practical and theoretical aspects of teaching lecture/lab studio, and/or seminar courses in art and design. No graduation credit. Prerequisites: Consent of the instructor, and consent of Director of Graduate Studies.

502. Seminar in Contemporary Theory. 4 Hours. Must be repeated for a minimum of 16 hours of credit. Developments and current issues in contemporary design, studio and media arts: major philosophies, debates, and social/environmental aspects (may include visiting lecturers, critics, and discussants). Prerequisites: Approval of the school, graduate faculty committee and the student's advisor.

507. Special Projects in Art and Design. 0 to 16 Hours. Prerequisites: Consent of the sponsoring instructor and the graduate faculty committee in the student's area of specialization.

508. Advanced Electronic Visualization and Critique. 4 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in electronic visualization through a consultive agreement with graduate faculty committee. Prerequisite: Approval of the school graduate faculty committee.

509. Advanced Electronic Visualization. 5 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in electronic visualization through a consultive agreement with graduate advisor. Prerequisites: Approval of the school graduate faculty committee and the student's advisor.

510. Advanced Graphic Design and Critique. 4 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in graphic design by each student through consultive agreement with graduate faculty committee. Prerequisites: Approval of the school graduate faculty committee.

511. Advanced Graphic Design. 5 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in graphic design by each student through consultive agreement with graduate advisor. Prerequisites: Approval of the school graduate faculty committee and the student's advisor.

520. Advanced Industrial Design and Critique. 4 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in industrial design by each student through consultive agreement with graduate faculty committee. Prerequisites: Approval of the school graduate faculty committee.

521. Advanced Industrial Design. 5 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in industrial design by each student through consultive agreement with graduate advisor. Prerequisites: Approval of the school graduate faculty committee and the student's advisor.

530. Advanced Studio Arts and Critique. 4 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in studio arts by each student through consultive agreement with graduate faculty committee. Prerequisite: Approval of the school graduate faculty committee.

531. Advanced Studio Arts. 5 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in studio arts by each student through consultive agreement with graduate advisor. Prerequisites: Approval of the school graduate faculty committee and the student's advisor.

550. Introduction to Art Therapy. 4 Hours. History, theory, and professional issues in art therapy. Prerequisite: Admission to the MA in art therapy program.

551. Art Therapy Methods. 4 Hours. Utilization of art materials for specific client needs; evaluating art work in relation to developmental level and psychodynamic functioning; assessment and treatment planning. Prerequisite: Admission to the MA in art therapy program.

552. Group Art Therapy. 4 Hours. Principles and skills of group art therapy including application to various populations. Prerequisite: Admission to the MA in art therapy program.

553. Career Counseling with Art Therapy. 1 Hour. Overview of history, theory, and techniques of career development with adolescent and adult clients in art therapy. Prerequisite: Admission to the MA in art therapy program.

554. Art Therapy Studio. 4 Hours. Analysis of the art therapy experience through art-making, including use of materials, creativity, self-image, and therapeutic processes. Prerequisite: Admission to the MA in art therapy program.

555. Art Therapy Practicum. 4 Hours. Must be repeated for 12 hours of credit. In-depth experience in clinical, educational, or rehabilitative setting in which student conducts art therapy under weekly supervision. Prerequisite: Consent of the art therapy program director.

556. Supervision Seminar I: Assessment. 3 Hours. Art therapy assessment in combination with small group clinical supervision. Prerequisites: AD 550, AD 551, and concurrent registration in AD 555.

557. Supervision Seminar II: Ethics and Professional Practice. 3 Hours. Professional ethics and practice in combination with clinical supervision seminar. Prerequisites: AD 550, AD 551, and concurrent registration in AD 555.

558. Supervision Seminar III: Termination. 3 Hours. Final seminar of clinical supervision with a focus on treatment termination and review of training. Prerequisites: AD 550, AD 551, 8 hours of AD 555, and concurrent registration in AD 555.

560. Advanced Photography and Critique. 4 Hours. May be repeated for credit. A forum for presenting and discussing individual work with all photography graduates and faculty participating. Prerequisite: Approval of the school graduate faculty committee.

561. Advanced Photography. 5 Hours. May be repeated for credit. Individualized graduate study; creative projects and research in photography by each student through consultive agreement with graduate advisor. Prerequisites: Approval of the school graduate faculty committee and the student's advisor(s).

569. Photography/Film/Electronic Media Colloquium. 2 Hours. May be repeated for a maximum of 8 hours of credit. Films,
lectures, and discussion relating to photography, film, and electronic media.

570. Advanced Film/Animation/Video and Critique. 4 Hours. May be repeated for credit. Individualized graduate study; projects for creative research in film, video, and animation by each student through conference and consultive agreement with graduate faculty committee. May involve supportive consultation in other areas. Prerequisite: Approval of the school graduate faculty committee.

571. Advanced Film/Animation/Video. 5 Hours. May be repeated for credit. Individualized graduate study; projects for creative research in film, video, and animation by each student through consultive agreement with graduate advisor. May involve supportive consultation in other areas. Prerequisites: Approval of the school graduate faculty committee and the student’s advisor.

581. Child and Family Art Therapy. 2 Hours. Art development in normal childhood and under pathological conditions; family system dynamics; art therapy interventions with children and families in various treatment contexts. Prerequisites: AD 550 and AD 551.

582. Art Therapy for Substance Abuse. 1 Hour. Art therapy interventions in the treatment of substance abuse. Prerequisite: AD 550 and AD 551.

583. Multicultural Diversity in Art Therapy. 1 Hour. Issues of ethnicity, class, physical disability, women, sexual preference; art therapy with elderly, homeless, chronically mentally ill: considerations for art therapy treatment. Prerequisites: AD 550 and AD 551.


594. Special Topics in Art and Design. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specialized research topics in art and design directed and announced by the instructor. Prerequisites: Consent of the instructor and the student’s advisor.

597. Master’s Project. 0 to 16 Hours. May be repeated for a maximum of 16 hours of credit. S/U grade only. Independent research under faculty supervision in a specific area of interest. Prerequisites: 20 hours of 500-level courses and consent of the instructor.

598. Master’s Thesis Research: Art Therapy. 0 to 16 Hours. Must be repeated for a total of 8 hours of credit. S/U grade only. Independent research under faculty supervision in an area of the student’s interest. Prerequisite: Approval of the art therapy program director.

Art History (AH)

404. Topics in Architecture, Art and Design. 4 Hours. May be repeated for a maximum of 12 hours of credit when topics vary. Students may register for more than one section per term when topics vary. Selected topics in the history of European and North American architecture, art, and design. Prerequisite: 3 hours of art history at the 200 level or consent of the instructor.

420. History of Architecture I. 4 Hours. Introduction to architecture, urbanism, and architectural theory worldwide from antiquity to 1450.

421. History of Architecture II. 4 Hours. Introduction to architecture, urbanism, and architectural theory worldwide from 1450 to the present. Prerequisite: AH 420.

422. Topics in the Literature of Architecture. 4 Hours. May be repeated for credit when topics vary. Discussion of selected readings in the theory and criticism of architecture. Prerequisite: 3 hours in the history of architecture or consent of the instructor.

423. Topics in Modern and Contemporary Architecture. 4 Hours. May be repeated for credit when topics vary. Selected topics in modern and contemporary architecture. Prerequisite: 4 hours in the history of architecture or consent of the instructor.

424. Topics in Architecture and Urban Form in Chicago. 2 to 4 Hours. Topics on the development of the built environment of the Chicago and metropolitan area, and the effect on its architecture of social, political, and economic forces.

430. Contemporary Photography. 4 Hours. May be repeated for credit when topics vary. Developments in the history of photography since 1950. Prerequisite: 3 hours in the history of photography or consent of the instructor.

432. Topics in Film and Video. 4 Hours. May be repeated for credit when topics vary. Selected studies in genres, schools, individual artists, critics, and theorists of film and video. Prerequisite: 3 hours in the history of film or consent of the instructor.

434. Women and Film. 4 Hours. Same as Engl 472 and WS 472. Roles and representations of women in classical Hollywood, European art, and independent feminist cinemas. Prerequisite: 6 hours of English from Engl 241, 242, 243, 300; or consent of the instructor.

435. Topics in Modern and Contemporary Design. 4 Hours. May be repeated for credit when topics vary. Topics in modern and contemporary design. Prerequisite: 3 hours in the history of design or consent of the instructor.

441. Topics in Medieval Art and Architecture. 4 Hours. May be repeated for credit when topics vary. Selected topics in European art and architecture of the Middle Ages. Prerequisite: 3 hours of medieval art and architecture or consent of the instructor.

450. Topics in Renaissance Art. 4 Hours. Selected topics in Early Renaissance, High Renaissance, or Manierist Art and Architecture. Prerequisite: 3 hours in art history at the 200-level or above, or consent of the instructor.

460. Topics in Modern and Contemporary Art. 4 Hours. May be repeated for credit when topics vary. Selected topics in 19th and 20th century modern and contemporary art. Prerequisite: 3 hours of modern art and architecture or consent of the instructor.

463. Topics in North American Art and Architecture. 4 Hours. May be repeated for credit when topics vary. Selected topics in North American art and architecture from colonial times to 1945. Prerequisite: 3 hours of North American art and architecture or consent of the instructor.

464. Topics on Art in Chicago. 2 to 4 Hours. Topics on the survey of art in Chicago, from the 19th century to the present, with an emphasis on contemporary Chicago art expressions.

465. Arts of the Black Atlantic. 4 Hours. Interdisciplinary and discursive explorations of the visual and artistic expressions of artists of African descent in the New World.

470. Topics on Non-Western Art and Architecture. 4 Hours. May be repeated for credit when topics vary. Selected topics in the art and architecture of Africa, Asia, Oceania, and the indigenous peoples of the Americas.

471. Topics in Asian Art and Architecture. 4 Hours. Same as AsSt 471. May be repeated for credit when topics vary. Selected topics in the art and architecture of Asia. Prerequisite: 3 hours of Asian art and/or architecture or consent of the instructor.

480. History of Collecting and Museology. 4 Hours. The history of collecting and patronage: public and private collections, museums, and commercial art galleries; government funding, and the arts. Prerequisites: AH 110 and 111 or consent of the instructor.

481. Museum Practices. 4 Hours. Exhibition planning, research, selection, and catalog preparation. Administration of visual arts organizations, their budgets, staffing, and structures. Prerequisite: AH 480 or consent of the instructor.

482. Museology Internship. 8 Hours. Practical supervised experience in institutions serving the visual arts. Placements in museums, community art centers, college, commercial, or nontraditional galleries, and public agencies. Prerequisite: AH 481 or consent of the instructor.

485. Introduction to Historic Preservation. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Preservation planning, historic building restoration, and the political and economic factors affecting the conservation of historic resources. Prerequisite: 3 hours of art history at the 200 level or consent of the instructor.

491. Study Abroad in Art History. 0 to 12 Hours. May be repeated for credit with the approval of the department. Study abroad within an approved foreign exchange program or department-sponsored program. Prerequisite: Approval of the department.

492. Readings in Art and Architecture History. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Individually planned readings on selected topics under the supervision of a faculty.
510. Historiography of the Visual Arts, 1750 to 1960. 4 Hours. Analysis of the emergence of a historiography of the visual arts in the modern era, with an analysis of stylistic history, artistic biography, and iconography. Prerequisite: Graduate standing in the art history program or consent of the instructor.

511. Toward New Histories of the Visual Arts, 1960 to the Present. 4 Hours. Analysis of the recent consciousness of the ideological configuration and organization of knowledge extending the discipline to issues of gender, class, ethnicity, and popular culture. Prerequisite: Graduate standing in the art history program or consent of the instructor.

512. Art History Teaching Seminar. 0 Hours. May be repeated once. S/U grade only. Theoretical and practical aspects of teaching in undergraduate course in the history of the visual arts. Prerequisites: Graduate standing in the art history program and appointment as a teaching assistant in the department.

522. Issues in Architecture, Design, and Urbanism. 4 Hours. Theories and contemporary critical issues relating to the history of the environment created and modified by people. Readings and presentations on historic and regional variations.

530. Seminar in the History of Photography. 4 Hours. May be repeated for credit when topics vary. Selected topics in the history of photography with emphasis on primary source materials for research purposes.

541. Seminar in Medieval Art and Architecture. 4 Hours. The art and architecture of Europe during the Middle Ages.

550. Seminar in Renaissance and Baroque Art and Architecture. 4 Hours. May be repeated for credit when topics vary. European art and architecture of the Renaissance.

560. Seminar in Modern Architecture, Art, and Design. 4 Hours. May be repeated for credit when topics vary. Students may register for more than one section per term. North American and European art, architecture, and design between 1780 and 1945.

561. Seminar in Contemporary Architecture and Art. 4 Hours. Selected topics in recent North American or European art, architecture and design. Prerequisite: Consent of the instructor.

562. Issues in the Art of the Americas. 4 Hours. Historical, theoretical, and critical issues in the art of the Americas and the Caribbean; indigenous, imported, and diasporan cultures and the interaction between them.

563. Seminar in North American Architecture and Art. 4 Hours. May be repeated when topics vary. North American art and architecture from the Colonial period to 1945. Prerequisite: Consent of the instructor.

570. Seminar in Non-Western Art and Architecture. 4 Hours. Selected topics in Pre-Columbian, North American Indian, African, and Oceanic Art.

596. Readings in Art and Architecture. 1 to 4 Hours. Individually planned readings on selected topics under the supervision of a faculty member. Prerequisite: Consent of the instructor.

598. Thesis Research. 0 to 16 Hours. May be repeated for a maximum of 8 hours of credit. S/U grade only. Individual research under faculty direction. Prerequisite: Consent of the instructor.

599. PhD Dissertation Research. 0 to 16 Hours. May be repeated for a maximum of 24 hours of credit. S/U grade only. Supervised research on the part of the student. Prerequisites: Consent of the instructor and satisfactory completion of the preliminary examination.

510. Research Methods in Allied Health. 3 Hours. Application of basic concepts of research methodology to allied health, including problem formulation, research design, sampling, measurement, and data analysis. Emphasis on critique of research studies and preliminary proposal writing. Prerequisite: Consent of the instructor.

520. Systems Theory in Allied Health. 4 Hours. Focuses on allied health practice in emerging and existing health care systems and emerging medical and social needs of patient care groups. Prerequisite: Consent of the instructor.

594. Special Topics in Associated Health Sciences. 1 to 4 Hours. Selected topics of interest within disciplinary specialty areas of the allied health professions. Particular attention is given to topics of cross cutting importance to these professions.

595. Seminar in Associated Health Sciences. 1 Hour. S/U grade only. Topics of current interest in a discipline of associated health sciences. Includes discussions of current journal articles and important new developments in the specific disciplines. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. Students may register for more than one section per term. For graduate students who wish to pursue independent study not related to their project/thesis research.

597. Project Research in Associated Health Sciences. 1 to 4 Hours. S/U grade only. Independent investigation of a topic to contribute to the associated health professions. Students investigate a topic/problem in this area, write an article/report, and/or make an oral presentation. Prerequisite: Consent of the instructor.

510. Introduction to Biological Chemistry. 4 Hours. Lecture course designed primarily for students in the College of Dentistry. Includes chemistry of cellular constituents; enzymeology; metabolism of sugars, proteins, lipids, and nucleic acids; and regulation of metabolism. Prerequisite: Organic chemistry.

460. Biochemistry. 5 Hours. Intended primarily for first-year graduate students. Discussions of chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids. Also includes elements of enzymology. Prerequisite: Organic chemistry.

501. Biochemistry. 3 Hours. Same as Mlm 501. Immunoglobulin genetics and structure; regulation of immunoglobulin gene expression and generation of antibody diversity; molecular and genetic aspects of lymphocyte receptors and activation. Prerequisites: Mlm 451 and Bche 460 and/or consent of the instructor.

513. Structure of Biopolymers. 3 Hours. Same as Mlm 513 and PmPg 513. Explores the relationship between structural stability, kinetic properties and function of biopolymers, with particular emphasis on proteins and nucleic acids. Prerequisites: Bche 460 and a year of physical chemistry; or consent of the instructor.

516. Physiology and Biochemistry of Muscle Contraction. 2 Hours. Same as Phys 516. Structure and function of myosin, actin, tropomyosin, troponin, and the sarcomplasmic reticulum; control, energetics, and mechanism of muscle contraction; gene expression.

520. Biochemical Research Techniques I. 3 Hours. Lectures, demonstrations, and discussions concerned with principles and practical aspects of modern quantitative biochemical methodology. Prerequisites: Organic chemistry and credit or concurrent registration in Bche 460 and consent of the instructor.

521. Biochemical Research Techniques II. 2 to 5 Hours. Students carry out assigned projects in each of two different
407. Pattern Recognition I. 4 Hours. Same as ECE 407. The design of automated systems for detection, recognition, classification, and diagnosis. Parametric and nonparametric decision-making techniques. Applications in computerized medical and industrial image and waveform analysis. Prerequisite: Math 220.

Bioengineering (Bioe)

415. Biomechanics. 4 Hours. Use of rigid and deformable body statics and rigid body dynamics to analyze various aspects of the human musculoskeletal system. Prerequisites: CEMM 204 and ME 210 and either BioS 442 or 443.

420. Introduction to Field and Waves in Biological Tissues. 4 Hours. Principles of electromagnetic and ultrasonic interaction with biological systems; characterization of biological materials; diagnostic and therapeutic uses; and techniques of dosimetry and measurement. Prerequisite: ECE 310. or the equivalent.

430. Bioinstrumentation and Measurements I. 4 Hours. Theory and application of instrumentation used for physiological and medical measurements. Characteristics of physiological variables, signal conditioning devices and transducers. Prerequisites: ECE 210; and either BioS 442 or 443.

431. Bioinstrumentation and Measurement Laboratory. 1 Hour. Practical experience in the use of biomedical instrumentation for physiological measurements. Prerequisite: Credit or concurrent registration in Bioe 430.

432. Artificial Organs. 4 Hours. The underlying engineering concepts involved in the development, testing and application of artificial organs. Prerequisites: ECE 210; and ChiE 311 or ME 211; and Bios 442 or Bios 443.

433. Artificial Organs Laboratory. 1 Hour. Laboratory experiments with implantable and extra-corporeal artificial organs. Prerequisite: Credit or concurrent registration in Bioe 450.


452. Biocontrol. 4 Hours. Considers the unique characteristics of physiological systems using the framework of linear systems and control theory. Static and dynamic operating characteristics, stability, and the relationship of pathology to control function. Prerequisites: ECE 310 and either BioS 442 or 443.

455. Introduction to Cell and Tissue Engineering. 4 Hours. Foundation of cell and tissue engineering covering cell technology, construct technology, and cell-substrate interactions. Emphasis in emerging trends and technologies in tissue engineering. Prerequisites: Bios 100 and CEMM 260; or the equivalent.

456. Cell and Tissue Engineering Laboratory. 2 Hours. Includes polymer scaffold fabrication, microstamping biomolecules, cellular adhesion and proliferation assays, and immuno/fluorescent tagging. Prerequisite: Bioe 455; or consent of the instructor.

460. Materials in Bioengineering. 4 Hours. Analysis and design considerations of problems associated with prostheses and other implanted biomedical devices. Prerequisites: CEMM 260 and either BioS 442 or 443.

470. Bio-Optics. 4 Hours. Physical principles and instrumentation relevant to the use of light in biomedical research. Several current and developing clinical applications are explored. Prerequisite: Phys 142.

472. Models of the Nervous System. 4 Hours. Mathematical models of neuronal excitation and nerve conduction, stochastic models and simulation of neuronal activity, models of neuron pools and information processing, models of specific neural networks. Prerequisites: ECE 310 and either BioS 442 or 443.

474. Neural Engineering I. 4 Hours. Same as BioS 474; Characterization, modeling, and design of neural systems, from channels to networks, within the context of potential and existing applications including neuromechanics and hybrid devices. Prerequisites: BioE 340 and BioS 442 or consent of the instructor.

480. Introduction to Bioinformatics. 4 Hours. Computational analysis of genomic sequences and other high throughput data. Sequence alignment, dynamic programming, database search, protein motifs, cDNA expression array, and structural bioinformatics. Prerequisites: BioS 100 and CS 201 or consent of the instructor.

494. Special Topics in Bioengineering. 1 to 4 Hours. May be repeated for credit. Students may register for more than one
section per term. Special topics to be arranged. Prerequisite: Consent of the instructor.

500. Interfacial Biosystems Engineering. 4 Hours. Advanced and detailed exposition of the fundamentals of biological systems using quantitative approaches. Areas of concentration include bioinformatics, cell and tissue engineering, and neuroscience. Prerequisite: BioS 442.

507. Pattern Recognition II. 4 Hours. Applications in nuclear medicine, radiology, remote sensing, speech recognition and cardiology, time-varying image sequences, image operator statistics, feature selection techniques, computer-aided diagnosis and clustering techniques. Prerequisite: Bioe 407.

509. Pattern Recognition III. 4 Hours. Recognizing objects in images; representation, segmentation, matching, fitting, edge and curve detection and linking, textures, shapes, projections, symmetry, moments, relaxation techniques, complexity, sharpening, and smoothing. Prerequisite: Bioe 407.

514. Biotransport. 4 Hours. Same as ChE 514. Diffusion and flow in living systems. Blood rheology and flow. Microcirculation, oxygen transport, diffusive transport across membranes. Membrane structure; water, and ion flows, active transport. Prerequisite: ChE 410 or consent of the instructor.


520. Wave Propagation and Scattering in Biological Tissue. 4 Hours. Inverse and direct solution techniques will be utilized in applications of acoustic, electromagnetic, and radiation transport methodologies to the characterization of biological media. Prerequisite: Bioe 420.

521. Imaging Systems for Biological Tissues. 4 Hours. Examination of major imaging systems using ionizing and nonionizing energy for characterization of biological tissues and physiological lesions. Prerequisite: Bioe 420.


544. Advanced Theory and Technology of Devices. 4 Hours. Same as ECE 544. Theory, design, and technology of a selected semiconductor device at current research and industrial state-of-the-art level. Prerequisite: ECE 540.

550. Principles of Cell and Tissue Engineering. 4 Hours. Introduction to tissue engineering. Presents principles of biomedical, biochemical, and biomaterials science applied to tissue engineered organ replacements, implantable medical devices, and drug delivery systems. Prerequisites: BioS 442 or 443; and CEMM 260. A course in cell biology is recommended.

552. Advanced Biocontrol. 4 Hours. Modeling and analysis of physiological systems including such topics as adaptive control, statistical analysis, error signal analysis, and the characterization of individual neural control elements. Prerequisite: Bioe 452.

555. MEMS for Biomedical Engineering. 4 Hours. Interaction of biologica with microfabricated surfaces and devices. Protein immobilization and patterning using microolithography. Biointegration and packaging. Biomedical examples of MEMS. Prerequisite: ECE 400.

560. Processing and Properties of Structural Biomaterials. 4 Hours. Considers the interrelationships between atomic bonding, atomic/molecular structure and material processing to provide a fundamental understanding of the properties and performance of advanced biomaterials. Prerequisite: CEMM 260. Credit in Bioe 460 is recommended.

575. Neuromuscular Stimulation. 4 Hours. Neuromuscular stimulation, excitation, brain and activation, measurement and processing of neural signals, stimulation of neural tissue, source modeling and neural imaging. Prerequisite: Consent of the instructor.

579. Neuromuscular Stimulation. 4 Hours. Neuromuscular electrical stimulation for ambulation by paraplegics, of upper limb in tetraplegics, of vocal cord and breathing functions, stimulation of cochlea, retina, and visual cortex. Prerequisite: Consent of the instructor.

590. Internship in Bioengineering. 1 to 4 Hours. S/U grade only. Current clinical practice experience in a health care setting culminating in a written and oral report. Prerequisites: Bioe 430, 431 and 479.

594. Advanced Special Topics in Bioengineering. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Systematic review of selected topics in bioengineering theory and practice. Subjects vary from year to year. Prerequisite: Consent of the instructor.

595. Seminar on Bioengineering. 0 to 1 Hour. S/U grade only. May be repeated for credit. Students who are presenting seminars should register for 1 hour, others for 0 hour. Recent innovations in bioengineering theory and practice presented by invited speakers, faculty, and graduate students.

596. Independent Study. 1 to 5 Hours. May be repeated for credit. Students may register for more than one section per term. Research on special problems not included in thesis research. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. Students may register for more than one section per term. S/U grade only. Research in MS thesis project.

599. PhD Thesis Research. 0 to 16 Hours. Students may register for more than one section per term. S/U grade only. Research in PhD thesis project.

Biological Sciences (BioS)

401. Biological Methods for Teachers. 4 Hours. Introduction to teaching biology in the secondary schools; methods of instruction; techniques for detecting learning difficulties. Conducted primarily as a practicum. Prerequisites: 32 hours of biological sciences.

402. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

403. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in BioS 402 and approval of the department.

416. Natural Products. 4 Hours. Same as Chem 456. Biogenetic approach to secondary metabolites. General principles and selected studies of phenolic compounds, terpenes, alkaloids, and other interesting natural products. Prerequisite: One year of organic chemistry.

422. Cell and Molecular Biology. 3 Hours. The assembly, regulation, and properties of cell components and how they interact during secretion, signal transduction, mitosis, and motility. Emphasis on understanding and interpreting experimental methods. Prerequisite: BioS 220 or the equivalent, or consent of the instructor.

424. Mammalian Histology. 4 Hours. The microscopic anatomy of tissues and organs in relation to their function. Prerequisite: BioS 225 or 272.

426. Ultrastructural Cell Biology. 3 Hours. Structure and function of the differentiated, eukaryotic cell; emphasis on electron microscopic studies of cells in vertebrate tissues. Prerequisites: Two years of biological sciences and one year of chemistry required. Chem 232 is highly recommended.

428. Electron Microscopy. 3 Hours. Lectures, demonstrations, and discussions of the principles of instrumentation, and specimen preparation of biological material for transmission and scanning electron microscopy. Prerequisites: BioS 222 and 426.

429. Laboratory in Electron Microscopy. 3 Hours. Animals used in instruction. S/U grade only. Laboratory instruction in cell preparation and instrument operation in transmission and scanning electron microscopy. Prerequisite: Consent of the instructor.

430. Evolution. 4 Hours. Mechanisms of genetic and phenotypic stability and change in populations and species; modes of speciation and...
431. Plant and Animal Interactions. 3 Hours. Ecology of nonsymbiotic relationships of plants and animals, including protection mutualisms, pollination, seed dispersal, animal herbivory and plant defense. Prerequisites: BioS 100 and 101, or the equivalent; and any 200- or 300-level BioS course.

432. Restoration Ecology. 3 Hours. Philosophical, historical, and ecological basis for ecological restoration, with emphasis on readings in the primary literature and writing. Prerequisite: BioS 330 or the equivalent.


435. Population Biology Laboratory. 2 Hours. Analysis and interpretation of population and gene dynamics in laboratory populations, field populations and computer simulations. Participation in one or more weekend field trips required. Prerequisite: BioS 330; or credit or concurrent registration in BioS 434.

436. Biological Conservation. 3 Hours. Applied ecology of the sustained use of natural resources; emphasis on biological diversity, pollution, population increase, multiple-use concept, and land ethics. Lecture, discussion, and term paper. Prerequisite: Credit or concurrent registration in BioS 330 and 331, or consent of the instructor.

438. Conservation of Tropical Biodiversity. 3 Hours. Diverse set of conceptual and practical topics, with emphasis on island biogeographical models, extinction patterns, reserve management, environmental economics, and socio-political aspects of conservation. Prerequisite: BioS 330 or the equivalent.

439. Field Problems in Biology. 1 to 3 Hours. May be taken either between semesters (registration during preceding semester) or for a full semester. Credit is given on completion of a satisfactory written report. Field research in natural habitats. Prerequisites: Field experience in a previous biological sciences course and consent of the instructor.

440. Plant Physiology. 2 Hours. Structure and function of the plant cell; emphasis on membrane function, water relations, solute absorption and translocation, and photosynthesis. Prerequisites: BioS 100 and 101, or the equivalent; and BioS 222 or 244.

441. Plant Physiology Laboratory. 2 Hours. Laboratory experiments and techniques in plant physiology. Prerequisite: Credit or concurrent registration in BioS 440.

442. Nerve and Muscle Physiology. 4 Hours. Function of excitable cells in neural, muscular, and cardiovascular tissues will be studied at both cellular and system levels. Prerequisite: Two years of biological sciences.

443. Animal Physiological Systems. 4 Hours. Animals used in instruction. Basic function of renal, respiratory, and digestive systems. Integrative role of endocrine systems. Prerequisites: Two years of biological sciences.

444. Plant Growth and Development. 2 Hours. Physiology of plant growth and development: phytomorphology, differential growth, photomorphogenesis, photoperiodism and flowering, growth suspension and resumption. Prerequisites: BioS 100 and 101, or the equivalent; and BioS 244 or 263 or 420.

445. Plant Growth and Development Laboratory. 2 Hours. Laboratory experiments and techniques in plant growth and development. Prerequisite: Credit or concurrent registration in BioS 444.

448. Environmental Toxicology. 3 Hours. Sources of environmental pollution and their ecological and health effects. Prerequisites: BioS 100 and 101, or 110, and one physiology course, and credit or concurrent registration in Chem 232.

450. Advanced Microbiology. 3 Hours. Comprehensive analysis of metabolic, ecological, phylogenetic, and cytological diversity among the major groups of eubacteria and archaeobacteria. Prerequisites: BioS 330; credit in BioS 456 is strongly recommended.

452. Biochemistry I. 4 Hours. Same as Chem 452. Chemistry of proteins, nucleic acids, carbohydrates, and lipids. Prerequisite: Credit or concurrent registration in Chem 234.


456. Microbial Physiology. 4 Hours. Prokaryotic cell structure and function; various pathways of energy generation; microbial photosynthesis; microbial genetics; molecular biology of biosynthesis of amino acids, nucleotides, and informational macromolecules. Prerequisite: BioS 350.


458. Microbial Biotechnology. 3 Hours. Production and industrial uses of bacteria, yeasts, molds, and viruses; review of new and established technologies for development of microbial products. Prerequisites: BioS 350; credit in BioS 456 is strongly recommended.

466. Principles of Paleontology. 4 Hours. Same as EeEs 466. Theory and methods of evolutionary paleobiology; includes paleocology, functional morphology, and major features of organic evolution. Prerequisite: BioS 360 or consent of the instructor.

468. Vertebrate Paleontology. 5 Hours. Same as Geol 468. Evolution, morphology and paleoecology of the fossil vertebrates. Prerequisites: One year of biological sciences or earth and environmental sciences, and consent of the instructor.

474. Neural Engineering I. 4 Hours. Same as BioE 474. Characterization, modeling, and design of neural systems, from channels to networks, within the context of potential and existing applications including neuropsychosensory and hybrid devices. Prerequisites: BioE 340 and BioS 442 or consent of the instructor.

483. Mammalian Neuroanatomy. 5 Hours. Animals used in instruction. Structure and function of the mammalian central nervous system. Prerequisite: BioS 225 or 272.

486. Animal Behavior and Neuroethology. 4 Hours. Animals used in instruction. Neural and behavioral mechanisms of environmental information processing and interaction throughout the animal kingdom; emphasis on invertebrate and lower vertebrates. Laboratory emphasizing individual research projects with a final report, and occasional field trips required. Prerequisite: One advanced course in zoology and animal physiology.

487. Developmental Neurobiology. 3 Hours. Mechanisms contributing to the development of structural and functional components of the nervous system; emphasis on cellular interactions. Prerequisite: BioS 225 or 420.

488. Developmental Neurogenetics. 3 Hours. Classical and molecular genetic approaches to the study of the development of the nervous system, concentrating on studies in fruit flies, nematodes and vertebrates. Prerequisites: BioS 220 and either BioS 225 or 420.

489. Cellular Neurobiology Laboratory. 3 Hours. Recording from and analyzing the activity of nerve cells, neuronal networks, and other electrically excitable tissues. Prerequisite: BioS 286 or the equivalent.

490. Topics in Ecology and Evolution. 3 to 4 Hours. May be repeated for credit. Credit varies according to topic offered. Students may register for more than one section per term. In-depth analysis of advanced topics in ecology and evolution, involving reading primary literature, term paper, student presentations, and critical discussion.

491. Laboratory in Ecology and Evolution. 0 Hours. May be repeated. Students may register for more than one section per term. Laboratory component of BioS 490. Prerequisite: Concurrent registration in BioS 490.

501. Foundations of Biological Thought. 4 Hours. Analysis of some fundamental concepts in the mainstream of biological thought. Special emphasis on designing instruction that enhances concept acquisition and problem solving.

502. Patterns of Biological Inquiry. 4 Hours. Analysis of the influence of concepts, principles, and theories in guiding the design, execution, and interpretation of research. Special emphasis on producing inquiry-based instruction.

520. Topics in Genetics. 2 Hours. May be repeated for credit. Students may register for more than one section per term. Discussion of selected topics of current interest in genetics. Prerequisites: BioS 220 and 221 and consent of the instructor.

524. Molecular Biology I. 5 Hours. Structural properties and analysis of DNA, RNA, and proteins; principles of cloning and
recombinant DNA technologies; DNA replication, repair, recombination, and transposition. Prerequisite: Consent of the instructor.

525. Molecular Biology II. 5 Hours. Gene organization and function in lambda, phrakaryotes and eukaryotes; promoters, enhancers, RNA splicing, developmental regulation; protein secretion and targeting. Prerequisite: BioS 524 or consent of the instructor.

526. Molecular and Genetic Analysis of Development. 3 Hours. Same as Gene 526. Examines developmental mechanisms used in animal and plant model systems. Lecture. Prerequisite: Graduate standing or consent of the instructor.

527. Cellular and Systems Neurobiology. 3 Hours. Same as Anat 527. Molecular and cellular properties of ion channels in neurons and sensory cells and their relationship to brain and sensory systems. Prerequisite: Credit in one neuroscience course or consent of the instructor.

528. Topics in Molecular Biology. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. Credit varies according to topic offered. Selected topics emphasizing molecular studies in such diverse biological areas as virology, microbiology, genetics, photobiology, and immunology.

530. Population Ecology. 3 Hours. Life histories, population processes and interactions, and theories of distribution and abundance. Prerequisites: BioS 220, 221, 330, and 331, and consent of the instructor.

531. Introduction to Ecology and Evolution I. 3 Hours. Concepts, techniques, and skills needed for research in ecology and evolution. Prerequisite: Consent of the instructor.

532. Introduction to Ecology and Evolution II. 3 Hours. Evolutionary and physiological research. Prerequisite: Consent of the instructor.

533. Functional Ecology of Plants and Animals. 3 Hours. Some community attributes can be explained by morphological, behavioral, physiological, developmental, and genetic responses of individuals and populations to rigor, variability, and predictability of environments. Prerequisites: One course in general ecology, preferably with field trips (such as BioS 330, 331) or consent of the instructor.

535. Ecosystems. 3 Hours. Flow of energy and nutrients in aquatic and terrestrial environments. Prerequisite: BioS 330.

539. Seminar in Ecology and Evolution. 0 to 1 Hours. May be repeated for credit. S/U grade only. Graduate student and faculty seminars on selected topics in ecology and evolution. Credit is given only upon completion of a seminar presentation.

548. Biochemical Toxicology of Environmental Chemicals. 2 Hours. Biochemical mechanisms responsible for the toxic action and detoxification of environmental toxic chemicals in living organisms. Prerequisite: BioS 448 or a course in pharmacology/pharmacodynamics and pharmacokinetics.


559. Special Topics in Biochemistry. 3 to 4 Hours. Same as Chem 559. May be repeated for credit. Students may register for more than one section per term. Selected topics of current interest in biochemistry. Prerequisite: BioS 454 or consent of the instructor.

560. Topics in Paleontology. 3 to 4 Hours. Same as EaEs 560. May be repeated for credit if topic is different for each registration. In-depth analysis of current problems and issues in paleontology, involving reading primary literature, student presentations, and critical discussions. Prerequisite: Consent of the instructor.

580. Themes in Neuroscience. 2 Hours. Same as Neuro 580. May be repeated for credit. Survey of two or three topics in neuroscience with an emphasis on recent research advances. Research that spans the areas under consideration will be emphasized.

582. Methods in Modern Neuroscience. 2 Hours. Animals used in instruction. Same as Neuro 582. Underlying principles and applications of techniques used to analyze nervous system organization and function. Behavioral, electrophysiological, anatomical, and biochemical approaches are considered.

583. Practicum in Neuroscience Methods. 3 Hours. Same as Neuro 583. Technologically intense laboratory experience in the methods used by neuroscientists to solve research problems. Demonstrations and discussions complement laboratory exercises. Prerequisite: BioS 582.

586. Cell and Molecular Neurobiology. 3 Hours. Same as Anat 586. Structure and function of voltage-dependent and neurotransmitter-gated ion channels; the role of these ion channels in synaptic transmission, synaptic modification, and neuromodulation. Prerequisite: BioS 442 or consent of the instructor.

587. Topics in Neurobiology. 1 to 2 Hours. May be repeated for credit. Students may register for more than one section per term. Credit varies according to the topic offered. In-depth analysis of advanced topics in neurobiology, involving reading primary literature, student presentations, and critical discussion.

592. Research Seminar. 1 to 2 Hours. May be repeated for credit. S/U grade only. Presentation of student research with an emphasis on problem-solving and theoretical implications. Prerequisite: Consent of the instructor.

593. Introduction to Laboratory Research. 2 to 6 Hours. May be repeated for credit. Students may register for more than one section per term. Students may register for more than one section per term. Not to be used for MS project or MS/PhD thesis research. Individualized research projects of limited scope. Prerequisite: Consent of the instructor.

597. Project Research. 2 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. Not to be used for thesis research. S/U grade only. Guided research projects on selected topics in specific fields of advanced modern biology. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research in specialized projects under the direction of a faculty member with appropriate graduate standing, leading to completion of the master's thesis. Prerequisite: Consent of the instructor.

599. Doctoral Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research on specialized topics under the direction of a faculty member with appropriate graduate standing, leading to completion of the PhD thesis. Prerequisite: Consent of the instructor.

Biomedical and Health Information Sciences (BHIS)

405. Medical Sciences and Human Pathophysiology. 3 to 4 Hours. No credit given if the student has credit in AHS 420 or HIM 313 or HIM 314. Pathophysiological processes in human diseases and specific disease processes of human organ systems. Medical management of persons with disease and pharmacology related to the disease. Medical terminology. Students who require a medical terminology component register for 4 hours and participate in both laboratory and lecture-discussion; all others register for 3 hours and attend lecture-discussion only.

410. Health Data Structures and Management. 3 Hours. Data structures in clinical information systems, including database design and management, networking and security. Emphasis on “intrapreneural” skills required to solve organizational information management problems. Prerequisites: BHIS 400 and BHIS 480.

420. Biotechnology for Laboratory Sciences. 2 to 3 Hours. A course designed to provide information about good laboratory practices and general laboratory skills for a wide variety of students interested in laboratory methods which may include research, industry, and medical laboratory science.

433. Principles of Evidence-Based Health Care. 2 Hours. Same as MIHIE 433. Qualitative and quantitative assessment of human subject clinical research: locating, evaluating, comparing
scientific papers as bases for health care education and practice. Prerequisite: Graduate or professional standing; and approval of the Department.

437. Health Care Data. 3 Hours. Same as HPA 437. Review of fundamentals constituting a health care information system. How data is transformed into information and then again transformed into knowledge through integrated computer systems.

460. Introduction to Health Informatics. 1 Hour. Same as Phar 460. No credit is given if the student has credit in BHIS 400 or NURSc 218 or IPHIS 420. Introduction to information technology and systems in a healthcare setting; collection, analysis and management of healthcare data; storage, retrieval, and networking: system security. Taught on-line with some essential classroom lectures. Students must have an active UIC NetID with valid password and access to a computer and the Internet. Prerequisite: Students should demonstrate basic computing skills including knowledge of an office productivity suite (MS Office or other), electronic mail, and Internet browsers.

461. Information Systems for Health Information Management. 2 Hours. No credit given if the student has credit in BHIS 400. Advanced topics in information technology and systems in a health care setting; collection, analysis, and management of health care data; special issues related to the role of health information administrators. Extensive computer use required. Prerequisites: IDS 100 and credit or concurrent registration in BHIS 460.

480. Management and Business Practices. 3 Hours. Principles of management with emphasis on business functions, procedures, and organizational structure as applied to various health care settings including private and institutional practice. Prerequisite: Graduate standing in the School of Biomedical and Health Information Sciences or consent of the instructor.

495. Seminar in Biomedical and Health Information Sciences. 1 Hour. May be repeated for credit. S/U grade only. Specific topics are announced each term. Subjects of current interest presented through lectures and journal review.

500. Health Informatics Research Methods. 3 Hours. Review of analytic research methods and knowledge discovery techniques critical to the understanding, development and use of information and implementation of information technology. Prerequisite: Credit or concurrent registration in an introductory course in statistics.

501. Statistics for Health Informatics. 3 Hours. Builds on participants’ existing knowledge of descriptive statistics and fundamental inferential statistics for application in the field of health informatics. Emphasizes qualitative methods. Prerequisite: One introductory course in statistics (e.g., Bsst 400 or the equivalent).

505. Legal and Social Issues in Health Informatics. 3 Hours. Examination of the legal and ethical issues involved in computerized health information systems.

510. Health Care Information Systems I. 4 Hours. Same as HPA 510. Examination, through case studies, of current information technologies and systems currently in place and on the horizon, in health care organizations and in health science libraries. Prerequisite: Consent of the instructor.

511. Health Care Information Systems II. 3 Hours. Experience with health care applications using current information technology and systems in place in health care organizations. Prerequisite: BHIS 510 or consent of the instructor.

515. Management of Health Care Communication Systems. 4 Hours. Same as HPA 520. Examination and management of data communications in and between health care facilities including examination of issues, standards, technologies, and system configurations. Prerequisite: BHIS 510 or consent of the instructor.

520. Health Information Systems Analysis and Design. 4 Hours. Same as HPA 531. A project course applying systems analysis and design theory to health care systems evaluation, modeling, and implementation. Prerequisite: BHIS 510 or consent of the instructor.

525. Applications in Health Informatics. 4 Hours. Same as HPA 540. Covers the application of theory through case study analysis, and the use of information systems for quality assurance and management. Prerequisites: BHIS 510; and BHIS 515 or BHIS 520 or BHIS 530; or consent of the instructor.

526. Quality Management in Health Care. 3 Hours. Examination of processes, internal and external to an organization, used to measure, evaluate, and improve the quality, efficiency, and effectiveness of health care.

530. Topics in Health Informatics. 4 Hours. Same as HPA 550. The study of advanced topics in various areas of health informatics. Prerequisites: BHIS 510; and BHIS 515 or BHIS 520 or BHIS 525; or consent of the instructor.

555. Principles and Methods in Clinical Cytopathology. 3 Hours. Introduction to cytopathology methods including cell culture techniques. Chromosome analysis of various genetic and oncologic diseases. Laboratory experiments using human blood and tissue. Prerequisite: One course in genetics or consent of the instructor.

559. Clinical Cytopathology. 3 Hours. Biological theory and clinical implication of chromosome abnormalities such as trisomy, translocation, duplication, insertion, deletion, and complex arrangements plus actual clinical case studies. Prerequisite: One course in genetics or consent of the instructor.

580. Practicum in Biomedical and Health Information Sciences. 3 to 12 Hours. May be repeated for credit. Field experience under supervision of a professional expert in a biomedical and health information sciences setting that is consistent with the student’s area of study and career goals. Prerequisite: Consent of the instructor.

594. Special Topics in Biomedical and Health Information Sciences. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. Current theories and methods in biomedical and health information sciences. Seminar, literature search, directed study, and discussion format. Prerequisite: Consent of the instructor.

595. Seminar in Health Informatics. 1 Hour. May be repeated for credit. S/U grade only. Topics of current interest in health informatics. Includes discussion of current journal articles and new developments in the field. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. For graduate students who wish to pursue independent study not related to their project/thesis research. Prerequisite: Consent of the instructor.

597. Project Research in Biomedical and Health Information Sciences. 0 to 5 Hours. May be repeated for credit. Satisfactory/Unsatisfactory grade only. Independent investigation which engenders the responsibilities of professionals to contribute to their field. Students investigate a topic/problem in their field, write an article and deliver an oral presentation. Prerequisite: Consent of the instructor.

598. Research in Biomedical and Health Information Sciences. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. Satisfactory/Unsatisfactory grade only. Independent research in one area of biomedical and health information sciences directed by a faculty member. Prerequisites: Foundation courses in research and statistics, or consent of the instructor.

Biomedical Visualization (BVis)

400. Visual Cognition. 2 Hours. Introductory survey of visual information processing including perception, processing models, higher processes, memory and the impact of technology on visualization.

405. Anatomical Visualization. 3 Hours. Graphic manipulation and representation of human morphology and gross anatomy. Graphic construction skills, visual standards and conventions, data collection methods, and personal sketch style development. Prerequisite: Consent of the instructor.

410. Photo Application I. 2 Hours. Photography as a practical tool for the scientific illustrator. Stat camera, flat-copy functions, photographic note-taking, and editorial problem-solving imagery. Includes line, tone, and full-color processes. Prerequisite: Consent of the instructor.

415. Computer Applications. 2 Hours. Using the internet as a communication tool with emphasis on the World Wide Web: FTP, Telnet, HTML authoring, image processing, navigation and interface design. Prerequisite: Consent of the instructor.

420. Illustration Techniques. 3 Hours. Introduction to line, continuous tone and color rendering techniques. Digital image creation and manipulation, color theory and design, print and electronic publication issues. Prerequisite: BVis 405 or consent of the instructor.
430. Surgical Orientation. 1 Hour. Survey of surgical specialties, including an historical survey and relationship to visual communication. Instruments, aseptic technique, incisions, suturing, principles of wound healing, imaging modalities, and surgical terminology. Prerequisites: BVis 405 and consent of the instructor.

440. Instructional Design. 2 Hours. Instructional design process for print and audiovisual media development in the health sciences. Emphasis on theory in communication, learning, and the instructional design process. Prerequisite: Consent of the instructor.

450. Graphic Design. 2 Hours. Fundamentals of graphic design techniques and imagery production as applied to health science print media. Prerequisite: One year of basic design courses.

460. 3-D Model Design. 2 Hours. Introduction to the biocommunicator’s role in 3-D models, anatomical simulators, prosthetics, health care exhibits. Exploration of materials and techniques for impression taking, sculpting, mold construction, and casting.

480. Business Practices. 2 Hours. Business procedures and organizational structures associated with the role of a biocommunicator in institutional, freelance, and small business settings. Topics range from business forms and procedures to legal and ethical issues. Prerequisite: Consent of the instructor.

500. Biomedical Imaging I. 3 Hours. Methodologies for imaging biological structures at microscopic and macroscopic scales. Human anatomy and histology concepts and terminology are presented in relation to imaging methods. Prerequisite: Consent of the instructor.

501. Biomedical Imaging II. 3 Hours. Continuation of BVis 500. Technical aspects of image processing, analysis, compression, 3-D reconstruction and evaluation are stressed. Prerequisite: BVis 500.

505. Computer-Based Morphometrics. 2 Hours. Biological form measurement and comparison. Concepts of descriptive and inferential statistics applied to problems of measurement and quantification of the biological form. Prerequisite: Consent of the instructor.

515. Advanced Graphic Design. 3 Hours. Application of graphic design techniques to a simulated, multicomponent client project. Exploration of conceptualizing techniques and project management. Prerequisite: BVis 450.

520. Advanced Illustration Techniques. 3 Hours. Instruction in advanced line and color rendering techniques. Medical illustration methods for patient education, editorial and product, and diagnostic image interpretation. Print and electronic publication issues. Prerequisite: BVis 420.

525. Illustration Applications. 4 Hours. Production experiences in selected biomedical communications specialties: electronic print media, multimedia, animation, web site design, etc. Guest instructors with special expertise are utilized wherever feasible. Prerequisite: BVis 420.

530. Surgical Illustration. 4 Hours. Students attend surgery, research surgical procedures and prepare illustrations for educational and commercial use. Students integrate knowledge of instructional design, anatomy, graphic design, and illustration techniques. Prerequisites: Anat 441 and BVis 420, 430, 440, and 450.

540. Computer Visualization. 4 Hours. Construction of three-dimensional computer models of biological and anatomical structures using software modelers. 3-D input devices and medical scans and data. Prerequisite: BVis 415.

542. Computer Animation. 4 Hours. Investigates principles of motion using computer animation techniques to solve contemporary problems in medical education and communication where motion can effectively be used. Production from concept to final presentation. Prerequisites: BVis 415 and 540 and consent of the instructor.

545. Computer-Based Multimedia. 4 Hours. An introduction to the use of desktop multimedia development systems. Software options for creating, manipulating, animating and combining graphics, text, video, and sound for presentation and electronic publication. Prerequisites: BVis 415 and 440.

550. Simulators and Models. 2 Hours. An extension of the principles learned in BVis 460. Emphasis on materials research and problem-solving strategies for complex 3-D projects. Prerequisite: BVis 460.

554. Anaplastology Materials and Techniques. 2 Hours. Hands-on experience with prosthetic materials and techniques. Emphasis on health and safety issues related to laboratory equipment and clinical procedures. Prerequisites: AHS 420 and Anat 441 and BVis 460.

555. Clinical Anaplastology. 4 Hours. Concepts of prosthetic rehabilitation. Provision of facial/somato prosthetic services in a multidisciplinary clinical setting requiring direct interaction with patients with disfigurements. Emphasis on prosthetic techniques and materials. Prerequisite: Anat 441, AHS 420, and BVis 460, or consent of the instructor.

580. Practicum in Biomedical Visualization. 6 to 12 Hours. Field experience under supervision of a professional expert in a biomedical communication setting that is consistent with student’s area of concentration and career goals. Prerequisite: Consent of the instructor.

594. Special Topics in Biomedical Visualization. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Selected topics in specialty areas of biomedical visualization, depending on sufficient student demand and faculty availability, e.g., pharmaceutical illustration, ocular prosthetic design, etc. Prerequisite: Consent of the instructor.

595. Seminar in Biomedical Visualization. 1 Hour. May be repeated for credit. S/U grade only. Topics of current interest in biomedical visualization. Includes discussion of current journal articles and important new developments in the field. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. For students who wish to pursue independent study not related to their project research. Prerequisite: Consent of the instructor.

597. Project Research. 0 to 5 Hours. May be repeated for credit. S/U grade only. Independent investigation which engenders the responsibilities of professionals to contribute to their field. Students investigate a topic/problem in their field, write an article, and deliver an oral presentation. Prerequisite: Consent of the instructor.

598. Research in Biomedical Visualization. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research in biomedical visualization directed by a faculty member. Prerequisite: Foundation courses in research and statistics, or consent of the instructor.

**Biopharmaceutical Sciences (BpS)**

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.

423. Adverse Drug Reactions. 2 Hours. Previously listed as PmPd 423. Attention focused on the epidemiology and characterization of adverse reactions. Factors which interplay in adverse reactions to medications are discussed. Reactions characterized in relation to organ systems. Prerequisites: Phar 403 and Phar 404; or consent of the instructor.

470. Clinical Pharmacology I. 1 Hour. Previously listed as PmPd 470. Basic principles of clinical pharmacology/toxicology including clinical trial design, statistical interpretation, pharmacokinetics, drug interactions (side effects), as well as basic mechanisms involved in the above.

471. Clinical Pharmacology II. 1 Hour. Previously listed as PmPd 471. Basic principles of clinical pharmacology applied to critical analysis of patient case histories in major disease states and FDA requirements. Prerequisite: PpS 470.

480. Application of Science to the Law. 4 Hours. Previously listed as PmPd 480. Same as Crj 480. Issues affecting the development, accessibility and admissibility of forensic science services by the criminal justice system; problems which may compromise the quality, fairness and effectiveness of scientific inquiries. Prerequisites: Crj 210 and 260 or graduate standing.

501. Biopharmaceutical Sciences I. 4 Hours. First part of the fundamental didactic core course in biopharmaceutical sciences including fundamental principles of pharmaceutics, pharmacokinetics, scientific ethics and research design. Prerequisite: Graduate standing in the Biopharmaceutical Sciences program or approval of the department.

502. Biopharmaceutical Sciences II. 4 Hours. Second part of fundamental didactic core courses in biopharmaceutical sciences; fundamental principles of cell and molecular biology and pharmacogenomics, pharmacodynamics including toxicology, research communication and regulatory processes. Prerequisites: BpS 501 and graduate standing in the Biopharmaceutical Sciences program or approval of the department.
503. Laboratory Techniques in Biopharmaceutical Sciences. 3 Hours. No credit given if the student has credit in PmPd 500. Laboratory-based core course in methods and techniques employed in biopharmaceutical sciences research. Prerequisite: BPS 502 or consent of the instructor.

506. Industrial Experience. 4 to 10 Hours. Previously listed as PmPe 506. S/U grade only. Recommended to graduates with no industrial experience. Students spend time working in the pharmaceutical, medical, cosmetic, and food industries under academic supervision to obtain practical experience. Prerequisites: BpS 501 and 502 and 503 and 510 and 515; and Btt 400; and GC 401 and 470 and 471; and Bche 460.

510. Principles of Interfacial Phenomena. 3 Hours. Previously listed as PmPe 510. Quantitative and theoretical principles of physical and chemical sciences as applied to pharmacy. Thermodynamics, kinetics, colloid and surface chemistry in evaluation of pharmaceutical formulations. Prerequisites: Math 480.

515. Dissolution and Bioavailability of Dosage Forms. 2 Hours. Previously listed as PmPe 525. Theories and testing of the release of drug from solid dosage forms including the effect of dissolution rate on bioavailability. Prerequisites: Phar 323 and approval of the department.

519. Percutaneous Drug Delivery. 2 Hours. Previously listed as PmPe 576. Modern methods of drug delivery covering the use of enhancers, prodrugs, iontophoresis, and ultrasound are presented. Toxicity testing, regulatory issues for successful marketing and production issues. Prerequisite: Consent of the instructor.

520. Lipid-Based Drug Delivery Systems. 2 Hours. Previously listed as PmPe 580. The preparation, characterization, stability, pharmacological and diagnostic applications of lipid-based drug delivery systems including liposomes, micelles and emulsions prepared with phospholipids. Prerequisites: Phar 323 and approval of the department.

540. Topics in Adverse Drug Reactions. 2 Hours. Previously listed as PmPd 520. Advanced treatment of current adverse drug reaction incidents, involving evaluation of the issues. Prerequisite: Consent of the instructor.

542. Pharmacodynamics of Substance Abuse. 2 Hours. Previously listed as PmPd 523. Considers the mechanisms of action, responses to pharmacokinetics and dependence factors of substance abuse. Emphasis will be placed on research strategies in studying the biological aspects of drug abuse. Prerequisites: Consent of the instructor and a course in basic pharmacology.

543. Psychoneuroimmunology. 2 Hours. Previously listed as PmPd 525. The interactions between the immune system, the endocrine system and the central nervous system specifically as they relate to stress and immunity.

544. Immunotoxicology. 2 Hours. Previously listed as PmPd 562. Basic mechanisms of toxicologic responses to drugs and chemicals due to immediate and delayed hypersensitivity reactions. Emphasis on laboratory methods used in the study of immunotoxicology. Prerequisite: Consent of the instructor.

545. Advanced Pharmacokinetics. 3 Hours. Previously listed as PmPd 542. Kinetics of absorption, distribution, metabolism, and excretion of drugs. Factors affecting these kinetics and their relationship to pharmacodynamics will be discussed. Prerequisite: Consent of the instructor.

546. Computer Techniques in Pharmacokinetics. 3 Hours. Previously listed as PmPd 541. Computer applications in pharmacokinetics and pharmacodynamics. Principles necessary for understanding the uses, advantages and limitations of computer methods are discussed. Prerequisite: BpS 545 or consent of the instructor.

551. Pharmacological Basis of Therapeutics I. 2 Hours. Pharmacological basis of drugs for the treatment of diseases, including cancer, and conditions, including inflammation, of the nervous and gastrointestinal systems. Prerequisites: Credit or concurrent registration in Bche 460 and BpS 502; or approval of the department.

552. Pharmacological Basis of Therapeutics II. 2 Hours. Pharmacological basis of drugs for treatment of diseases, including cancer, and conditions, including inflammation, of the cardiovascular, renal and endocrine systems. Prerequisite: BpS 551; or approval of the department.

555. Pharmacogenomics and Toxicology. 1 Hour. Modern approaches to understanding the molecular basis of individual differences to drug response, including toxicity. Prerequisites: BbS 502 and Bche 460 and Gene 502; or approval of the department.

580. Forensic Science: Survey and Foundations. 2 Hours. Previously listed as PmPd 580. Same as CrJ 580. Survey course for forensic sciences with emphasis on criminalistics; unique characteristics, underlying philosophies; nature, analytical methods, significance of results with chemical, biological, trace, pattern evidence. Prerequisite: Approval of the department.

581. Forensic Analysis of Biological Evidence. 4 Hours. Previously listed as PmPd 581. Same as CrJ 581 and MLS 581. Forensic blood and physiological fluid identification; DNA typing of biological evidence; report writing; expert testimony. Prerequisite: Consent of the instructor.

582. Forensic Chemistry and Trace Evidence Analysis. 4 Hours. Previously listed as PmPd 582. Same as CrJ 582. Trace evidence: hairs, fibers, glass, soil, paint and miscellaneous; nature, chemical, instrumental, microscopical methods of analysis; interpretation and significance of trace similarities; expert testimony. Prerequisite: Consent of the director of graduate studies.

583. Physical Pattern Evidence Analysis. 4 Hours. Previously listed as PmPd 583. Same as CrJ 583. Pattern evidence: individualization, reconstruction; fingerprint classification; questioned documents; handwriting comparison; firearms and toolmarks comparisons; scene patterns and reconstruction will be studied in depth. Prerequisites: Consent of the instructor.

584. Forensic Drug Analysis and Toxicology. 4 Hours. Previously listed as PmPd 584. Same as MLS 584 and CrJ 584. Analysis of commonly abused drugs in their solid-dosage form and in biological media, with emphasis on modern instrumental methods and interpretation of results. Prerequisite: Consent of the instructor.

586. Topics in Specialty Forensic Examinations. 1 to 4 Hours. Previously listed as PmPd 582. May be repeated for credit if topic is different for each registration. Students may register for more than one section per term. Topics may vary but will revolve around specialty forensic examinations, covering specific evidentiary classes (e.g. drug identification, DNA typing, fingerprints), including forensic laboratory methods, approaches and data interpretation. Prerequisites: BpS 581 or 582 or 583 or 584; and consent of the instructor. Students must have credit in the forensic science program core course that covers the specific topic.

588. Expert Witness Testimony and Courtroom Demeanor. 3 Hours. Trials, hearings, grand jury; expert versus lay witness; personal and behavioral characteristics on the stand; results, reports and courtroom testimony; simulated trial testimony. Prerequisite: Approval of the department.

589. Special Topics in Forensic Science. 3 Hours. Previously listed as PmPd 589. May be repeated for credit if topic is different for each registration. Same as CrJ 589. Content may vary but will revolve around the philosophic, moral, and managerial problems associated with criminalistics practice. Topics may include evidence collection, analysis, reporting, and testimony to noncriminalistics fields. Prerequisite: Consent of the instructor.

590. Forensic Science Residency. 3 Hours. Previously listed as PmPd 590. May be repeated for a maximum of 12 hours of credit. S/U grade only. In-depth training for casework analysis in a specific forensic discipline (e.g. drug identification, DNA typing, fingerprints) in an approved forensic science laboratory. Prerequisites: BpS 581 or 582 or 583 or 584; and consent of the instructor. Students must have credit in the forensic science program core course that covers the specific topic.

591. Topics in Forensic Microscopy. 1 to 4 Hours. Previously listed as PmPd 591. May be repeated for credit if topic is different for each registration. Students may register for more than one section per term. Topic may vary but will revolve around microscopic characterization of various materials, with emphasis on forensic laboratory methods and approaches, and interpretation of material comparisons as evidence. Prerequisites: BpS 581 or 582; and consent of the instructor.

592. Forensic Science Internship. 2 to 4 Hours. Previously listed as PmPd 592. May be repeated for a maximum of 4 hours of credit. Students may register for more than one section per term. Placement in a forensic science or toxicology laboratory or setting, under the supervision of a faculty member, with an accepted research project or paper required. Prerequisites: BpS 580; and consent of the instructor; and a minimum of 15 hours of credit earned in the MS in forensic science program.
593. Research in Biopharmaceutical Sciences. 0 to
16 Hours. Previously listed as PmPc 593 and PmPd 593. May be
repeated for credit. S/U grade only. Research in biopharmaceutical
sciences with the guidance of a faculty mentor. Prerequisite: Approval
of the department.

594. Special Topics Biopharmaceutical Sciences. 1 to
4 Hours. May be repeated for a maximum of 4 hours of credit if
topic is different for each registration. Content varies. Special topics in
biopharmaceutical sciences not covered in regular core or elective
offerings. Prerequisite: Consent of the instructor.

595. Departmental Seminar. 1 to 2 Hours. Previously
listed as PmPc 595 and PmPd 595. May be repeated for credit. S/U
grade only. Departmental seminar for research and experimental
techniques in the biopharmaceutical sciences. Prerequisite: Approval
of the department.

596. Independent Study in Forensic Science. 1 to 8
Hours. Previously listed as PmPd 596. May be repeated for credit.
Students may register for more than one section per term. S/U grade
only. Supervised research in forensic science; a research project to be
designed and completed within one semester. Prerequisites: BspS 580; and
consent of the instructor and at least the core course in the MS in Forensic Science program covering the subject area in which the research is to be conducted.

598. MS Thesis Research. 0 to 16 Hours. Previously
listed as PmPc 598 and PmPd 598. May be repeated for a maximum of
10 hours of credit. A minimum of 6 hours is required. S/U grade only.
For students doing MS thesis research or thesis writing. Prerequisite:
Consent of the instructor.

599. Dissertation Research. 0 to 16 Hours. Previously
listed as PmPc 599 and PmPd 599. S/U grade only. May be repeated for
credit. PhD thesis research. Prerequisite: Consent of the instructor.

Biostatistics (Bstt)

400. Biostatistics I. 3 Hours. Descriptive statistics, basic
probability concepts, one- and two-sample statistical inference, analysis
of variance, and simple linear regression. Introduction to a statistical
computer package such as Minitab or SAS. Prerequisite: Enrollment
restricted to public health students; other graduate and professional
students admitted by consent as space permits. To obtain consent, see
the SPH registrar.

401. Biostatistics II. 4 Hours. Simple and multiple linear
regression, stepwise regression, multivariate analysis of variance and
covariance, non-parametric methods, logistic regression, analysis of
categorical data; extensive use of computer software. Prerequisite: Bstt
400.

402. Logistic Regression and Survival Analysis. 2
Hours. Interpretation of logistic regression and survival analysis
models. Running logistic and proportional hazards regression models
and constructing life-tables using SAS. Prerequisite: Bstt 401.

410. Introduction to Statistical Computing. 1 Hour.
Application of statistical packages for appropriate statistical analysis and
interpretation. Students will use computers for homework assignments.
Prerequisite: Credit or concurrent registration in Bstt 400.

430. Design of Clinical Trials. 3 Hours. Rationale for
clinical trials, blinding, ethical issues, methods of randomization,
crossover trials, power and sample size calculations, data management,
protocol deviation, data analysis, interim analysis. Prerequisites: Bstt
401 or the consent of the instructor.

440. Sampling and Estimation Methods Applied to
Public Health. 3 Hours. Major sampling designs and estimation
procedures used in the conduct of sample surveys with emphasis on
topics relevant to the health sciences. Prerequisite: Bstt 401 or 502 or
consent of the instructor.

494. Introductory Special Topics in Biostatistics. 1 to
4 Hours. May be repeated for credit. Students may register for more
than one section per term. Special topics in biostatistics. Content varies.
Prerequisite: Consent of the instructor.

502. Biostatistics Methods I. 4 Hours. Foundations for and
introduction to statistical inference, including one- and two-sample
problems; regression analysis, including multiple regression and
indicator variables. Prerequisites: College calculus, including
multivariable calculus, concurrent registration in Bstt 503, and consent
of the instructor.

503. Biostatistics Laboratory. 2 Hours. Use of spreadsheets
for statistical investigations; use of statistical software; matrix theory,
including methods relevant in biostatistical analysis. Prerequisites:
Concurrent registration in Bstt 502 and consent of the instructor.

504. Biostatistics Methods II. 4 Hours. Analysis of variance
and multiple comparisons; model building and diagnostics; generalized
linear models; logistic and Poisson regression; introduction to repeated
measures and mixed models. Prerequisites: Bstt 502 and 503, or consent
of the instructor.

511. Categorical Data Analysis. 3 Hours. Previously listed as
Bstt 550. Contingency tables and their tests, measures of association,
stratified analysis, logistic regression, generalized linear model, Poisson
regression, log-linear model, matched data, marginal homogeneity, ordinal
data. Prerequisites: Bstt 504 and Stat 411 or consent of the instructor.

512. Survival Analysis. 3 Hours. Previously listed as Bstt 530.
Concepts of lifetime or survival distributions, especially with censored
data; nonparametric estimation of survival function; rank tests;
proportional hazards regression models; parametric models.
Prerequisites: Bstt 504 and Stat 541 or consent of the instructor.

513. Longitudinal Data Analysis. 4 Hours. Application and
theory of models for longitudinal data analysis for both continuous and
categorical response data, including use of statistical software for these
methods. Prerequisites: Stat 411 and Bstt 504, or consent of the
instructor.

514. Biostatistical Consulting. 2 Hours. Previously listed as
Bstt 516. Restricted to students enrolled in the biostatistics major.
Discussion of techniques required for successful biostatistical
consultation; effective communication, problem formulation, data
analysis, oral and written reports, supervised consulting experience.
Prerequisites: Bstt 504 and consent of the instructor.

521. Applied Multivariate Analysis. 3 Hours. Previously
listed as Bstt 580. Analysis of vector of responses; MANOVA, data
reduction methods; introduction to cluster analysis, discriminant
analysis, and structural equation models. Prerequisites: Bstt 513 and
consent of the instructor.

522. Biostatistical Investigations. 4 Hours. Analysis of
several large data sets that will require integration of numerous
biostatistical tools; written summarization, and discussion of results.
Prerequisites: Bstt 511, 512, 513, 514; and concurrent registration in
Bstt 521.

531. Advanced Statistical Inference. 3 Hours. An in-
depth consideration of some important ideas of statistical inference
including large-sample theory, estimation and testing. Specific topics to
be covered include asymptotic theory, parameter estimation methods and
hypothesis testing. Some computer use in class. Prerequisites: Consent
of the instructor. Open only to PhD degree students.

553. Linear Models. 4 Hours. Generalized inverse matrices;
distributions for quadratic forms; estimability and testable hypotheses;
constrained linear model; applications to regression, ANOVA, ANCOVA
models; variance component models. Prerequisites: Consent of the
instructor. Open only to PhD degree students.

594. Special Topics in Biostatistics. 1 to 4 Hours. May
be repeated for credit. Students may register for more than one section
per term. Advanced special topics. Content varies. Prerequisites: Bstt
501 and consent of the instructor.

595. Biostatistics Seminar. 1 to 3 Hours. S/U grade only.
Current developments in theory and application of biostatistics with
presentations by students, faculty, and visiting scientists. Prerequisites:
Bstt 501 and consent of the instructor.

Business Administration (BA)

589. Corporate Business Internship Program. 0 to 3
Hours. May be repeated for a maximum of 6 hours of credit.
Satisfactory/Unsatisfactory grade only. Corporate business internship
provides graduate students an opportunity to gain practical work
experience in their field of study and to test their career choice.
Prerequisites: Consent of the director of the Business Career Center.
Approval by the director of graduate studies prior to registration is
required for students in the MS in accounting and MS in management
information systems programs.
401. Physical Properties of Fluids. 4 Hours. Prediction and correlation of the various equilibrium (critical constants, surface tension, virial coefficients etc.) and nonequilibrium (transport coefficients) properties, and kinetic theory. Prerequisite: CHE 301 or consent of the instructor.

410. Transport Phenomena. 4 Hours. Continuum theory of momentum, energy, and mass transfer. Viscous behavior of fluids. Laminar and turbulent flow. Thermal conduction and convection, diffusion and coupled operations. Prerequisite: CHE 312 or consent of the instructor.


412. Fluid-Particle Processes. 4 Hours. Characterization of particles. Particle-fluid mechanics in single and multiple particle systems. Hydrodynamic and nonhydrodynamic forces. Stability, rheology, and flow behavior of colloidal suspensions. Prerequisite: CHE 410 or consent of the instructor.

413. Introduction to Flow in Porous Media. 4 Hours. Theoretical modeling of single-phase and multiphase flow in porous media. Darcy’s law and relative permeabilities. Oil production and hydrology. Capillary phenomena. Dispersion and miscible displacement. Prerequisite: CHE 312 or consent of the instructor.


423. Catalytic Reaction Engineering. 4 Hours. Catalytic reactions that occur under conditions for which heat and mass transfer cannot be neglected are considered. Includes porosimetry, surface area measurements, and catalyst deactivation. Prerequisite: CHE 321 or consent of the instructor.


431. Numerical Methods in Chemical Engineering. 4 Hours. Introduction to the application of numerical methods to the solution of complex and often nonlinear mathematical problems in chemical engineering. Includes methods for the solution of problems arising in phase and chemical reaction equilibria, chemical kinetics, and transport.

440. Non-Newtonian Fluids. 4 Hours. Fluid mechanics and transport processes involving non-Newtonian fluids. Purely viscous and viscoelastic behavior. Viscometric functions and rheometry. Heat and mass transfer in non-Newtonian fluids. Prerequisite: CHE 410 or consent of the instructor.

441. Computer Applications in Chemical Engineering. 4 Hours. Nonnumerical applications of computers: artificial intelligence and expert systems for chemical engineering design and online diagnosis; data acquisition and control for digital process control; process design calculations. Prerequisite: Senior standing in chemical engineering.

445. Mathematical Methods in Chemical Engineering. 4 Hours. Advanced mathematical techniques in chemical engineering. Includes infinite series in thermodynamic perturbation theory; Laplace transforms in process control; chemical diffusion transport theories and differential equations. Prerequisite: Math 220 or the equivalent.

450. Air Pollution Engineering. 4 Hours. Same as ME 450. Environmental aspects of combustion processes, pollutant formation. Control of pollutants and particulates. Air quality control. Fundamentals of combustion. Prerequisite: ME 321 or consent of the instructor.


502. Fluid Phase Equilibria. 4 Hours. Application molecular theories of fluids to phase equilibrium systems. Inter-molecular potentials, partition functions, correlation functions, chemical potentials, fugacity, and activity coefficient and their relationships. Prerequisite: CHE 301 or the equivalent.

503. Thermodynamics of Multicomponent Mixtures. 4 Hours. Thermodynamic theories of mixtures. Molecular principles of various solution theories. Conformal solutions, lattice theories, group contribution function theories, and perturbation and variational theories. Prerequisite: CHE 502 or the equivalent.


510. Separation Processes. 4 Hours. Advanced coverage of equilibrium stage separation. Multicomponent separation and distillation; unsteady state adsorption processes. Separation efficiencies and energy requirements. Prerequisite: CHE 410.


512. Microhydrodynamics, Diffusion and Membrane Transport. 4 Hours. Theoretical and numerical fluid mechanics of microstructure: potential flow and virtual mass, quasistatic versus transient Stokes flow, integral theorems, multipole expansions, singularity solutions, fluctuations, and current applications. Prerequisite: CHE 410 and 445 or consent of the instructor.

513. Coal Combustion and Gasification. 4 Hours. Chemical reaction engineering of coal combustion and gasification. Mathematical modeling of coal combustors and gasifiers. Heat transfer in fluidized beds and flue gas cleanup. Prerequisite: CHE 411 or consent of the instructor.

514. Biortransport. 4 Hours. Same as BioE 514. Diffusion and flow in living systems. Blood rheology and flow. Microcirculation, oxygen transport, diffusive transport across membranes. Membrane structure; water, and ion flows, active transport. Prerequisite: CHE 410 or consent of the instructor.

522. Advanced Biochemical Engineering. 4 Hours. Cell culture systems: procaryotic, eucaryotic, plant, and insect, design of specialized biological reactors, principles of genetically engineered biological systems, biochemical separation techniques, biochemical engineering applications for waste treatment. Prerequisite: CHE 422.

524. Characterization Techniques in Catalysis. 4 Hours. The most common crystallographic, spectroscopic, and physicochemical techniques for characterization of bulk solids, solid surfaces, and gas-solid interactions are surveyed. Prerequisite: Consent of the instructor.


590. ProMOTÉ Seminar I. 0 Hours. S/U grade only. The development of intercultural communication skills for PhD students in engineering from non-English speaking backgrounds. Prerequisite: Acceptance into a PhD program in engineering.

591. ProMOTÉ Seminar II. 0 Hours. S/U grade only. Workshop in U.S. culture and society for PhD students in engineering, from non-English speaking backgrounds. Prerequisite: Acceptance into a PhD program in engineering.

592. Specialized Problems. 4 to 8 Hours. Specialized problems under faculty supervision. Prerequisite: Consent of the instructor.

594. Advanced Topics in Chemical Engineering. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Systematic study of advanced topics in chemical engineering theory and practice. Subjects vary from year to year. Prerequisite: Consent of the instructor.

595. Seminar in Chemical Engineering Research. 1 Hour. Advances in chemical engineering research will be discussed in a seminar setting. Students will be expected to make presentations in areas of catalysis, thermodynamics, transport phenomena, and kinetics. Prerequisite: Graduate standing in chemical engineering.

598. MS Thesis Preparation. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual research in specialized problems under faculty supervision. Prerequisite: Consent of the instructor.

599. PhD Thesis Preparation. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual research in specialized problems under faculty supervision. Prerequisite: Consent of the instructor.

Chemistry (Chem)

414. Inorganic Chemistry I. 4 Hours. Introduction to the principles of inorganic chemistry. Structural and descriptive chemistry of the main-group elements. Prerequisite: Chem 342 or consent of the instructor.

415. Inorganic Chemistry Laboratory. 2 Hours. Advanced inorganic chemistry laboratory. Preparative methods, Schlenk techniques, dry box, Fourier-transform infra-red and UV-visible spectroscopy, crystal growth. Prerequisite: Credit or concurrent registration in Chem 414.

416. Inorganic Chemistry II. 4 Hours. Structural and descriptive chemistry of the transition elements. Prerequisite: Chem 414.

421. Instrumental Analysis. 4 Hours. A survey of contemporary instrumentation for chemical analysis. Emphasis on fundamentals of instrumental methods with actual experience on typical equipment. Includes two weekly three-hour laboratories. Prerequisites: Chem 222 and credit or concurrent registration in Chem 342.

422. Applied Electronics for Scientists. 4 Hours. For scientists with little background in electronics who need working knowledge of electronic devices, circuits, instruments, devices, principles of electronics, analog and digital systems. Includes two weekly laboratories. Prerequisite: Graduate standing in any of the physical sciences or engineering, or consent of the instructor.

432. Intermediate Organic Chemistry. 3 Hours. Rigorous treatment of the principles upon which modern organic chemistry is developed. Prerequisites: Chem 235 and 342.

444. Physical Chemistry III. 3 Hours. Application of quantum mechanics to molecular spectroscopy, statistical mechanics and activated complex theory. Prerequisite: Chem 346.

448. Statistical Thermodynamics. 4 Hours. Introduction to statistical mechanics, partition functions, chemical equilibrium, ensembles, fluctuations, real gases, Einstein and Debye models of solids, magnetic materials, electrolytes, introduction to liquids. Prerequisite: Chem 346.

452. Biochemistry I. 4 Hours. Same as BioS 452. Chemistry of proteins, nucleic acids, carbohydrates and lipids. Prerequisite: Credit or concurrent registration in Chem 234.


455. Biochemistry Laboratory. 3 Hours. Introduction to experimentation with biochemical systems. Includes gas electrophoresis, protein purification, enzyme kinetics, nucleic acid biochemistry, and cloning techniques. Prerequisites: Chem 222 and concurrent registration in Chem 454.

456. Natural Products. 4 Hours. Same as BioS 416. Biogenetic approach to secondary metabolites. General principles and selected studies of phenolic compounds, terpenes, alkaloids, and other interesting natural products. Prerequisite: One year of organic chemistry.

470. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

471. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Chem 470, and approval of the department.

474. Teaching Chemistry in High Schools. 1 Hour. May be repeated for credit. S/U grade only. Modern ways to help beginning learners construct in their own minds an understanding of scientific concepts and scientific method. Emphasis on the concepts of chemistry. Prerequisite: Approval of the department.

488. Cooperative Chemistry Practice. 1 Hour. May be repeated for credit. S/U grade only. Off-campus participation in a governmental or industrial training program. Credit is contingent on the submission of a final report. Prerequisite: Concurrent registration in LAS 289 or consent of the instructor.

492. Independent Study. 1 to 2 Hours. May be repeated for credit. S/U grade only. Individual study under supervision of a faculty member in areas not covered in standard courses. Credit is contingent on the submission of a final report. Prerequisites: Grade point average of 2.50 in science courses and consent of the instructor.

494. Special Topics in Chemistry. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which the course is given. Prerequisite: Approval of the department.

499. Supervised Research. 3 Hours. May be repeated for a maximum of 6 hours of credit. S/U grade only. Individual research performed under supervision of a faculty member. Credit is contingent on the submission of a final report. Research experience is strongly encouraged for career students.

500. Faculty Research. 1 Hour. S/U grade only. Mandatory for first year students. Faculty present their research interests to new graduate students.

510. Literature Seminar in Inorganic Chemistry. 1 Hour. S/U grade only. Discussion of inorganic research from the current literature. Emphasis on student presentations.

514. Advanced Inorganic Chemistry I. 4 Hours. The synthesis, structure, and bonding of selected main group and transition metal species. Describes materials science applications of these compounds. Prerequisite: Chem 416 or the equivalent.

516. Advanced Inorganic Chemistry II. 4 Hours. Structural and descriptive chemistry of the transition elements; spectroscopy and magnetism. Prerequisite: Chem 416 or the equivalent.

518. Advanced Inorganic Chemistry III. 4 Hours. Synthesis, structure, bonding, and properties of solid-state materials. Prerequisite: Chem 416 or the equivalent or consent of the instructor.

519. Special Topics in Inorganic Chemistry. 3 to 4 Hours. May be repeated for credit. Lectures on topics not represented in regularly scheduled courses.
520. Literature Seminar in Analytical Chemistry. 1 Hour. S/U grade only. Discussion of analytical chemical research from the current literature. Emphasis upon student presentations.

522. Techniques in Mass Spectrometry and Surface Analysis. 4 Hours. Various methods in mass spectrometry. Non-optical applied surface analysis including X-ray photoelectron spectroscopy, Auger spectroscopy, and scanning probe microscopy. Instrumentation, applications and data analysis. Prerequisite: Chem 421 or the equivalent.

523. Advanced Analytical Chemistry Laboratory. 4 Hours. Modern qualitative and quantitative analyses employing chromatography, mass-spectrometry, nuclear magnetic resonance, infrared spectroscopy. Development of data acquisition, processing and evaluation algorithms. Includes two-three-hour weekly laboratories. Prerequisites: Chem 421 or the equivalent and either Chem 522 or Chem 526.

524. Optical Spectroscopies in Analytical Chemistry. 4 Hours. Theory and experimental methods in infrared, ultraviolet and visible spectroscopies, both absorption and emission. Prerequisites: Chem 346 and 421, or consent of the instructor.

525. NMR Spectroscopy in Analytical Chemistry. 4 Hours. Principles governing one- and multidimensional nuclear magnetic resonance (NMR) spectroscopy; applications of NMR to chemical analysis. Prerequisite: Chem 421 and 346, or the equivalents, or consent of the instructor.

528. Chemical Separations. 4 Hours. Fundamentals and recent advances in techniques and technologies for the separation of chemical substances, including both chromatographic and electrophoretic methods. Special emphasis on trace and microscale methods. Prerequisite: Chem 421 or approval of the department.

529. Special Topics in Analytical Chemistry. 3 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Lectures and readings in areas not normally treated in standard courses. Discussion of topics of current interest in analytical chemistry. Prerequisite: Consent of the instructor.

530. Literature Seminar in Organic Chemistry. 1 Hour. S/U grade only. Discussion of organic chemical research from the current literature. Emphasis upon student presentations. Prerequisite: Consent of the instructor.

531. Spectroscopic Organic Structure Determination. 3 Hours. Discussion of principles and modern practice in the elucidation of the structures of organic molecules using NMR, IR, UV, and mass spectrometry. With practical examples. Prerequisite: Chem 234 or the equivalent.

532. Advanced Organic Chemistry I. 4 Hours. Chemical bonding, stereochemistry, organic reaction mechanisms, with emphasis on physical principles. Prerequisite: Chem 432 or the equivalent.


535. Advanced Synthetic Chemistry. 4 Hours. Topics include: control of stereochemistry (cyclic + acyclic), synthesis of complex natural and unnatural products (alkaloids, terpenes, and so forth) and new methodologies. Prerequisite: Chem 533.

536. Physical Organic Chemistry. 4 Hours. Theoretical and experimental methods of studying reaction mechanisms, with an emphasis on kinetic methods and linear free energy correlations. Prerequisite: Chem 533 or consent of the instructor.

537. Advanced Practical Preparative Chemistry. 4 Hours. An intensive practical course in the methods of synthesis, purification and characterization of organic and inorganic compounds. Prerequisite: Graduate standing in chemistry and the approval of the department.

539. Special Topics in Organic Chemistry. 3 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Discussion of topics of current interest. Prerequisite: Chem 533.

540. Current Problems in Physical Chemistry. 1 Hour. S/U grade only. Student seminars presented on varied topics in physical chemistry. Special emphasis on the application of quantum mechanics and statistical mechanics to the solving of problems in molecular structure, dynamics, and spectroscopy.

542. Quantum Mechanics. 4 Hours. Exact solutions of the Schroedinger equation for simple systems; variational principle and perturbation theory; many-electron atoms and diatomic molecules and their electronic structures; angular momentum. Prerequisite: Chem 346 or the equivalent.


544. Angular Momentum in Quantum Mechanics. 4 Hours. Quantum-mechanical theory of angular momentum. Application to spectroscopy, reaction dynamics, coupling of angular momenta, rotational transformations, graphical methods, Wigner-Eckart theorem, spherical tensors, rotational spectroscopy. Prerequisite: Chem 542 or consent of the instructor.

545. Chemical Kinetics. 4 Hours. Kinetics of elementary chemical reactions; modeling of reaction mechanisms, including collision theory; transition state theory; RRKM theory, and scattering theory; photochemistry, and energy transfer. Prerequisite: Chem 542.

546. Thermodynamics. 3 Hours. Thermodynamics. A formal introduction to physical theories of equilibirum thermostatics. Prerequisite: Chem 346 or the equivalent.

547. The Electronic Structure of Molecules. 3 Hours. Treatment of electrons in molecular systems. Self-consistent field treatments of electrons in many-electron systems. Configuration interaction and perturbation corrections for electron correlation effects. Prerequisite: Chem 543.

549. Special Topics in Physical Chemistry. 3 to 4 Hours. Lectures and readings in areas not normally treated in standard courses. Discussion of topics of current interest in physical chemistry. Prerequisite: Consent of the instructor.

550. Literature Seminar in Biochemistry. 1 Hour. S/U grade only. Presentation of student papers on current research topics in biochemistry.

551. Advanced Biochemistry. 4 Hours. A survey of biochemistry with special emphasis on the thermodynamics and kinetics of biochemical processes. Prerequisite: Chem 454 or 346, or 344.

553. Catalysis in Enzymology. 4 Hours. Applications of physical organic chemistry and steady state kinetics to the understanding of enzyme action. Prerequisite: Chem 454 or consent of the instructor.

554. Bioinorganic Chemistry. 4 Hours. Structure, function, and properties of metal ion coordination centers in metalloproteins, as well as the function of metal ions in enzyme activation and membrane transport. Prerequisite: Chem 452 or 415.

555. Advanced Biochemistry II. 4 Hours. The structure of nucleic acids and the role and processing of nucleic acids in various aspects of genetic regulation. Prerequisite: Chem 454.

556. Macromolecular Structure and Dynamics. 4 Hours. May be repeated for a maximum of 8 hours of credit. Descriptive macromolecular phenomena; translational motions and relation to size and shape; coherent scattering techniques; cooperative transitions; polymer models of nonrigid macromolecules. Prerequisite: Chem 448 or consent of the instructor. Credit in Math 410 is strongly recommended.

559. Special Topics in Biochemistry. 3 to 4 Hours. Same as BioS 559. Students may register for more than one section per term. May be repeated for credit. Selected topics of current interest in biochemistry. Prerequisite: Chem 454 or consent of the instructor.

572. Teaching Methods in Chemistry. 3 Hours. May be repeated for credit. A maximum of 3 hours may be credited toward departmental course requirements for the MS or PhD. Special problems and techniques, including audiovisual methods, lecture demonstrations, the use of computers, and the design of experiments. Prerequisite: Approval of the department.

590. Current Problems in Chemical Research. 2 Hours. May be repeated for credit. S/U grade only. In-depth discussion and analysis of selective aspects of contemporary research with particular emphasis on research carried out in the department. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Prerequisite: Approval of the department.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Prerequisite: Approval of the department.

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
Civil and Materials Engineering (CEMM)

400. Advanced Design of Reinforced Concrete Structures. 4 Hours. Design of reinforced concrete building structures, including design for lateral loads due to wind, structural systems for reinforced concrete buildings, shear walls, and design for seismic forces. Prerequisite: CEMM 310 or the equivalent.

401. Advanced Design of Metal Structures. 4 Hours. Plate girders; unsymmetrical bending; torsion of thin-walled structures; lateral-torsional instability; composite construction. Prerequisite: CEMM 301.


403. Hydraulic Design. 4 Hours. Selected applications of hydraulics and hydrology: pipe, pipe network and water distribution system design; unsteady pipe flow; open channel design; storm water engineering. Prerequisite: CEMM 215.

404. Urban and Regional Transportation Methods. 4 Hours. Same as UPP 461. Methods and models for analyzing and forecasting transportation requirements, costs, and capacities. Prerequisite: Consent of the instructor.

405. Foundation Analysis and Design. 4 Hours. Site characterization; analysis and design of shallow foundations, deep foundations and earth retaining structures; foundations on difficult soils; effects on construction; instrumentation and monitoring. Prerequisite: CEMM 315.

406. Bridge Design. 4 Hours. Theory and design procedures related to the analysis and design of modern bridges. Using the AASHTO Code, includes concrete and steel structures, construction practices and procedures. Prerequisites: CEMM 301 and 310.

407. Soil and Site Improvement Methods. 4 Hours. Compaction, preloading, vertical drains, grouting, admixture stabilization, thermal stabilization, soil reinforcement, geosynthetics; construction of embankments of soft clay, embankments on mechanically stabilized earth walls, hydraulic barriers; case studies. Prerequisite: CEMM 315.

409. Structural Analysis II. 4 Hours. Approximate analysis of structures including trusses and multistory frames. Influence lines, cables and arches. Principles of limit analysis for structures and structural elements. Prerequisite: CEMM 205 or consent of the instructor.

410. Design of Prestressed Concrete Structures. 4 Hours. Principles of prestressed concrete. Analysis and design of statically determinate prestressed concrete members. Introduction to design and detailing of connections. Prerequisite: CEMM 310.

411. Chemistry for Environmental Professionals. 3 Hours. Same as EOHS 440. Introductory atmospheric chemistry, aspects of air pollution, chemistry related to natural water and water treatment; priority organic pollutants and heavy metals. Prerequisite: one year of college chemistry.

412. Water Quality Management. 3 Hours. Same as EOHS 411. Water pollution; historical and current developments in problems and solutions: characterization, water purification, waste treatment, modeling, standards and criteria, public health concerns. Prerequisites: EOHS 405 or consent of the instructor.

413. Analysis of Water and Wastewater Quality. 2 Hours. Same as EOHS 418. Basic instrumentation and procedures related to measurement and surveillance of various water quality parameters.

415. Environmental Geotechnology. 4 Hours. Environmental laws and regulations, sources and types of waste materials, waste materials in geotechnical engineering applications, geotechnical management of municipal, industrial, mine and nuclear wastes. Prerequisite: CEMM 315.

419. Air-Quality Management I. 3 Hours. Same as EOHS 431. Sources, control, dispersion, and effects upon receptors of air pollution: health and other adverse effects, meteorology and dispersion estimation, photochemistry, aerosol characterization. Prerequisites: CEMM 216, or EOHS 405, or consent of the instructor.

420. Water and Wastewater Analysis Laboratory. 4 Hours. Laboratory class for environmental engineering. Analysis of water, wastewater and soil for nutrients, pollutants, physical parameters, and biological parameters.

421. Water Treatment Design. 4 Hours. Water quality control systems. Physical-chemical unit processes applied to systems designed for treatment of municipal and industrial waters. Field trip required at a nominal fee. Prerequisites: CEMM 216 and consent of the instructor.

422. Biological Wastewater Treatment Design. 4 Hours. Processes involved in the geological treatment of wastewater. Aerobic and anaerobic treatment, sludge stabilization, and nutrient removal. Field trip required at a nominal fee. Prerequisite: CEMM 216 or the equivalent.

423. Management of Solid and Hazardous Wastes. 3 Hours. Same as EOHS 472 and Geog 444. Management of solid and hazardous waste, including radioactive waste: landfills, incineration, recycling, composting, source reduction, groundwater and air pollution impacts, control, regulations, siting, health impacts.

425. Environmental Remediation Engineering. 4 Hours. Sources of contamination, regulations, site characterization, impact assessment, waste disposal and containment options, waste treatment options, case studies. Prerequisite: CEMM 315.

429. Introduction to Construction Management. 4 Hours. Structure of the construction industry and construction projects; review of arrow and precedence networks. Critical path and PERT networks; consideration of time-cost trade-offs in construction projects; resource allocation analyses.

430. Theory of Elasticity I. 4 Hours. The boundary value problems of linear elasticity. Uniqueness of solution. Reduction to two dimensions: the plane problems, torsion, bending, Polar coordinates and general orthogonal coordinates. Prerequisites: CEMM 204 and Math 481 or the equivalents.

431. Introduction to Continuum Mechanics. 4 Hours. Vectors and tensors, stress, principal stresses and principal axes, deformation, compatibility conditions, constitutive equations, isotropy and mechanical properties of fluids and solids. Prerequisites: CEMM 204 and ME 211.


434. Finite Element Analysis I. 4 Hours. Establishment of basic finite element, matrix relations for one-dimensional heat conduction problems: truss, beam, and frame structural systems. Solution methods of the resulting equations. Introduction to two-dimensional analysis. Prerequisites: CEMM 205 or ME 401 and EECS 170.


453. Experimental Stress Analysis. 4 Hours. Structural similitude and dimensional analysis. Strain measurement techniques. Introduction to photomechanics. Prerequisite: CEMM 430.

454. Structural Analysis and Design of Tall Buildings. 4 Hours. State-of-the-art introduction to structural analysis and design of tall buildings. Load impact on different structural systems. Prerequisites: CEMM 401 or CEMM 409 or the equivalent, or consent of the instructor.

461. Materials Synthesis and Processing, Principles and Applications. 4 Hours. Processing and synthesis approaches, status, thermodynamics and process engineering, microstructure development, silicon production, chemical vapor deposition of ceramics and semiconductors, plasma processing in CVD. Prerequisite: CSE 311 or CEMM 364 or consent of the instructor.


464. Processing and Properties of Ceramics. 4 Hours. Introduction to the processing, technology, and properties of ceramic materials. Prerequisite: CEMM 260.


470. Physical and Mechanical Properties of Materials. 4 Hours. Basic metallurgical phenomena; kinetics and phase stability; diffusion and transformation rates. Mechanical properties of materials; creep; fatigue and fracture. Prerequisite: CEMM 260.

471. Thermodynamics of Materials. 4 Hours. Application of chemical and thermodynamic principles to processing and characterization of materials. Prerequisite: CEMM 260.


478. Corrosion. 4 Hours. Electrochemical concepts in corrosion; polarization, passivation, methods of corrosion control and oxidation. Prerequisite: CEMM 364.

480. Welding Metallurgy. 4 Hours. Metallurgy of metals joining processes. Selection of processes and design of products manufactured by joining processes. Prerequisite: CEMM 368.


493. Seminar. 1 to 3 Hours. Topics of mutual interest to a faculty member and a group of students. Offered as announced in the timetable.

494. Special Topics in Civil Engineering, Mechanics, and Materials. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Subject matter varies from section to section and from semester to semester, depending on the specialties of the instructor. Prerequisite: Consent of the instructor.

496. Special Problems. 1 to 4 Hours. Special problems or reading by special arrangement with a faculty member. Prerequisite: Consent of the instructor.

500. Design of Concrete Plate and Shell Structures. 4 Hours. Practical design of reinforced concrete slabs, walls, and shells of single and double curvatures. Includes barrel roofs, domes, and storage tanks. Prerequisite: CEMM 310.

501. Urban Transportation. 4 Hours. Transportation technology, and its relation to travel and location phenomena in large urban areas, as a basis for planning, operating and design of multimodal transportation systems. Prerequisites: CEMM 302 and Math 210 and Econ 120.

502. Advanced Traffic Control Strategies. 4 Hours. Modeling approaches to traffic flow. Intersection, arterial and network control methods. Traffic simulation with emphasis on signal control logic. Prerequisite: CEMM 402 or consent of the instructor.

504. Advanced Transportation Planning II. 4 Hours. Same as UPP 567. Analysis and design of transportation networks using methods from mathematical programming and optimal control theory; integration of travel choice models with urban location and network design models. Prerequisite: Consent of the instructor.

505. Advanced Soil Mechanics. 4 Hours. Soil structure, stresses in soil mass, fluid flow, consolidation, drained and undrained shear strength, stress-strain relations, laboratory determination of strength and compressibility of soils. Prerequisite: CEMM 315.

506. Physical/Chemical Principles in Environmental Systems. 4 Hours. Physical and chemical principles in natural and engineered environmental systems. Environmental process equilibrium and rates. Reactor design and mass transfer in environmental systems. Multiphase environmental processes. Prerequisite: CEMM 216.

508. Urban Travel Forecasting. 4 Hours. Theory and method of forecasting travelers’ choices of route, mode, destination, departure time, trip frequency and origin location in congested urban transportation networks. Prerequisites: CEMM 302 and Math 210 and Econ 120.

509. Transportation Networks. 4 Hours. Application of constrained optimization methods to the analysis, planning and design of urban transportation networks. Prerequisites: CEMM 501 and CEMM 508 and Econ 501 and Math 484.

510. Advanced Design of Prestressed Concrete Structures. 4 Hours. Analysis and design of indeterminate prestressed concrete members. Composite beams, torsion, deflections and design and detailing of connections, special topics such as anchorages and zone design. Prerequisite: CEMM 410.

512. Theory of Traffic Flow. 4 Hours. Theory of traffic flow, including statistical properties of traffic events, car following and traffic stream models. Queuing and gap acceptance processes at intersections and roadways. Prerequisites: CEMM 402 and Math 370 or the equivalents, or consent of the instructor.

515. Embankments and Earth Structures. 4 Hours. Shear strength and consolidation of soils, slope stability analysis, embankments and earth dams, sheet pile walls, braced and tied back walls, slurry walls, tunnel supports. Prerequisite: CEMM 315.

516. Design of Landfills and Impoundments. 4 Hours. Regulatory overview, site selection, waste characterization, design and construction of landfill and impoundment components, operations, performance monitoring, closure plans, long-term impacts and monitoring, economic analysis. Prerequisite: CEMM 315.

518. Pollution Prevention Engineering. 4 Hours. Pollution prevention concepts, planning and economics. Improved manufacturing operations and life cycle assessment. Design for the environment, resource conservation and sustainable development. Prerequisite: CEMM 216.

520. Earthquake Engineering of Concrete Structures. 4 Hours. Earthquake phenomena; response spectrum and design spectrum concepts; dynamic response of structures to earthquakes, methods of analysis; code approach to earthquake-resistant design; alternative approaches. Prerequisite: CEMM 310.

521. Biological Treatment Fundamentals. 4 Hours. Fundamental processes for the biological treatment of wastewater, pollutants, and bioremediation. Growth and metabolism, kinetics, microbial ecology, biogeochemistry, and pollutant biodegradation. Prerequisite: Credit or concurrent registration in CEMM 422, or consent of the instructor.

522. Water and Wastewater Treatment. 3 Hours. Same as EOHS 512. Water and wastewater characterization, physical, chemical and biological methods of water and wastewater treatment; regulatory and control trends; and environmental impact determinations. Prerequisite: CEMM 412 or consent of the instructor.


524. Water Chemistry. 3 Hours. Same as EOHS S42. Chemical equilibria and kinetic principles as applied to processes.
occurring in natural and engineered water systems. Prerequisite: CEMM 411.

525. Advanced Biological Treatment and Bioremediation. 4 Hours. Advanced biological treatment processes. Stoichiometry of biological reactions, kinetics, bioremediation, biochemical pathways for pollutant biodegradation, immunological and genetic characterization of microbial cultures. Prerequisite: Credit or concurrent registration in CEMM 521; or consent of the instructor.

526. Air-Quality Management II. 2 Hours. Same as EOHS 532. Air quality management: Integration of diverse aspects. Data interpretation; standards setting; policy implementation; equipment design; hazardous spill modeling; indoor air pollution; case studies. Prerequisite: CEMM 419.

528. Hydrometeorology. 4 Hours. Evaporation, transpiration, and the surface energy budget; fluid mechanics and thermodynamics of the turbulent lower atmosphere applied to transport of water and other quantities. Prerequisite: CEMM 427 or consent of the instructor.

530. Theory of Elasticity II. 4 Hours. Review of complex variable theory. Complex variable formulation of plane problems. Singularities and crack problems. Prerequisite: CEMM 430 or the equivalent.

531. Nonlinear Continuum Mechanics. 4 Hours. Matrices and general tensors, isotropic tensor functions, representation theorem, kinematics, polar decompositions, Cauchy-Green tensors, Cauchy stress, Piola-Kirchoff stresses, constitutive laws, frame indifferences, hyperelastic and universal solutions. Prerequisite: CEMM 430 or 431.

532. Theory of Plates. 4 Hours. Development of classical plate theory and boundary conditions and solutions to problems in rectangular and polar coordinates. Energy principles, large deflection theory, thick plate theory with applications. Prerequisite: CEMM 432.


534. Finite Element Analysis II. 4 Hours. Application of the finite element method to the analysis of complex continuum and structural linear systems. Introduction to error analysis and convergence of the finite element solutions. Prerequisite: CEMM 434.

535. Theory of Vibrations II. 4 Hours. Same as ME 535. Harmonic vibrations; vibrations of a string; vibrations of a beam; vibrations of a membrane; periodic systems; floquet waves; nonlinear vibrations. Prerequisite: CEMM 435 or ME 408 or the equivalent.

536. Nondestructive Testing of Concrete. 4 Hours. Strength and durability of concrete structures by nondestructive evaluation of the material through acoustic, magnetic, thermal, electrical, optical phenomena; nondestructive methodologies for evaluation of concrete structures. Prerequisite: CEMM 310.


538. Wave Propagation in Solids I. 4 Hours. Traffic flow; flood flow; elastic waves in rods; plastic waves in rods; combined stress waves and shock waves; waves in Timoshenko beams; the Riemann problem. Prerequisite: CEMM 430 or the equivalent.


541. Mechanics of Composite Materials. 4 Hours. Anisotropic elastic materials; stress analysis for anisotropic materials; Stress-strength parameters; anisotropy; singularities at free-edges; stress analysis in composites; wave propagation in composites. Prerequisite: CEMM 430 or the equivalent.

542. Theory of Shells. 4 Hours. Differential geometry, kinematics of deformation, equations of equilibrium, energy theory, membrane theory, general bending theory. Prerequisite: CEMM 430.


544. Structural Dynamics. 4 Hours. Formulation and solution methods for time dependent systems. Pertinent numerical techniques and their application to seismic analysis, blast loading and heat transfer problems. Prerequisite: CEMM 434.

550. Theory of Viscoelasticity. 4 Hours. Laplace transforms, Stieltjes integrals; linear stress-strain laws; correspondence principles; encaus viscoelastic cylinder; contact problems; beam-columns; vibration; thermoviscoelasticity. Prerequisite: CEMM 430 or the equivalent.

554. Nonlinear Finite Element Analysis. 4 Hours. Nonlinear elastostatics, consistent linearization, Newton and modified-Newton methods, line search techniques, arc-length methods. Hyperelasticity, B-bar type methods. Finite deformation elastodynamics, semi-discretization, time-stepping algorithms. Prerequisites: CEMM 531 and 534, or consent of the instructor.

560. Advanced X-ray Diffraction. 4 Hours. Single crystal methods in X-ray diffraction, determination of crystal structure, precise parameter measurement, phase diagram determination, X-ray spectroscopy. Prerequisite: CEMM 460.

562. Electron Microscopy. 4 Hours. Principles and experimental methods of electron microscopy of crystalline materials. Discussion of electron optics and X-ray and electron spectroscopy. Selected laboratory experiments utilizing SEM. Prerequisite: Consent of the instructor.


568. Kinetics of Reactions and Phase Transformations in Metals. 4 Hours. Nucleation and growth kinetics, order of transformation, grain growth recovery, recrystallization, solidification, phase transformation in solids, precipitation hardening, spinodal decomposition and martensitic transformations. Prerequisite: Consent of the instructor.

570. Diffusion Phenomena in Materials. 4 Hours. Diffusion mechanisms in crystals; Kirkendall effect; diffusion in ionic solids; diffusion in gases and liquids; diffusion through porous media; kinetics of diffusion controlled processes.


574. Deformation Mechanisms of Solids. 4 Hours. Dislocation motion in solids; influence of impurities and point defects on dislocation velocities; hardening mechanisms; creep and fracture processes.

594. Advanced Special Topics in Civil Engineering, Mechanics and Materials. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Subject matter varies from section to section and from semester to semester, depending on the specialties of the instructor. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. Special problems of reading by special arrangement with a faculty member. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Students may register for more than one section per term. MS thesis work under the supervision of a faculty member.

599. PhD Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Students may register for more than one section per term. PhD thesis work under the supervision of an advisor.

Classics (CI)

401. Topics in Greek History. 4 Hours. Same as Hist 401. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history or classics.

402. Topics in Roman History. 4 Hours. Same as Hist 402. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history or classics.

404. Roman Law and the Civil Law Tradition. 4 Hours. Same as Hist 404 and CrJ 404. Roman law and its relationship to values
and social structure; social analysis through law; continental law tradition. Prerequisite: CJf 200 or Hist 203 or consent of the instructor.

490. The Classics and Their Survival: Literature and Myth. 4 Hours. All readings are in English. Classical myth and literature (Vergil, Ovid, and in particular, Seneca) with emphasis on survival and influence on later literature and culture. Prerequisite: One 200-level course in classics or graduate-level work in literature or consent of the instructor.

498. Special Topics in Classical Civilization. 4 Hours. May be repeated for credit. Students may register for more than one section per term. All readings are in English. Advanced study of topics in classical civilization. Sample topic: Augustus and his image. Prerequisite: Two classics courses at the 200 level.

499. Advanced Independent Study. 4 Hours. Students may register for more than one section per term. Advanced independent study under faculty direction. Reading and papers on chosen topics for qualified students based on preparation and interest. Students must consult with faculty. Prerequisites: Consent of the faculty member and the department.

Committee on Institutional Cooperation (CIC)

500. Committee on Institutional Cooperation. 0 to 16 Hours. Students may register for more than one section per term. Holding course for UIC doctoral students taking approved course work at other institutions through the CIC Traveling Scholar Program. Prerequisites: Admission to a doctoral program and approval of the Graduate College.

Communication (Comm)

404. Discourse Analysis. 4 Hours. Nonverbal aspects of communication; rules of communication; speech acts; conversational coherences; acts and sequences in communication; marital communication patterns. Prerequisite: Comm 304 or 315 or 416; or approval of the department.

410. Rhetorical Criticism. 4 Hours. Analysis and evaluation of critical standards for rhetorical interpretation. Application of critical standards to contemporary rhetorical events. Prerequisite: Comm 312 and 313; or approval of the department.

416. Conflict and Communication. 4 Hours. Students learn to manage and resolve conflict in business, governmental, and community settings. Practical analysis of interpersonal and group conflict cases. Prerequisite: Comm 312, 313 and 315; or approval of the department.

430. Media, Information, and Society. 4 Hours. News as a distinct form of mass communication, involving social functions and significant questions about facts, truth, knowledge, and values. Prerequisites: Comm 103, and 200 or 300; or approval of the department.


454. Psychology of Language. 3 Hours. Same as Ling 474 and Psch 454. Introductory survey of methods, theory and research; linguistic foundations, history, and present status of the field.

467. Public Opinion and Political Communication. 4 Hours. Same as PolS 467. Nature of public opinion and political communication systems. Patterns of opinion distribution and its measurement. Forces shaping public opinion and its impact on public policy. Prerequisite: PolS 200 or the equivalent or consent of the instructor.

473. Organizations and Their Publics. 4 Hours. History of relevant theories and models; problem solving: analyzing goals, identifying publics, setting objectives, designing messages, choosing channels, planning implementation (budgeting, staffing, timetables), evaluating efforts. Prerequisite: Comm 201 and 306; or approval of the department.

474. Internship. 3 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. Only 3 hours may be counted toward the communication major. May not be counted toward the Master of Arts degree requirements. Students work in an approved professional setting. Individual projects developed through conferences with a faculty member and a field supervisor. Prerequisites: 12 hours of upper-division (200 or higher) courses in communication, with a 3.00 grade point average in those courses; recommendation of two faculty members and approval of department obtained in semester prior to internship.

490. Communication, Culture, and Society. 4 Hours. Same as Ling 490. Analysis of contrastive cultural paradigms (interethnic, gender, class) to develop student's awareness of own socialization and cultural orientation. Prerequisites: Comm 201 and 203, and at least two 300- or 400-level communication courses; or approval of the department.

494. Special Topics in Communication. 4 Hours. May be repeated for a maximum of 12 hours of credit. Contemporary trends in the field of communication. Prerequisites: Comm 200 and 201 and consent of the instructor; or approval of the department.

498. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. May not be counted toward the minimum MA in communication degree requirements. Individual investigation of special problems (student-initiated or related to faculty research). May be used for special projects, such as interdisciplinary seminars. Prerequisite: Approval of the department.

500. Introduction to Communication Research. 4 Hours. History of the field, research traditions, communication viewed as social science; forming research questions, reviewing and critiquing literature, formulating hypotheses and rationale, conceptually defining variables. Prerequisite: Consent of the instructor or graduate standing in communication.

501. Operationalizing Communication Research. 4 Hours. Levels of measurement; operational definitions; sampling qualitative and quantitative designs; coding and analysis of data; statistics; pilot testing and instrument/design revision; writing research reports. Prerequisite: Comm 500.

502. Seminar in Media Studies. 4 Hours. In-depth, intensive examination of theories, perspectives, and approaches to media studies. Prerequisite: Comm 500 or consent of the instructor.

503. Seminar in Intercultural Communication. 4 Hours. Introduction to basic theoretical concepts and important issues in intercultural communication. Prerequisite: Comm 500 or consent of the instructor.

505. Organizational Communication. 4 Hours. Classic and current research. Models that examine organizational communication; assessment of organizational problems and conduct of problem-solving research. Prerequisites: Comm 306 and 500, or consent of instructor.

506. Cross-Cultural Communication. 4 Hours. Same as Ling 506. Analysis of different theoretical approaches to cross-cultural communication (sociolinguistic, attributional); contrastive analysis of Western and non-Western cultural systems (interactional etiquette, discourse rules).

524. Developmental Psycholinguistics. 3 Hours. Same as Ling 572 and Psch 523. Theories, research methods and research findings in the area of language development. Biological, cognitive, and social influence; disorders of language development. Prerequisite: Consent of the instructor.

525. Approaches to Rhetorical Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Contemporary approaches to rhetorical criticism. Each offering focuses upon the distinctive contributions of specified rhetoricians to the theory and practice of rhetorical criticism. Prerequisite: Comm 410.

534. Mass Communication Theory. 4 Hours. Introduction to major theories of mass communication: their social history and substantive claims; distinction between mass mediated and other forms of communication, implications of distinction.

567. Topics in Political Communication. 4 Hours. Same as PolS 567. Intensive study of selected aspects; organizational communication in public institutions, urban political communication patterns, communication elites. Independent research using a variety of community research techniques. Prerequisite: Consent of the instructor.

580. Qualitative Methods in Communication. 4 Hours. Same as Ling 582. Qualitative methods course analyzing language and culture patterns. Prerequisite: Comm 501 or consent of the instructor.

591. Health Communication. 4 Hours. Focusing on interpersonal, organizational and public contexts, seminar participants
will review current literature in health communication, and apply selected communication concepts to health-related situations. Prerequisite: Graduate standing in communication or enrollment in a health professions school or college or consent of the instructor.

592. Cross-Cultural Health Communication: Ethnicity, Class, and Gender. 4 Hours. Using theory and students’ experiences, this course examines cultural values, assumptions and communicative practices in terms of their implications for patients and health practitioners. Prerequisites: Graduate standing in communication or enrollment in a health professions school or college or consent of the instructor.

594. Advanced Special Topics in Communication. 1 to 4 Hours. May be repeated for credit. Student may register for more than one section per term. Advanced topics in communication theory and research. Subject matter varies. Prerequisite: Consent of the instructor.

596. Independent Research. 1 to 4 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Department approved research projects not included in thesis research. Prerequisites: Consent of the head of the department.

598. Thesis Research. 0 to 16 Hours. S/U grade only. Students may register for more than one section per term. Under guidance of an advisor and committee the student develops and conducts a research project addressing a communication problem of a basic or applied nature. Prerequisite: Comm 501.

Community Health Sciences (CHSc)

400. Public Health Concepts and Practice. 3 Hours. Concepts, principles and case studies which provide an overview of the philosophy, purpose, history, organization, functions, tools, activities, and results of public health practice. Prerequisite: Enrollment restricted to public health students; other graduate and professional students admitted by consent as space permits. To obtain consent, see the SPH registrar.

403. The Future of Public Health. 2 Hours. Key public health issues in the United States since the late 1970s. Review of major governmental reports and discussions by public health practice experts.

405. Leadership in Public Health Practice. 3 Hours. Same as HPA 405. Utilizing public health core functions, this course explores leadership style and practice through case studies and techniques which enhance leadership development. Prerequisites: CHSc 400 and consent of the instructor.

411. Nutrition for Public Health Professionals. 3 Hours. Foundation course to introduce nutrition principles and their application to public health populations and problems. Prerequisite: CHSc 400 or consent of the instructor.

413. Principles of Delivering Public Health Nutrition Services. 3 Hours. Same as HN 413. Assessment, planning and evaluation of community nutrition programs using a systems approach. Prerequisite: CHSc 411 or consent of the instructor.

419. Public Health Aspects of Sexuality and Women’s Health. 3 Hours. Same as GWS 419. An overview of human sexuality from a public health view with special emphasis on family planning, sexuality and behavior effects on women’s health.

421. Family Perspectives on Disability. 3 Hours. Same as DHD 420 and DMD 420. Societal trends, family caregiving theories and research methodology, support policies and interventions, and family-centered approaches pertaining to families of persons with disabilities.

425. Public Health and Aging. 3 Hours. Gerontological public health issues are examined through the psychosocial and physical dimensions of the aging process and interactions between the elderly and the health care system. Prerequisite: CHSc 400 or consent of the instructor.

432. Analytic Methods in Public Health. 3 Hours. Provides analytic and computer skills needed for assessment and planning in public health and for maximizing the acquisition and use of public health data. Prerequisites: Bstt 400 and Epid 400 and CHSc 400.

433. Public Health Planning and Evaluation. 3 Hours. Planning and evaluation for community health programs, including proposal development and evaluation; considerations for community/consumer involvement in planning process. Prerequisite: Credit or concurrent registration in CHSc 442 and CHSc 480 or consent of the instructor.

434. Introduction to Qualitative Methods in Public Health. 3 Hours. Introduction to the major techniques used in qualitative research (observation, participant observation, in-depth interviews). Includes field and in-class exercises, and introduces computer-assisted qualitative data analysis.

441. Introduction to Maternal and Child Health. 3 Hours. Same as GWS 441. Title V maternal and child health programs; concepts of delivery risks by age; effective interventions and public sector organization for delivery of MCH services. Prerequisite: Consent of the instructor. Recommended background: Some knowledge of maternal and child health issues.

442. Introduction to Assessment in Public Health. 2 Hours. Conceptualization and measurement of community health status. Epidemiologic, sociocultural and health systems approaches to assessment, qualitative and quantitative techniques, and political and group processes. Prerequisites: Bstt 400, Epid 400, and CHSc 400.

446. Research Methods in Community Health. 3 Hours. Introduction to principles and techniques for scientific investigation of problems in public health research and practice: planning and proposal development; ethics; research design; subject selection; measurement; data collection; program evaluation; and reporting results. Prerequisite: Bstt 400 or the equivalent.

447. Survey Planning and Design. 2 Hours. Theory and applications of sample survey planning and design for conducting research in health sciences and related fields. Addresses three major topics: survey design and planning, sampling and data collection procedures. Prerequisite: Bstt 400 or the equivalent. Credit in CHSc 446 or the equivalent is recommended.

450. Introduction to International Health. 3 Hours. Survey of health conditions focusing on Third World issues including consequences of population trends, disease prevalence, prevention/ control, and technology transfer in socio-economic context.

454. Women, Health, and International Development. 3 Hours. Introduction to health and development for women in the developing world, including gender analysis, poverty, education, economic productivity, mortality and morbidity patterns and psychosocial health. Prerequisite: CHSc 400 or consent of the instructor.

456. Women's Health: A Primary Health Care Approach. 3 Hours. Same as NuPH 455 and NuSc 455 and NuWH 455. Health promotion and disease prevention in women's health. Includes community experience with community women. Primary health care approaches examined. Prerequisite: Consent of the instructor.

460. Public Health Aspects of Mental Health. 2 Hours. Basic concepts of the community mental health movement: issues of deviance, psychiatric diagnosis, prevention and service delivery. Prerequisite: CHSc 400 or consent of the instructor.

461. Public Health Aspects of Family Violence. 2 Hours. The theory, etiology, treatment and prevention from a public health perspective of child abuse, child sexual abuse, spouse abuse, and elder abuse. Prerequisite: CHSc 400 or consent of the instructor.

463. Public Health Aspects of Disability. 3 Hours. Surveys psychological, sociological, economic, and health related issues of lifetime disability as they affect individuals and their families; includes problems of physical and mental handicaps. Prerequisite: CHSc 400 or consent of the instructor.

464. Survey of Developmental Disabilities. 3 Hours. Same as DHD 464. Survey of the developmental disabilities field, including basic definitions, history of DD services, relevant public policies and legislation, service delivery systems, and research. Prerequisite: Consent of the instructor.

480. Health Education and Health Promotion. 3 Hours. Theories of health, illness behavior and health education for public health professionals; classical health interventions and surveys, approaches for individual and group behavior change.

485. Communications, Mass Media and Public Health. 3 Hours. Examines the development, theoretical bases, and assessments of mass media interventions, and the intended and unintended effects of the mass media in society.

494. Special Topics in Community Health Sciences. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Special topics in community health sciences are presented. Prerequisite: Consent of the instructor.

500. Proseminar in Community Health Sciences. 3 Hours. Analysis of current key literature from behavioral sciences.
maternal and child health, gerontology, general and miscellaneous fields of community health sciences. Prerequisites: CHSc 400 and 8 semester hours in student’s major field.

501. Foundations of Public Health Inquiry. 3 Hours. Examination of research paradigms, precepts of theory development, literature synthesis, and ethical principles, all enhance the scholarliness and meaningfulness of doctoral students’ public health inquiry. Prerequisite: CHSc 400.

514. Nutritional Epidemiology. 3 Hours. Examination of nutritional and epidemiological techniques to the design of population-based nutrition research. Students complete research proposal using nutritional assessment, epidemiology and research skills. Prerequisites: CHSc 411 and Epid 400 and 401, or consent of the instructor.

520. Socio-Economic Aspects of Family Planning. 3 Hours. The social and economic determinants of population and family planning, projections to the future and trends in contraceptive use in both developed and developing countries. Prerequisite: CHSc 450 or consent of the instructor.

525. Dying, Grief and Hospice. 3 Hours. An interdisciplinary course stressing team management of dying persons and their families; includes hospice concepts and a hospice practicum. Prerequisite: CHSc 425 or 426, or consent of the instructor.

527. Critical Issues in Long Term Care Policy. 3 Hours. Same as HPA 527. Long-term care organization, financing, delivery utilization and policy, emphasizing affordability, access and quality in a managed care environment. Prerequisites: CHSc 400 and 425 or consent of the instructor.

528. Societal Analysis of Aging, Health and Health Care. 3 Hours. Same as Soc 528. Analysis of aging, health and health care issues mainly from sociological and public health perspectives. Review and application of appropriate concepts, theories and methods. Prerequisite: CHSc 425 or consent of the instructor.

529. Gerontological Health/illness Behavior. 2 Hours. Perceptions and behaviors of older adults are examined in reference to illness prevention, health promotion and reactions to acute and chronic illness. Prerequisite: CHSc 480.

542. Advanced Maternal and Child Health Applied Programs. 3 Hours. Interventions and services in health care programs for maternal and child populations. In-depth program analysis and problem solving with emphasis on public sector programs, population needs and program evaluation. Prerequisite: CHSC 441.

543. MCH Policy and Advocacy. 3 Hours. Explores the social, economic and political dynamics which influence the development and implementation of MCH policy and U.S. health policy in general. Prerequisite: CHSC 441 or consent of the instructor.

544. Public Health Aspects of Adolescent Health. 3 Hours. Students research contemporary issues in adolescent health, relating them to physical and emotional development and to policy. Prerequisite: CHSc 441.

545. Reproductive and Perinatal Health. 3 Hours. Same as Epid 545. This course focuses on the epidemiology of key reproductive and perinatal health outcomes and relevant health services and health policies. Prerequisites: Bstt 400 and CHSc 400 and Epid 400 and consent of the instructor.

546. Reproductive/Perinatal Epidemiology Data Seminar. 2 Hours. Using existing relevant data bases with multiple exposures and perinatal outcomes, students will employ epidemiologic methods to examine the effect of various exposures on perinatal outcomes. Prerequisites: Bstt 400 and Epid 401 and consent of the instructor.

547. Public Health Approaches to Maternal and Child Nutrition. 2 Hours. Advanced seminar to integrate role and application of nutrition for maternal and child populations. Prerequisite: CHSc 411 or CHSc 441 or consent of the instructor.

548. Readings in Reproductive and Perinatal Epidemiology. 1 Hour. Advanced seminar in reproductive/perinatal epidemiology with particular emphasis on methodologic issues. Prerequisites: CHSC 441 and Epid 401 or consent of the instructor.

554. International Health Studies. 2 Hours. Examines global health patterns, and variation among nations on disease causation; provides critical reviews of comparative studies of specific health problems. Focus varies each offering. Prerequisite: CHSc 450 and 400, or consent of the instructor.

564. Community Integration in Developmental Disabilities. 3 Hours. Same as DHD 564 and Dis 564. Historical and contemporary issues pertaining to the empowerment and integration of persons with developmental disabilities into community settings.

565. Advanced Concepts in Work Rehabilitation. 4 Hours. Same as OT 545. Presents current theory, research, and clinical practice in work-related rehabilitation of physically injured, psychiatric, and neurologically impaired clients. Prerequisite: Consent of the instructor.

577. Survey Questionnaire Design. 3 Hours. Concepts and strategies for developing survey questionnaires for various modes of survey data collection. Students develop and present questionnaires related to their individual interests. Prerequisite: CHSc 446 or 447, or consent of the instructor.

584. Community Organizing for Health. 3 Hours. Focus on the bases of facilitating community organizing processes in health promotion including theories, fieldwork tools, feminist and international perspectives. Field work required. Prerequisite: CHSc 480 or consent of the instructor.

585. Health Advertising. 2 Hours. Effects of pro- and anti-health advertising (e.g., for nutrition, alcohol, tobacco). Policies and laws regarding current controversies. Elements of ads and campaigns that effect behavior change. Prerequisite: CHSc 485.

586. Health Behavior Interventions. 3 Hours. Advanced concepts and strategies for the development, implementation, and evaluation of public health interventions to change health behaviors. Individual intervention project proposal or equivalent final paper required. Prerequisites: CHSc 446 and CHSc 480.

594. Advanced Special Topics in Community Health Sciences. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced study of topics in maternal and child health, gerontology, psychosocial problems in health and illness, health care delivery, international health, aspects of community health. Prerequisites: Epid 400, Bstt 400, CHSc 400, and consent of the instructor.

595. Seminar in Community Health Sciences. 1 to 3 Hours. S/U grade only. Analysis of current research in community health sciences. Prerequisite: Consent of the instructor.

Computer Science (CS)


415. Computer Vision I. 4 Hours. Previously listed as EEC 487. Computer vision system design. Segmentation and representation of regions and boundaries; image filtering; object recognition; advanced topics (examples: texture, stereo, color); applications. Programming assignments. Prerequisite: CS 202 or MCS 360 or consent of the instructor.

421. Natural Language Processing. 4 Hours. Design of natural language processing systems; part-of-speech tagging, statistical and symbolic parsers; semantic interpretation; discourse and dialogue processing; natural language generation; applications. Prerequisite: CS 301 or MCS 441.

422. User Interface Design and Programming. 4 Hours. Previously listed as EEC 479. User interface design, implementation, and evaluation of user-centered design methodologies, windowing systems, I/O devices and techniques, event-loop programming, user studies. Programming projects. Prerequisite: CS 340.

426. Multimedia Computing. 4 Hours. Processing multimedia information including video, images, audio, text, and specialty data. Multimedia sources, formats, operations, and algorithms. Implementation projects. Prerequisite: CS 202 or MCS 360 or consent of the instructor.

440. Introduction to Software Engineering. 4 Hours. Previously listed as EEC 470. Software life-cycle model, requirement specification techniques, large-scale software design techniques and
tools, implementation issues, testing and debugging techniques, software maintenance. Prerequisite: CS 340.

441. Distributed Object Programming Using Middleware. 4 Hours. Extensive computer use required. Design and implementation of distributed object programs using middleware software standards; interface definition languages and programming language mappings; static and dynamic object communication mechanisms. Prerequisites: CS 340 and CS 385.

450. Introduction to Networking. 4 Hours. Credit is not given for CS 450 if the student has credit in EECS 433 or ECE 433. Network protocols, algorithms, and software issues. Topics include the open systems interconnect model, data link, network and transport layers, TCP/IP, ATM, mobile networks. Prerequisites: CS 202 and CS 385, and either Stat 381 or Stat 401 or IE 342.


486. Advanced Computer Architecture. 4 Hours. Credit is not given for CS 466 if the student has credit in EECS 466 or ECE 466. Design of high performance computer architecture. Cost-performance; instruction sets; pipelining; memory hierarchy; I/O. Prerequisite: CS 366.

469. Computer Systems Design. 4 Hours. Credit is not given for CS 469 if the student has credit in EECS 469 or ECE 368 or ECE 469. Analysis and modeling of digital systems; hardware description languages; CAD tools for simulation, synthesis, and verification of computer systems. Project: a simple processor design. Prerequisite: CS 366.

472. Testing and Verification of Real-Time Software. 4 Hours. Previously listed as EECS 472. Correctness properties, modeling and specification languages, testing and automatic verification techniques for concurrent and real-time systems. Ada programming projects. Lab assignments with automatic verification tools. Prerequisites: CS 301 and CS 385 and CS 440.

473. Compiler Design. 4 Hours. Previously listed as EECS 473. Same as MCS 411. Language translation: lexical analysis, parsing schemes, symbol table management, syntax and semantic error detection, and code generation. Development of fully-functional compiler. Prerequisites: Grade of C or better in either CS 301 or MCS 441, and in either CS 202 or MCS 360 and CS 266.

474. Object-Oriented Languages and Environments. 4 Hours. Previously listed as EECS 474. Data abstraction, classes and objects, messages and methods, polymorphism and dynamic binding, inheritance. Object-oriented design. Pure and hybrid object-oriented languages. Prerequisite: CS 340.

475 Object-Oriented Programming. 4 Hours. No credit given if student has credit in CS 340 or CS 347. OO Paradigm: classes, messages, methods, variables, inheritance, polymorphism; the C++ and Java languages; programming labs required. Extensive computer use required. Prerequisites: CS 202; and consent of the instructor.

476. Programming Language Design. 4 Hours. Previously listed as EECS 476. Same as MCS 415. Definition, design and implementation of programming languages. Syntactic and semantic description; variable bindings, control and data structures; parsing, code generation, optimization; exception handling; data abstraction. Prerequisites: MCS 261 and MCS 275; or CS 340.


485. Networked Operating Systems Programming. 5 Hours. Previously listed as EECS 471. Concepts, design, and programming of multiprocess and distributed systems; interprocess communications; fault tolerance; distributed programming semantics. Programming assignments and project required. Prerequisite: CS 385.

488. Computer Graphics I. 4 Hours. Previously listed as EECS 488. Same as AD 488. Principles of interactive computer graphics. Raster and vector display, techniques and hardware considerations. Introduction to two-dimensional and three dimensional rendering. Laboratory. Prerequisite: Credit or concurrent registration in CS 340.

491. Seminar. 1 to 4 Hours. Previously listed as EECS 491. May be repeated for credit. Topics of mutual interest to a faculty member and a group of students. Offered as announced by department bulletin or the Timetable. Prerequisite: Consent of the instructor.

493. Special Problems. 2 to 4 Hours. Previously listed as EECS 493. No graduate credit for computer science majors. Special problems or reading by special arrangement with the faculty. Prerequisite: Consent of the instructor.


503. Applied Graph Theory. 4 Hours. Previously listed as EECS 563. Paths, circuits, trees, cutsets, planarity, duality, matrices and vector space of graphs, directed graphs, coloring, covering, matching and applications to switching networks and computer science. Prerequisite: Consent of the instructor.

505. Computability and Complexity Theory. 4 Hours. Previously listed as EECS 561. Turing machines, undecidability, Rice's theorem, recursively enumerable sets, complexity theory, hierarchy theorems, alternation, parallel complexity classes, complete problems. Prerequisite: CS 301.

511. Artificial Intelligence II. 4 Hours. Previously listed as EECS 574. Predicate logic and resolution strategies, reasoning under uncertainty, incomplete information reasoning, state and change, planning, temporal reasoning knowledge representation, learning, advanced search techniques and current topics. Prerequisite: CS 411.

513. Logic Programming. 4 Hours. Previously listed as EECS 583. Logic programming theory and its application to databases, knowledge representation and knowledge bases. Prerequisite: CS 411 or 480 or consent of the instructor.


515. Advanced Computer Vision. 4 Hours. Previously listed as EECS 587. Analysis of 3-D scene images. Shape from shading, texture, line drawings, and surface orientation. Surface representation methods and reconstruction of 3-D scenes. Design of knowledge-based vision systems and 3-D applications in robotics and industrial environments. Prerequisite: CS 415.

522. Human-Computer Interaction. 4 Hours. Previously listed as EECS 578. The computer-user interface: media, languages, interaction techniques, user modeling. Human factors in software development. Theory, experimental methods, evaluation, tools. Project required. Prerequisites: CS 422.

523. Multimedia Systems. 4 Hours. Previously listed as EECS 579. Principles of multimedia interface design for computer applications. Multidisciplinary approaches to integrating text, still images, animation, and sound into human-computer interfaces. Prerequisite: CS 422 or consent of the instructor.


527. Computer Animation. 4 Hours. Previously listed as EECS 589. Theoretical and practical aspects of computer animation and computer-assisted animation in two and three dimensions and in black and white or full color. Laboratory. Prerequisite: CS 488.


540. Advanced Topics in Software Engineering. 4 Hours. Previously listed as EECS 570. Methodology: requirements and specification languages; program flow analysis; validation and verification; software metrics; program representations; software tools; software testing; software process. Prerequisite: CS 440 or consent of the instructor.

541. Software Engineering Environments. 4 Hours. Previously listed as EECS 571. Software configuration management;
software quality assurance; software engineering economics; software factory; software reuse; computer-aided software engineering; software prototyping. Prerequisite: CS 540 or consent of the instructor.

542. Distributed Software Engineering. 4 Hours. Previously listed as EECS 572. Fundamental concepts of distributed software. Task allocation algorithms, language concepts for concurrency and communication, analysis methods and tools, and formal models. Prerequisite: CS 440.

545. Formal Methods In Concurrent and Distributed Systems. 4 Hours. Previously listed as EECS 575. Formal methods in concurrent and distributed systems, particularly temporal logic and automata for specifying and reasoning real-time properties. Automated and manual techniques for checking correctness. Prerequisite: Consent of the instructor.

553. Distributed Computing Systems. 4 Hours. Previously listed as EECS 573. Distributed computing systems terminology and design issues. Data communications protocols; distributed operating systems, resource management, and synchronization; security, database systems. Prerequisites: CS 366 and 385.

554. Advanced Topics in Concurrent Computing Systems. 4 Hours. Previously listed as EECS 564. Petri nets, methods and their applications to concurrent, distributed, parallel, and data-flow systems; logic programming and rule-based systems. Prerequisite: Consent of the instructor.

559. Neural Networks. 4 Hours. Previously listed as EECS 559. Artificial neural networks for parallel computing including perceptrons, backpropagation and Kohonen nets, statistical methods in neural computing, Hopfield nets, associative memories, cognition and recognition. Prerequisite: Consent of the instructor.

560. Fuzzy Logic. 4 Hours. Previously listed as EECS 560. Fuzzy sets and fuzzy membership functions; fuzzy operations; fuzzy relations and their solution; approximate reasoning; fuzzy modeling and programming; applications; project. Prerequisite: Consent of the instructor.

565. Algorithms for VLSI Physical Design. 4 Hours. No credit given if the student has credit in ECE 565 or EECS 565. Computer-aided physical design of integrated circuits; circuit partitioning and placement; floorplanning; global and detailed routing; timing optimization; general optimization tools: local search, constraint relaxation. Prerequisites: CS 401 and CS 469, or consent of the instructor.

566. Parallel Processing. 4 Hours. Previously listed as EECS 566. Parallel processing from the computer science perspective. Includes architecture (bus based, lockstep, SIMD), programming languages (functional, traditional and extensions), compilers, interconnection networks, and algorithms. Prerequisite: CS 466.

569. High-Performance Processors and Systems. 4 Hours. Previously listed as EECS 569. Instruction-level parallelism, multiple-instruction issue, branch prediction, instruction and data prefetching, novel cache and DRAM organization, high-performance interconnect, compilation issues, case studies. Prerequisite: CS 466.

577. Object Stores. 4 Hours. Previously listed as EECS 577. Use, design, and implementation of object stores. An object store enables object-oriented programming to be extended by storing objects on disk and communicating objects between processes. Prerequisites: CS 385 and 480 and knowledge of C++, or consent of the instructor.

580. Query Processing in Database Systems. 4 Hours. Previously listed as EECS 580. Same as IDS 511. Query processing in deductive databases and in distributed/parallel databases systems. Prerequisite: CS 480.

581. Database Management Systems. 4 Hours. Previously listed as EECS 581. Concurrency control; reliability, recovery, data integrity, database machines and current topics. Prerequisite: CS 480.

582. Information Retrieval. 4 Hours. Previously listed as EECS 582. Document retrieval, office automation. Optimal retrieval, relevance feedback, clustered search, construction of clusters, model of term weighting, thesaurus construction, multimedia data, handling of audio and video. Prerequisite: CS 480.

594. Special Topics. 4 Hours. Previously listed as EECS 594. May be repeated for credit. Students may register for more than one section per term. Subject matter varies from term to term and section to section, depending on the specialties of the instructor. Prerequisite: Consent of the instructor.

595. Departmental Seminar. 0 Hours. Previously listed as EECS 595. May be repeated. S/U grade only. Seminar by faculty and invited speakers.

596. Individual Study. 1 to 4 Hours. Previously listed as EECS 596. S/U grade only. May be repeated for credit. Students may register for more than one section per term. Individual study or research under close supervision of a faculty member. For CS majors only. Prerequisite: Consent of the instructor.

597. Project Research. 0 to 9 Hours. Previously listed as EECS 597. S/U grade only. May be repeated for credit. Students may register for more than one section per term. For CS majors only. A research design or reading project approved by the committee appointed by the director of graduate studies. Prerequisite: Consent of the instructor.

598. MS Thesis Research. 0 to 16 Hours. Previously listed as EECS 598. S/U grade only. May be repeated for credit. Students may register for more than one section per term. For CS majors only. MS thesis work under the supervision of a graduate adviser. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. Previously listed as EECS 599. S/U grade only. May be repeated for credit. Students may register for more than one section per term. For CS majors only. PhD thesis work under supervision of a graduate adviser. Prerequisite: Consent of the instructor.

**Criminal Justice (CrJ)**

402. Trial Interaction. 4 Hours. Same as Ling 402. Language use, culture, and law in the trial process. Analysis of qualitative methods applied to legal processes and change. Prerequisites: CrJ 261 and CrJ 350, or consent of the instructor.

404. Roman Law and the Civil Law Tradition. 4 Hours. Same as Hist 404 and CL 404. Roman law and its relationship to values and social structure; social analysis through law; continental law tradition. Prerequisite: CrJ 200 or Hist 203 or consent of the instructor.

405. The Problem of Justice. 4 Hours. Same as PolS 405. Premodern and modern views of justice and their practical utility in analyzing legislative, executive, and judicial programs for enhancing or restricting justice. Prerequisites: CrJ 101, plus two 200-level courses in criminal justice or two 200-level courses in political science.

421. Juvenile Justice System. 4 Hours. Theories of juvenile delinquency and rule-breaking; juvenile rights; organization and administration of the juvenile justice system in the U.S. Prerequisites: CrJ 210 and 220.

422. Victimization. 4 Hours. Survey of criminal victimization theory and research. Examination of causes, consequences, and prevention of violent crime and of victims’ experiences in the criminal justice system. Prerequisites: CrJ 101 and two 200-level criminal justice courses.

423. Violence. 4 Hours. Same as Anth 424. Explores how men and women have experienced violence historically and in modern times. Students examine how violence is perpetrated through words, pictures, physical harm, and silences. Prerequisites: CrJ 101 and CrJ 200.

424. Gender, Crime, and Justice. 4 Hours. Same as GWS 424. An in-depth examination of the etiology of female crime and the involvement of females in the criminal justice system as offenders, victims, and workers/professionals. Prerequisites: CrJ 101 and CrJ 220 or consent of the instructor.

435. Organized and White Collar Crime in the United States. 4 Hours. Analysis and evaluation of organized crime, including its public perception; sociological, political, and economic impacts as well as past and present enforcement strategies. Prerequisite: Two 200-level criminal justice courses.

440. History of Criminal Justice Institutions. 4 Hours. Topics in law, jurisprudence, enforcement and punishment and their social settings, from classical times to mid-twentieth century, mainly in civil and common law traditions. Prerequisites: CrJ 245 or 250 or 255, plus one other 200-level criminal justice course.

442. Comparative Criminal Justice Institutions. 4 Hours. Comparative study of law, jurisprudence, enforcement, and punishment in Western and non-Western societies, including civil law, common law, and Islamic systems. Prerequisite: Two 200-level criminal justice courses.

446. Emergency and Crisis Management. 4 Hours. The application of theories of multidisciplinary approaches to planning for
the mitigation, preparation, emergency response, and recovery from major incidents or mega-disasters which threaten the safety and security of the public and its institutions. Prerequisites: Completion of CrJ 240 and one course from among the CrJ 345, 350, or 355.

456. Community Corrections. 4 Hours. History, processes, and functions of programs organized for sanctioning offenders in community settings, such as probation, parole, halfway houses, restitution, community service, home confinement. Prerequisites: CrJ 350 or 355 and one 200-level criminal justice course.

480. Application of Science to the Law. 4 Hours. Same as BsS 480. Issues affecting the development, accessibility and admissibility of forensic science services by the criminal justice system; problems which may compromise the quality, fairness and effectiveness of scientific inquiries.

490. Topics in Rule Making. 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Content of course varies, addressing major issues. Prerequisites: Six 200- or 300-level courses in criminal justice.

491. Topics in Rule Breaking. 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Content of course varies, addressing major issues. Prerequisites: Six 200- or 300-level criminal justice courses.

492. Topics in Rule Application. 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Content of course varies, addressing major issues. Prerequisites: Six 200- or 300-level criminal justice courses.

500. Law and Society. 4 Hours. Emergence and growth of rule-governed social order; social organization of legal actors; functional aspects of law including social control, dispute resolution; rule interpretation; and the promotion of social and economic enterprises.

519. Topics in Legal Studies. 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Selected areas of legal administration where appellate courts have reviewed and created norms of official behavior such as wiretapping, competency of defense counsel and prisoners’ rights. Prerequisite: Consent of the instructor.

520. Criminological Theory. 4 Hours. Critical examination of major traditions in criminological theories: emphasis on critical, positivist, interpretivist, and postmodern.

521. Contemporary Theories of Rule Breaking. 4 Hours. Critical examination of contemporary theories of crime and delinquency, including functional, anomic, differential association, labeling, and conflict theories.

539. Seminar in Rule Breaking. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of a specific area of rule-breaking such as larceny, criminal violence, corporate crime, political crime, public order criminality or occupational crime. Content varies. Prerequisite: Consent of the instructor.

540. Criminal Justice: Process and Institutions. 4 Hours. Critical examination of the criminal justice system. The dynamics and processes of contemporary police, judicial, and correctional institutions are evaluated in the context of key historical developments and relevant research.

541. The Dynamics of Behavior in Criminal Justice Agencies. 4 Hours. Leading theories of organizational behavior used to interpret organizational patterns, functions, and constraints in rule-applying institutions; emphasis on the application of these theories to the problems of planned change.

543. Systems Concepts: Interaction and Change. 4 Hours. Analysis of the criminal justice system as a system. Interorganizational structure, the interaction of component parts, organizational analysis, problem formulation, analytic systems methodology, and planned organizational and systems changes and their consequences. Prerequisite: CrJ 540.

545. Law Enforcement and Order Maintenance. 4 Hours. Review of major studies of police/investigative agencies. Analysis of research on their leadership, organizational priorities, reactive and proactive strategies, and ethical context. Prerequisite: CrJ 540.

546. Violence and Victimization. 4 Hours. The field of victimology and victimization theories are introduced including characteristics of victims, crime and postcrime victimization effects, and victim criminal justice system experiences.

547. Race, Class, and Gender Dimensions of Crime and Justice. 4 Hours. Same as GWS 547. Theories addressing the intersections of race, class, gender, crime, and justice. Specifically, students examine criminological theories, social construction of race, class, and gender, legal decision-making, and implications of this for justice in our society.

548. Legal Discourse and Culture in Law and Society. 4 Hours. Discourse, power, and culture in legal settings and analysis of power and resistance in the construction of law as a social fact. Prerequisite: CrJ 500.

550. Criminal Prosecution and Adjudication. 4 Hours. Institutional, organizational, and role factors in criminal court behavior and decision making by prosecutors, defense attorneys, judges, juries, defendants, witnesses, and probation officers. Comparison of legal standards with practice. Prerequisite: CrJ 500 or 540.

552. Dispute Processing. 4 Hours. Examination of the distinctive features and interrelationships of dispute processing by avoidance, negotiation, mediation, arbitration, and adjudication. Emphasis on historical and cross-cultural materials. Prerequisites: CrJ 500.

555. Corrections: Institutions and Field Operations. 4 Hours. Examines institutions and field services in public and private sectors. Addresses historical and empirical approaches to the analysis of policy and correctional effectiveness; the neo-classical challenge to rehabilitation, and corrections case law. Prerequisite: CrJ 540.

557. Behavioral Consequences of Punishment. 4 Hours. Analysis of research on the relationship between criminal sanctions and the correctional goals of retribution, incapacitation, deterrence, and rehabilitation. Prerequisite: CrJ 560 or the equivalent, or consent of the instructor.

560. Quantitative Methods and Design. 4 Hours. Fundamentals of scientific inquiry, the logic of casual inference, and qualitative methods. Development of critical perspective and identification of weaknesses in research design and measurement. Development of skills in proposal development and data collection unique to criminal justice. Prerequisite: CrJ 262 or consent of the instructor.

561. Qualitative Methods and Design. 4 Hours. Theories and techniques of qualitative research methods, particularly fieldwork and in-depth interviews. Criminal justice problems amenable to these techniques and methods and interrelationship between the researcher role and substantive findings. Prerequisite: CrJ 262 or consent of the instructor.

562. Statistical Applications in Criminal Justice I. 4 Hours. Basic descriptive and inferential statistics, their applications in data analysis, and assumptions underlying use of these procedures in criminal justice research. Prerequisite: CrJ 262 or the equivalent.

563. Evaluation Research in Criminal Justice. 4 Hours. Experimental, quasi-experimental, and nonexperimental approaches to evaluation research; indicators of effectiveness. Applications to crime prevention, police, courts, and correctional programs. Politics of researcher-agency interactions. Prerequisites: One graduate-level course in research methods and consent of the instructor.

564. Statistical Applications in Criminal Justice II. 4 Hours. Introduction to multivariate statistics with emphasis on multiple regression in criminal justice research, analysis and interpretation of regression output, coding of variables and path analysis. Prerequisite: CrJ 562.

570. Advanced Methods in Criminal Justice. 4 Hours. Methodological problems in criminal justice measurement including the identification problem in estimating deterrence and the limitations of survival analysis in estimating recidivism. Students are required to submit a paper demonstrating evidence of independent research skills. Prerequisites: CrJ 560 and CrJ 561 or the equivalent.

579. Advanced Topics in Research Methods. 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Intensive study of a specific area of multivariate analysis, time series, factor analysis, log-linear analysis, field, historical or legal research. Content varies. Prerequisite: Consent of the instructor.

580. Forensic Science: Survey and Foundations. 3 Hours. Same as BsS 580. Survey of forensic sciences with emphasis on criminalistics; unique characteristics, underlying philosophies; nature, analytical methods, significance of results with chemical, biological, trace, pattern evidence.
581. Forensic Analysis of Biological Evidence. 4 Hours. Same as BpS 581 and MLS 581. Forensic blood identification and typing; body fluid identification and typing; blood group, isoenzyme, serum protein typing; electrophoresis; isoelectric focusing; DNA typing; reporting results; expert testimony. Prerequisite: Consent of the director of graduate studies.

582. Forensic Chemistry and Trace Evidence Analysis. 4 Hours. Same as BpS 582. Trace evidence: hairs, fibers, glass, soil, paint and miscellaneous; nature, chemical, instrumental, microscopical methods of analysis; interpretation and significance of trace similarities; expert testimony. Prerequisite: Consent of the director of graduate studies.

583. Physical Pattern Evidence Analysis. 4 Hours. Same as BpS 583. Pattern evidence: individualization, reconstruction; fingerprint classification, latent print development, AFIS; questioned documents; ink, paper, handwriting comparison; firearms and toolmarks comparisons; scene patterns and reconstruction. Prerequisite: Consent of the director of graduate studies.

584. Forensic Drug Analysis and Toxicology. 4 Hours. Same as MLS 584 and BpS 584. Analysis of commonly abused drugs in their solid-dosage form and in biological media. Emphasis on modern instrumental methods and interpretation of results. Prerequisite: Consent of the director of graduate studies.

589. Special Topics in Forensic Science. 3 Hours. Same as BpS 589. Content varies. Theoretical, philosophic, moral, and managerial problems associated with criminalistics practice. Quality control issues relating to evidence collection, analysis, reporting, and testimony.

592. Internship in Criminal Justice. 2 to 4 Hours. May be repeated for a maximum of 4 hours of credit. Students may register for more than one section per term. Placement in a criminal justice agency or setting under the supervision of a faculty member with an accepted research project and paper. Prerequisite: Consent of the instructor.

593. Teaching Criminal Justice. 4 Hours. Analysis of current trends in criminal justice education, discussion of the contextual setting of the field, and the development of rudimentary teaching skills.

594. Selected Issues in Crime and Criminal Justice. 4 Hours. May be repeated for a maximum of 12 hours. Students may register for more than one section per term. Current issues and advanced problem areas related to deviance, crime, etiology, labeling, criminal careers, organized crime and victimology.

596. Independent Study or Research. 2 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. Research undertaken for this course may not duplicate that being done for CrJ 598. Supervised projects, which may consist of extensive readings in criminal justice, research on special problems not included in the regular course offering. Prerequisites: Consent of the instructor and approval of the director of graduate studies.

597. Project Research. 0 to 8 Hours. May be repeated for a maximum of 8 hours of credit. S/U grade only. Independent research project under the supervision of a faculty member. Prerequisites: Graduate standing in the MA in criminal justice program and consent of the instructor.

598. Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for a maximum of 8 hours of credit. For students doing thesis research or writing. Prerequisites: Consent of the student's adviser and acceptance of the thesis topic and preliminary thesis outline by the thesis committee.

599. Dissertation Research. 0 to 16 Hours. May be repeated for a maximum of 20 hours of credit. Satisfactory/Unsatisfactory grade only. Research on the topic of the doctoral dissertation. Prerequisites: Consent of the faculty adviser and director of graduate studies.

Curriculum, Instruction, and Evaluation (CIE)

459. Foundations of Reading: Literacy and Society. 4 Hours. Analysis of the economic, social, cognitive, and political antecedents and consequences of literacy. History of literacy development and its relationship to schooling in American society.

460. Foundations of Reading Instruction. 4 Hours. Principles and practices of reading instruction including classroom diagnosis, content-area reading, emergent literacy, and instructional materials and techniques. Prerequisite: CIE 459 or consent of the instructor.

461. Instruction and Evaluation in the Elementary School. 5 Hours. Theory and practice in curriculum development, planning instruction, implementing learning activities, using multiple resources, and assessing learning. School-based practicum. Prerequisites: Ed 402 or 403; Ed 421, 422 or 445; Ed 430; CIE 460 and a second reading methods course.

462. Foundations of Secondary Reading Instruction. 4 Hours. Issues concerning secondary school reading; instructional approaches for skill development within content areas. Prerequisite: Consent of the instructor.

464. Bilingualism and Literacy in a Second Language. 4 Hours. Theoretical foundations of second language acquisition and the teaching of English as second language. Methods and materials for teaching reading and writing to bilingual children.

468. Children's Literature in the Content Areas. 4 Hours. Effective use of children's literature to enrich instruction in language arts, social studies, science, and other subjects taught in the elementary and junior high schools. Prerequisite: One course in children's literature or consent of the instructor.

469. Practicum in Teaching Reading. 1 to 4 Hours. Emphasis on intensive, supervised practicum experiences and seminars in order to fill gaps in students' clinical experience in teaching of reading. Prerequisite: Consent of the instructor.

472. Assessment and ESL Instruction for the LEP Student. 4 Hours. Assessment of limited English proficiency (LEP) populations; information on instruments and procedures. Methods and materials for teaching English as a second language in school settings.

480. Technology and Multimedia: Learning Tools in the Classroom. 4 Hours. Same as SpEd 480. New technologies to support teaching and learning in precollege classrooms.

481. Foundations and Cross-Cultural Issues in Educating LEP Students. 4 Hours. Philosophical, theoretical, sociocultural, and educational examination of learning and achievement problems that culturally and linguistically different students face in American schools. Extensive field experience required.

482. Assessment and Instruction: A Multicultural Perspective. 4 Hours. Methods and materials for teaching LEP students in bilingual/ESL classrooms. Emphasis upon present curricular and methodological practices. Assessment for placement and instruction of bilingual students.

483. Methodology of TESOL. 4 Hours. Same as Ling 483. Methods of teaching listening, speaking, reading, and writing to speakers of English as a second or foreign language. Prerequisite: Consent of the instructor.

484. Curriculum and Instruction in the Middle School. 3 Hours. Philosophy, curriculum, and instructional methods for teaching middle grade students (grades five through eight). Content area reading is included. Prerequisites: Approval of the College of Education; and either Ed 402 or 403; and either Ed 421 or 422 or 445; and either Ed 430 or 431.

494. Special Topics in Curriculum, Instruction, and Evaluation. 1 to 4 Hours. May be repeated for a maximum of 12 hours. Students may register for more than one section per term. Exploration of an area not covered in existing course offerings. Content varies. Prerequisite: Consent of the instructor.

500. Proseminar in Curriculum and Instruction. 1 Hour. May be repeated for credit. S/U grade only. Research-oriented colloquia on issues in curriculum and instruction. Serves as introduction to faculty research interests. Provides opportunity to consider issues in research design. Prerequisite: Admission to the PhD in education program or consent of the instructor.

501. Literature, Social Studies, and the Arts in the Elementary School. 4 Hours. Theory and practice in curriculum development, planning instruction, and assessing learning in elementary classrooms. Literature, social studies, and the arts content foci. School-based practicum. Prerequisites: Ed 402 or 403; and either Ed 421 or 422 or 445; and Ed 430; and CIE 460; and a second reading course.

502. Mathematics and Science in the Elementary School. 4 Hours. Integrating mathematics and science content with issues of teaching and learning, including adapting and developing curriculum, planning, classroom interactions, and assessment in elementary classrooms. Prerequisites: Ed 402 or 403; and either Ed 421 or 422 or 445; and Ed 430; and CIE 460; and a second reading methods course.


520. The K-12 Mathematics Curriculum: Theory, Politics, and Reform. 4 Hours. A look at the K-12 curriculum from three perspectives: theoretical (epistemological, learning, teaching), political (whose interests are served) and practical (implementation issues in schools). Prerequisite: Consent of the instructor.

521. Learning and Teaching Mathematics with Technology. 4 Hours. Can technology support conceptually-based learning of mathematics? Issues of learning, teaching, and equity related to technology in the K-12 mathematics classroom. Prerequisite: Consent of the instructor.

522. Social Context of Mathematics Education. 4 Hours. Examination of contextual, social, and linguistic factors which influence the learning of mathematics; emphasis on sociohistorical and activity theories; and equity in schooling. Prerequisite: Graduate standing in the College of Education or consent of the instructor.

532. Staff Development and School Improvement. 4 Hours. Analysis of issues of school improvement and teacher professional development. Emphasis on processes of and alternative approaches to individual and organizational change. Prerequisites: Consent of the instructor and one of the following: CIE 574; Ed 430, 431, or 543.

539. Internship in Instructional Leadership. 4 Hours. May be repeated for a maximum of 8 hours of credit. Conceptualization, development, implementation, analysis, and interpretation of a curriculum and/or instructional improvement in an educational setting (supervised by university faculty and leadership from the setting). Prerequisite: CIE 532.

540. Linguistics for Teachers. 4 Hours. Introduction to linguistic concepts as they apply to teaching in monolingual and bilingual classrooms. Relation of linguistic theory to theories of language and cognition.

545. Educational Evaluation. 4 Hours. Examination of theoretical and operational assumptions of alternative evaluation models; analysis and critique of evaluation case-studies. Prerequisite: Admission to the PhD in education program or the PhD in public policy analysis program.

550. Conflicts in Curriculum Development. 4 Hours. Analysis of theoretical models for curriculum development; special attention to alternative and often conflicting viewpoints about the particulars of the development process. Prerequisite: Admission to a graduate program in education.

551. Leadership and Educational Supervision. 4 Hours. Same as PS 535. Theory and practice of supervisory leadership in educational settings; effects of interactive factors on performance assessment and professional development. Field experience requirement. Prerequisite: ED 430 or 431, or consent of the instructor.

552. Curriculum and Cultural Context. 4 Hours. Influence of cultural, political, sociological, and economic factors on curriculum at the institutional, institutional, societal, and ideological levels. Prerequisite: CIE 574 or consent of the instructor.

553. History of Curriculum Thought. 4 Hours. Analysis of selected documents on curriculum theory and policy from antiquity to present; secondary treatments and primary sources; interaction of theory and practice. Prerequisite: CIE 574, or consent of the instructor.

555. Integrated Reading and Writing Instruction. 4 Hours. Examination of the reading-writing relationship. Specific instructional strategies for teaching reading and writing together in the elementary grades. Prerequisite: CIE 460 or consent of the instructor.

560. Resources for Effective Reading Programs. 4 Hours. Analysis of curriculum materials, instructional decision-making processes, and organization of instructional time for effective school-based reading programs; role of reading specialists in school change. Prerequisites: CIE 460 and either ED 430 or 431.

563. Analysis of Research Literature in Reading. 4 Hours. Critical analysis of issues in reading and reading instruction with reference to research. A research project is developed. Prerequisites: Ed 490 and CIE 460.

564. Language Foundations of Reading Behavior. 4 Hours. Analysis of language-based models of reading behavior; language development and reading; complexity of written prose. Stress on reading development of both monolingual and bilingual pupils. Prerequisite: One graduate course in linguistics or one graduate course in reading.

565. Diagnostic and Remedial Reading Instruction I. 4 Hours. Theoretical and practical issues concerning the etiology of reading problems and clinical diagnostic techniques. Two reading-disabled children are diagnosed in the practicum component. Prerequisite: CIE 460 or consent of the instructor.

566. Diagnostic and Remedial Reading Instruction II. 4 Hours. Second course of two-course sequence with CIE 565. Emphasizes issues in remedial reading instruction. Practicum involves tutoring a reading disabled client in the UIC Reading Clinic. Prerequisite: CIE 565.

567. Guiding the School Reading Program. 4 Hours. Theories and practices influencing the role of the reading specialist supervisor including management and evaluation of support systems, programs, personnel, and inservice instruction in reading. Prerequisites: Ed 430 or 431, and CIE 460.

568. Themes and Issues in Children's Literature. 4 Hours. Exploration of themes and current issues related to children's literature from preschool through grade 12. Emphasis on critical analysis relevant to instruction. Prerequisite: One course in children's literature or consent of the instructor.

569. Practicum in Reading Research. 4 Hours. May be repeated for a maximum of 8 hours of credit. Independent work under faculty supervision in conducting and reporting a research project in reading/literacy. Prerequisites: Ed 490 and CIE 566.

570. Critical Issues in Science Education. 4 Hours. Explores the nature of scientific activity and educational issues, such as constructivism, discourse, gender and multicultural issues, assessment, the role of technology, and teacher research. Prerequisite: Admission to a graduate program in the College of Education or consent of the instructor.

571. Integrating Mathematics, Science, and ESL. 4 Hours. Curriculum and instructional issues and practice related to the integration of mathematics, science, and English as a Second Language development. Prerequisite: CIE 481 or consent of the instructor.

572. Assessment in Science and Math Education. 4 Hours. Explores different purposes of assessment, generates principles to guide assessment, studies “new” assessment practices, and explores ways to implement them in science and mathematics classes. Prerequisite: Admission to graduate study in education or consent of the instructor.

574. Foundations of Curriculum Design. 4 Hours. Curriculum as area of inquiry; historical, philosophical, cultural, and related foundations; variations on curriculum theory and practice; alternative paradigms of curriculum inquiry. Prerequisite: ED 430, or admission to the PhD in education program or the PhD in public policy analysis program.

575. Seminar in Linguistic Minority Research. 4 Hours. May be repeated for a maximum of 12 hours of credit. Selected topics in the education of language minority students for advanced MEd and PhD students. Topics vary each semester. Prerequisite: CIE 481.

576. Conceptions of Teaching and Schooling. 4 Hours. Philosophical and conceptual analysis of teaching and schooling and the impact of those conceptions on the conduct of educational practice. Prerequisite: CIE 574 or consent of the instructor.

578. Advanced Studies in Qualitative Research Methods. 4 Hours. The dynamics of data collection and analysis, the use of theory and interdisciplinary frameworks, and writing up and presenting original research. Prerequisite: Ed 502.

580. Colloquium on Literacy. 1 Hour. May be repeated for 12 hours of credit. S/U grade only. Various areas of reading, writing, and literacy including research on learning, instruction, and use. Prerequisites: Enrollment in a graduate specialization in reading and consent of the instructor.
581. Research on Reading Comprehension Instruction. 4 Hours. Review of issues related to the nature and instruction of reading comprehension, and analysis of instructional research. Prerequisite: CIE 563 or the equivalent.

583. Research on Beginning Literacy. 4 Hours. Analysis of theories and research concerning the initial steps in young children's acquisition of reading and writing ability with emphasis on instruction. Prerequisites: CIE 460 and consent of the instructor.

585. Seminar in Reading Studies. 4 Hours. May be repeated for a maximum of 12 hours of credit. Selected topics in reading education and research for advanced MED and PhD students. Topics vary each semester. Prerequisite: CIE 563 or the equivalent, or consent of the instructor.

586. Research in Elementary Writing. 4 Hours. Research and theory in elementary writing and spelling development. Analysis of cognitive, developmental and pedagogical aspects of children's writing development. Prerequisites: CIE 460 and consent of the instructor.


590. Alternative Paradigms of Qualitative Research in Education. 4 Hours. Methodology, cases, and rationale for action research, educational criticism, critical ethnography, historiography, and phenomenological hermeneutics as alternatives in qualitative research in education. Prerequisites: CIE 578 or consent of the instructor, and admission to the PhD in education program or the PhD in public policy analysis program.

593. PhD Research Project. 1 to 8 Hours. May be repeated for a maximum of 8 hours of credit. Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. Prerequisite: Admission to the PhD in Education program.

594. Special Topics in Curriculum, Instruction, and Evaluation. 2 to 4 Hours. May be repeated for up to 12 hours of credit. Students may register for more than one section per term. Seminar on a preannounced topic focusing on methodology, research and educational implications of recent models of learning, problem solving and thinking. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Students design, implement and analyze the results of a research problem in this area of specialization. Prerequisite: Consent of the study advisor.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Research on the topic of the student's dissertation. Prerequisite: Consent of the dissertation advisor.

Disability and Human Development (DHD)

401. Foundations of Disability and Human Development. 3 Hours. A critical review of key concepts and issues in disability. Students will develop a framework for understanding disability as a multi-level entity, including the impact of disability at personal, social, and societal levels. Prerequisite: Enrollment in the MS in disability and human development program or consent of the instructor.

415. Concepts in Interdisciplinary Research on Disability. 3 Hours. Core methodological skills and concepts of interdisciplinary approaches to disability research. Topics include traditions of inquiry, problem formulation, research designs, and research report writing. Prerequisite: CIE 460 or consent of the instructor.

420. Family Perspectives on Disability. 3 Hours. Same as Community Health Sciences 421 and Disability Studies 420. Societal trends, family caregiving theories and research methodology, support policies and interventions, and family-centered approaches pertaining to families of persons with disabilities.

430. Introduction to Disability Policy and Organization. 3 Hours. Legislative, legal, and administrative foundations for the provision of services to persons with disabilities in the U.S. Roles of residential institutions, the independent living movement, class action litigation and advocacy. Prerequisite: DHD 401 or consent of the instructor.

440. Introduction to Assistive Technology: Principles and Practice. 3 Hours. Underlying principles and exemplary practice of assistive technology used by individuals with disabilities, including augmentative communication, seating, mobility, computer access, environmental control, home modifications, and worksite modifications.

441. Adaptive Equipment Design and Fabrication. 3 Hours. Examination of the interaction between design and disability issues through comparison of appropriate design theory, materials, and work with consumers. Some assignments will involve field work. Prerequisites: Graduate standing, or DHD 440 and consent of the instructor.

442. Seating and Wheeled Mobility. 3 Hours. Issues of wheelchair seating, positioning and mobility for children and adults with physical disabilities. Assessment procedures, technology selection, and analysis of funding sources. Prerequisite: DHD 440 or consent of the instructor.

444. Qualitative Methods in Disability Research. 3 Hours. Comparisons of qualitative and quantitative approaches to research, presentation of commonly used methods, issues of analysis and interpretation, and the use of participatory research methods.

446. Survey of Developmental Disabilities. 3 Hours. Same as CHSc 464. Survey of the developmental disabilities field, including basic definitions, history of DD services, relevant public policies and legislation, service delivery systems, and research.

451. Special Topics in Disability and Human Development. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Systematic study of selected topics in disability and human development.

514. Ethical Issues in Disability. 3 Hours. Examines contemporary ethical issues affecting the lives of persons with disabilities and disability professionals. Critiques the application of ethical principles to problems of genetics, treatment decisions, and competency.

515. Statistical Methods in Disability Studies. 3 Hours. Same as Dis 515. Examination of parametric and non-parametric statistical methods commonly used in disability research with microcomputer applications to supplement text and lecture materials. Prerequisite: An introductory course in statistics.

520. Disability and Physical Activity. 3 Hours. Same as Kine 540. Examination of the foundations of physical activity for persons with disabilities. Emphasis on strategies for promoting physical activity among persons with disabilities in community settings.

532. Community Intervention. 3 Hours. Same as Pach 532. Theory, research, and practice of community interventions in public, nonprofit and voluntary settings, e.g., disability organizations; intervention types and effectiveness; role of community intervenor. Prerequisite: Consent of the instructor.

535. Advocacy and Empowerment in Disability. 3 Hours. Same as Dis 535. In-depth review of academic literature on advocacy and empowerment. Relevant theories, research, and interventions in the context of individuals with disabilities will be reviewed.

537. Disability and Health Promotion. 3 Hours. Examines health issues in disability with emphasis on health promotion and preventing secondary disease. Relationship of emerging theories of health promotion to disability are discussed.

541. Advanced Concepts in Disability Research. 3 Hours. Same as Dis 541. Seminar-based applications of advanced scholarship skills. Topics covered include problem formulation, manuscript development, and critical reviews.

551. Computers, Communication, and Controls in Rehabilitation Technology. 3 Hours. Same as OT 551. Assistive technology course covering different methods for evaluating controls used to operate computers, communication devices, and powered wheelchairs. Instruction also addresses device features and integration factors.

552. Achieving Functional Mobility Through Assistive Technology Intervention. 3 Hours. Assessment procedures, identifying appropriate technology, and customization to address functional mobility in children and adults through use of assistive technology. Prerequisite: DHD 440.

554. Augmentative Communication Assessment. 3 Hours. Augmentative communication assessment strategies and
evaluation of materials development. Utilizes case examples for discussion of specific approaches for different ages, disabilities, and settings. Prerequisite: DHD 440.

564. Community Integration in Developmental Disabilities. 3 Hours. Same as CHSc 564 and Dis 564. Historical and contemporary issues pertaining to the empowerment and integration of persons with developmental disabilities into community settings.

565. Research Approaches in Rehabilitation Technology Use and Delivery. 3 Hours. Same as Dis 565 and OT 565. Advanced course in the design and critical analysis of research on the delivery and long term use of rehabilitation technology and universal access modifications by people with disabilities within the home, school, worksite and community.

570. Disability and Culture. 3 Hours. Development of a cultural comparative approach in disability studies; American and cross-cultural aspects of disability; imagery of disability; disability and the body; gender and life-course issues, cultures of disability. Prerequisite: DHD 401 or consent of the instructor.

572. A Representational History of Disability. 4 Hours. Same as Dis 572. Examines historical and contemporary representations of “the body” to demonstrate how cultural concepts such as normalcy, health, and morality are created in reference to “aberrant bodies.”

575. History of Human Differences: Disability Minorities in America. 3 Hours. Historical experiences of disability minorities during the modern era. Focus on American experiences and comparing them to premodern and contemporaneous experiences in Western European societies. Prerequisite: DHD 401 or consent of the instructor.

576. Visualizing the Body. 4 Hours. Same as Dis 576. Survey of key moments in the representational life of disability in film. Film portrayals of disability will be analyzed from the perspective of narrative theory, film grammar, and social history.

590. Field Experience in Disability and Human Development. 0 to 12 Hours. May be repeated for a maximum of 12 hours of credit. Opportunities for guided experience working with agencies, families, and persons with disabilities providing concrete, practical applications of concepts and principles of disability and human development. Prerequisites: DHD 401 and 415 or consent of the instructor.

593. Independent Research. 1 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Advanced study and analysis of a topic selected by a student under the supervision of a faculty member. Prerequisite: Consent of the instructor.

594. Advanced Special Topics in Disability and Human Development. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Systematic study of advanced selected topics in disability and human development.

595. Seminar in Disability and Human Development. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Identifies and analyzes a broad range of issues related to disability and human development. Topics vary according to student interests and instructor availability. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced study and analysis of a topic under the guidance of a faculty member. Prerequisite: Consent of the instructor.

597. Project Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research project under the supervision of a faculty member. Prerequisites: Graduate standing in the MS in disability and human development program and consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Thesis research to fulfill master's degree requirements. Prerequisites: Graduate standing in the MS in disability and human development program and consent of the instructor.

Disability Studies (Diss)

420. Family Perspectives on Disability. 3 Hours. Same as CHSc 421 and DHD 420. Societal trends, family caregiving theories and research methodology, support policies and interventions, and family-centered approaches pertaining to families of persons with disabilities.

447. Ethnographic Research in Health and Human Services I. 4 Hours. Same as OT 447. Course for practitioners and researchers who are not well-versed in ethnography. Details strategies for conducting ethnographic research in health and human service contexts. Prerequisite: Consent of the instructor.

501. Disability Studies I. 4 Hours. Provides analysis of contemporary classification and diagnosis systems for disability as well as the conceptual foundations for disability studies as a content area.

502. Disability Studies II. 4 Hours. Current approaches and practices in disability studies, critically considered from a variety of perspectives. Service delivery systems and the influence that civil rights and self determination have had. Prerequisite: Dis 501.

519. Statistical Methods in Disability Studies. 3 Hours. Same as DHD 515. Examination of parametric and nonparametric statistical methods commonly used in disability research with microcomputer applications to supplement text and lecture materials. Prerequisite: Introductory course in statistics.

535. Advocacy and Empowerment in Disability. 3 Hours. Same as DHD 535. In-depth review of academic literature on advocacy and empowerment. Relevant theories, research, and interventions in the context of individuals with disabilities will be reviewed.

541. Advanced Concepts in Disability Research. 3 Hours. Same as DHD 541. Seminar-based applications of advanced scholarship skills. Topics covered include problem formulation, manuscript development, and critical reviews.

547. Ethnographic Research in Health and Human Services II. 4 Hours. Same as OT 547. Provides faculty supervision and peer criticism for students at various stages of proposing and conducting ethnographic research in health and human service contexts. Prerequisite: Dis 447.

550. Disability in the Urban Environment. 4 Hours. Same as OT 550. Features of urban contexts that influence experiences of persons with disabilities are examined as they exacerbate problems or enhance resources in low income communities.

560. Dilemmas in Disability Services. 4 Hours. Same as OT 560. The complexities inherent in the delivery of therapeutic and related services to persons with disabilities including personal attributes, interpersonal, and contextual components.


564. Community Integration in Developmental Disabilities. 3 Hours. Same as CHSc 564 and DHD 564. Historical and contemporary issues pertaining to the empowerment and integration of persons with developmental disabilities into community settings.

565. Research Approaches in Rehabilitation Technology Use and Delivery. 3 Hours. Same as DHD 565 and OT 565. Advanced course in the design and critical analysis of research on the delivery and long term use of rehabilitation technology and universal access modifications by people with disabilities within the home, school, worksite and community.

566. Narrative and the Phenomenology of Disability. 4 Hours. Same as OT 566. Open to master's and PhD students in social sciences, medicine, nursing, social work, education, and related health professions. Recent interdisciplinary studies of narrative as they pertain to chronic illness and disability.

572. A Representational History of Disability. 4 Hours. Same as DHD 572. Examines historical and contemporary representations of “the body” to demonstrate how cultural concepts such as normalcy, health, and morality are created in reference to “aberrant bodies.”

576. Visualizing the Body. 4 Hours. Same as DHD 576. Survey of key moments in the representational life of disability in film. Film portrayals of disability will be analyzed from the perspective of narrative theory, film grammar, and social history.

589. Current Research in Disability Studies. 1 Hour. May be repeated for a maximum of 10 hours of credit. S/U grade only. A review of the current primary source literature in the area of disability research. Prerequisite: Consent of the instructor.

590. Research Project in Disability Studies. 1 to 8 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. S/U grade only. Formal
research project for students not having prior research experience. Prerequisite: Consent of the instructor.

593. Independent Research in Disability Studies. 1 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Advanced study and analysis of a topic selected by a student under the supervision of a faculty member. Prerequisite: Consent of the instructor.

594. Special Topics in Disability Studies. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Systematic study of advanced selected topics in disability studies. Prerequisite: Consent of the instructor.

595. Interdisciplinary Seminar in Disability Studies. 1 Hour. May be repeated for a maximum of 4 hours of credit. S/U grade only. Students, faculty, and guest speakers present topics addressing current issues in research in the area of disability studies. Prerequisite: Consent of the faculty adviser.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced study and analysis of a topic under the guidance of a faculty member. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research in one area of disability studies. Prerequisites: Graduate standing in the PhD in Disability Studies Program and consent of the instructor.

Doctor of Arts (DA)

502. Analysis of Content for Instruction. 4 Hours. Same as EPsy 554. Psychological factors influencing the analysis of content for the development of procedures, materials and systems for instruction in subject matter disciplines. Prerequisite: Consent of the instructor.

504. Instructional Design. 4 Hours. Same as EPsy 555. Principles and practice in instructional development, including design models for various content outcomes, student and media characteristics; formative evaluation of materials. Prerequisite: Credit or concurrent registration in DA 502.

505. Theory and Development of Instructional Microcomputing. 4 Hours. Same as EPsy 556. Analysis of instructional applications of microcomputing; emphasis upon theory of courseware design, development, and implementation; courseware selection and management factors in instructional settings. Prerequisite: DA 504 or consent of the instructor.

506. Instructional Technology. 4 Hours. Same as EPsy 557. Training and laboratory work in computer-assisted instruction, audiovisual media, interactive video; development and implementation costs; problems of integrating instructional technology into educational systems. Prerequisite: DA 504 or consent of the instructor.

Earth and Environmental Sciences (EaES)

400. Field Experience in Earth Sciences. 6 Hours. Application of geologic mapping and other field techniques to a summer field camp in the Black Hills of South Dakota for a period of six weeks. Prerequisites: EaES 330 and 440 or consent of the instructor.


415. Environmental Geochemistry. 4 Hours. Chemical reactions in natural environments; surface chemistry of metals and organic compounds. Clay minerals in soils and sediments. Chemistry of contaminant remediation. Prerequisite: EaES 310 or consent of the instructor.

416. Organic Geochemistry. 4 Hours. Global carbon cycle, chemical composition of biogenic matter, sedimentology and diagenesis of organic matter, molecular fossils, geopolymers, fossil fuels, anthropogenic organic compounds, carbon isotope geochemistry. Prerequisite: Chem 114 or Chem 130, and EaES 350; or consent of the instructor.

422. Crystal Chemistry of Rock-Forming Minerals. 4 Hours. The crystal chemistry, chemistry, phase equilibria, and properties of materials and minerals. Prerequisite: EaES 220 or consent of the instructor.
isotope fractionation, compound specific isotope analysis, biomarker geochemistry, paleoenvironment. Prerequisite: EaES 416 or consent of the instructor.

520. Advanced Mineralogy. 4 Hours. May be repeated if the same topic is not covered twice. Various topics in one of the following categories: structural determination, advanced diffraction techniques, crystal chemistry and structural mineralogy. Lectures, seminars, and laboratory. Prerequisite: Consent of the instructor.

530. Advanced Petrology. 3 to 4 Hours. May be repeated for credit if topic is different for each registration. Selected topics: generation and properties of magmas, formation of metamorphic rocks, reaction rates in metamorphic rocks. Prerequisite: Consent of the instructor. Credit in EaES 430 is recommended.

541. Seismology. 4 Hours. Elastic wave propagation theory, instrumentation, seismic source mechanisms, body and surface waves, free oscillations, earth’s interior, focal mechanisms, earthquakes and plate tectonics. Prerequisite: EaES 444 or consent of the instructor.

543. Advanced Geophysics and Plate Tectonics. 4 Hours. May be repeated for credit if topic is different for each registration. Students must register for more than one section per term. Advanced topics in geophysics and plate tectonics including subjects such as mantle convection, driving forces of plate tectonics and evolution of rifted continental margins. Prerequisites: EaES 444 or EaES 448.

560. Topics in Paleontology. 3 to 4 Hours. Same as BioS 560. May be repeated for credit if topic is different for each registration. In-depth analysis of current problems and issues in paleontology, involving reading primary literature, student presentations, and critical discussions. Prerequisite: Consent of the instructor.

570. Advanced Surficial Processes. 4 Hours. May be repeated for credit if topic is different for each registration. Advanced topics in theoretical, empirical, and applied aspects of hillslope processes, sediment transport mechanisms, river mechanics, weathering and soil development, or drainage basin development. Prerequisite: EaES 470.

572. Quaternary Environmental Systems. 3 Hours. Interrelations between eolian, lacustrine, marine, eolian and glacial environments for the past 1.8 million years; geochronologic and isotopic methods; stratigraphic and geomorphic approaches. Prerequisites: Graduate standing and EaES 470.

575. Advanced Groundwater Hydrology. 4 Hours. May be repeated for credit if topic is different for each registration. Selective topics; mechanics of near surface groundwater, flow in fractured rocks, groundwater contamination, unsaturated-saturated flow, surface-groundwater interactions. Prerequisite: EaES 475.

576. Paleoclimatology. 3 Hours. Principles of climatology and paleoclimatology; mechanisms and causes of climate change for the past 63 million years; geologic records of climate and modelling. Prerequisite: EaES 470.

584. Marine Geology. 4 Hours. Marine topography, tectonics, and sedimentology; continental margins and submarine canyons; abyssal plains and hills; mid-ocean ridges and transform faults; trenches, island arcs, and back-arc basins. Prerequisite: Consent of the instructor.

595. Departmental Seminar. 1 Hour. S/U grade only. Special one-hour seminar, every Thursday, by invited speakers from other earth and environmental sciences departments, governmental agencies, and industry.

596. Advanced Studies in Earth and Environmental Sciences. 1 to 6 Hours. May be repeated for credit. A maximum of 4 hours of credit may be applied towards the requirements for the MS degree. Independent study or research with faculty supervision, leading to a written report. Prerequisites: Consent of the head of the department and the faculty member who will supervise the study.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual work under the supervision of faculty members in their respective fields. Prerequisite: Consent of the thesis supervisor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual work under the supervision of faculty members in their respective fields. Prerequisite: Consent of the thesis supervisor.

Economics (Econ)

436. Mathematical Economics. 4 Hours. Application of mathematics to theories of consumer and producer behavior, determination of prices in markets, growth and stability features of macroeconomic models. Prerequisites: Econ 218 or 220; and either Econ 345 or Math 165 or 180.

441. Teaching Methods in Economics. 4 Hours. Credit earned in Econ 441 may not be used to satisfy Economics credit requirements for the MA or PhD degrees given by the Department of Economics. Credit earned in Econ 441 may be applied toward the degree as an elective. Develops skills in preparing and giving lectures and examinations, computer usage and other aspects of teaching economics and consumer economics at secondary/higher education levels. Prerequisite: one course in graduate-level microeconomics or macroeconomics.

450. Business Forecasting Using Time Series Methods. 4 Hours. Same as IDS 476. Autoregressive, moving average, and seasonal models for time series analysis and business forecasting. Forecasting using multivariable transfer function models is also included. Prerequisite: IDS 371 or Econ 445 or consent of the instructor.

472. Real Estate Finance. 3 Hours. Same as Fin 472. Finance principles applied to real estate; financing of residential and income-producing real estate; real estate development finance; secondary mortgage market; taxation and real estate finance. Prerequisite: Fin 300.

495. Competitive Strategy. 4 Hours. Multidisciplinary analysis of organizational strategy and policy, using case method and/or business simulation. Assignments involve extensive library research and oral and written reports. Prerequisite: Consent of the instructor.

499. Independent Study in Economics. 1 to 3 Hours. Independent study of a topic not covered in a graduate-level course. Prerequisites: Consent of the Director of Graduate Studies and the instructor.

500. Managerial Economics. 4 Hours. Economic analysis applied to business operations; demand theory; production cost analysis; capital theory; pricing policies; capital budgeting. Prerequisite: Econ 501 or 520.


502. Microeconomics II. 4 Hours. Advanced microeconomic theory. Theories of consumer behavior, uncertainty, general equilibrium, welfare economics. Prerequisite: Econ 501.

504. The Economics of Organization of Business Enterprises. 4 Hours. The economic reasons for the existence of firms, the determinants of firm size and the theory of organizational structure. Prerequisite: Econ 501 or Econ 520.

510. Macroeconomics I. 4 Hours. Static and dynamic theories of income, employment and the price level; advanced treatment of consumption, investment, money demand and aggregate production functions; stabilization theory and policy. Prerequisite: Econ 221.

512. Macroeconomics II. 4 Hours. Neoclassical and modern market-clearing models of real and monetary influences on economic growth, inflation and business cycles. Prerequisite: Econ 511.

513. Special Topics in Macroeconomics and International Economics. 4 Hours. Intense study of selected research topics in macroeconomics and international economics. Topics may vary. Prerequisite: Econ 512.

514. International Trade Policy. 4 Hours. Analysis of effects of tariff and nontariff policy on flow of trade and distribution of income within and between countries; policy implications of factor price equalization; stability conditions for balance of payments equilibrium. Prerequisite: Econ 501 or Econ 520 or Econ 521.

515. International Monetary Policy. 4 Hours. Capital mobility and stabilization policy under fixed and flexible exchange rates; optimum currency areas; reform of international monetary system; problems of liquidity adjustment and confidence. Prerequisite: Econ 511 or 521.

516. Economic Development in an Interdependent World. 4 Hours. Theoretical and empirical studies of economic development with intersectoral and international perspectives; structural
change and resource reallocation; factor proportions, substitutability, and movement; export-led growth. Prerequisite: Econ 501 or 520 or consent of the instructor.

520. Microeconomics for Business Decisions. 4 Hours. Credit is not given for Econ 520 if the student has credit in Econ 501 or 540 or MBA 502. Efficient allocation of resources by consumers, profit and nonprofit firms and government, regulation of industry, monopoly and imperfect competition, business ethics and the market place, efficiency vs. equity, social welfare. Prerequisite: Math 165 or 181 or the equivalent.

521. Macro and International Economics for Business. 4 Hours. Credit is not given for Econ 521 if the student has credit in Econ 511 or MBA 502 and 508. Impact of the macro economy and international economics on business decisions. Determination of economic activity, inflation, interest rates and exchange rates. Role of monetary and fiscal policy.

531. Labor Economics I. 4 Hours. Determinants of wage differentials; analysis of determinants and consequences of investments in human capital (schooling, on-the-job training, health); labor mobility, supply and allocation of time. Prerequisite: Econ 501 or 520.

532. Labor Economics II. 4 Hours. Impact of training, legislation, institutional constraints, and discrimination on the labor market. Focus on demographic groups (race, nativity, ethnicity, gender). Prerequisite: Econ 501 or 520.

533. Economic Development and Human Resources. 4 Hours. Economic theory applied to less developed countries, focusing on human aspects of development. Household economy, employment, earnings; labor productivity, unemployment; migration, population growth, income distribution. Prerequisite: Econ 501 or 520.

534. Econometrics I. 4 Hours. Detailed treatment of the multivariate linear regression model using matrix algebra. Emphasis on formulating and testing static and dynamic econometric models. Prerequisite: Econ 445 or IDS 532.

535. Econometrics II. 4 Hours. Detailed treatment of simultaneous equations estimation; evaluation of alternative estimators; problems of estimation including PROBIT, LOGIT, TOBIT, and Error Component Models. Prerequisite: Econ 534.

536. Advanced Mathematical Economics. 4 Hours. Mathematics theory and applications, including calculus and linear algebra, to theories of consumer and producer behavior, general equilibrium, welfare economics, externalities, and social choice. Prerequisite: Math 181.

537. Business Research and Forecasting I. 4 Hours. Same as IDS 582. The role of research in business; forecasting methods and techniques, including models and their applications. Prerequisites: Econ 534. and at least one statistics course with regression analysis at the 300-level or above.

538. Business Research and Forecasting II. 4 Hours. Same as IDS 583. The role of research in business; forecasting methods and techniques, including multivariate time series models and their applications. Prerequisite: IDS 476 or IDS 582.

540. Economics for the Social Sciences. 4 Hours. Same as PPA 540. Credit is not given for Econ 540 if the student has credit in Econ 501 or 520. Introduction to economics for graduate students in the social sciences. Economic cost, incentives, resource allocation and economic institutions. Supply and demand analysis. Economic behavior of consumers and households, business firms, government and not-for-profit institutions.

551. Economics of Education. 4 Hours. Basic concepts and tools of economics applied to education. Economic implications of educational outcomes for the economy; and for socio-economic structure (e.g., income distribution, fertility patterns, ethnic group differences). Prerequisite: Econ 501 or 520.

552. Economic Demography. 4 Hours. Economic analysis of fertility (number and timing of children), mortality; marriage and divorce, population age structure, the relationship between population growth and economic development. Prerequisite: Econ 501 or 520.

555. Advanced Health Economics. 4 Hours. Same as HPA 543. Topics in the supply and demand for health services; the role of insurance in the medical care industry; public policy issues of cost and quality regulation. Prerequisite: Econ 501 or 520 or consent of the instructor.

560. Industrial Organization. 4 Hours. Analysis of industry structure, behavior and performance; firms in imperfect competition; concentration measurement; oligopoly theory; cartels; price discrimination; vertical and horizontal integration. Prerequisite: Econ 501 or 520 or consent of the instructor.

570. Environmental and Natural Resource Economics. 4 Hours. Analytical methods for evaluating the impacts and control costs of pollution externalities and natural resource changes. Consequent implications for public and business policy. Prerequisite: Econ 501 or 520.

571. Urban Real Estate and Land Economics. 4 Hours. Economic analysis of urban real estate and land. Real estate appraisal. Demand for urban land; supply of land and improvements. Prerequisite: Econ 501 or 520.

572. Urban Economics. 4 Hours. Urban economic models and economic analysis of urban problems. Firm location, housing, transportation, local public finance. Prerequisite: Econ 501 or 520.

574. Comparative Urbanization. 4 Hours. Process of urbanization in different economic and social contexts. Urban growth, primacy, city size, distribution, urban hierarchy, core and periphery. Relationship with economic development. Prerequisite: Econ 501 or 520 or consent of the instructor.

575. Economic Analysis of Public Expenditures. 4 Hours. Microeconomic theory as applied to public expenditure decisions; externalities, shadow prices and investment criteria in cost-benefit analysis; uncertainty and the value of life; extensive illustrative case studies. Prerequisite: Econ 501 or 520.

576. Economics of Taxation. 4 Hours. Analysis of the effects of taxation on economic behavior; taxation and public choice; the effects of taxation on the distribution of income; theory and empirical analysis of welfare effects of taxes; optimal tax theory; issues in tax policy and tax reform. Prerequisite: Econ 501 or 520.

592. Workshop in Economics. 4 Hours. Bridges the transition from coursework to dissertation research. The nature of a PhD dissertation, topic selection, career design, research support networks. Students define a potential dissertation topic, survey the literature, and present it in class. Prerequisite: Comprehensive exams in micro and macro.

593. Internship Program. 0 to 8 Hours. Under the direction of a faculty supervisor, students work in government or a private firm on problems related to their major field of interest. Specific credit allotted is determined by the Graduate Curriculum Committee after receiving the supervisor’s recommendation. Prerequisites: Completion of the core courses in the degree program in which the student is enrolled and approval of the internship program by the graduate adviser and the Graduate Curriculum Committee.

596. Independent Study. 1 to 4 Hours. Independent study under faculty supervision. Prerequisite: Consent of the instructor.

598. Master’s Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Students may register for more than one section per term. Research on MA thesis. Prerequisite: Consent of the chair of the thesis committee.

599. PhD Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Students may register for more than one section per term. Research on a PhD thesis. Prerequisite: Consent of the chair of the thesis committee.

Education (Ed)

402. Philosophy of Education and Urban School Policy. 3 Hours. Selected social and education philosophies and their impact on urban school curriculum design, school organization, and control.

403. Policy Issues in the History of American Education. 3 Hours. Political, economic, and cultural influences shaping the development of American education policy; emphasis on issues of education theory and practice in their historical settings.

421. Advanced Educational Psychology. 3 Hours. Examines current theory and research on the teaching-learning process with particular attention to general learning and curriculum-relevant problem-solving skills.

422. Advanced Developmental Psychology and Educational Processes. 3 Hours. Same as Psch 422. Focuses on cognitive and social development from birth to adolescence. Examines relations between development, learning, and educational processes. Prerequisites: Psch 100 and any one from Ed 210, Psch 259,
Psch 320; or consent of the instructor.

430. Curriculum, Instruction, and Evaluation in Education. 3 Hours. Introduction to curriculum, instruction, and evaluation as areas of inquiry; implications of these areas of inquiry for educational practice; related contemporary problems and issues. Prerequisite: Admission to graduate study in education or consent of the instructor.

431. Improving Learning Environments. 3 Hours. Analysis of structural, normative, and social dimensions of learning environments and their relationships to student learning. Exploration of change processes to improve those environments.

432. Instruction and Evaluation in Secondary Education. 5 Hours. Instructional planning and curriculum design; strategies for instruction and classroom management; forms of formative and summative evaluation; and professional development issues. Field experience required. Prerequisites: Completion of education core courses in the undergraduate teacher certification program; Ed 200 and 210 or, in the graduate teacher certification program, Ed 402 or 403 or PS 401; and Ed 421 or 422 or 445.

445. Adolescence and the Schools. 3 Hours. Physiological, intellectual, and social development of adolescence. Relations between aspects of adolescent development and the academic and social demands of secondary schools.

461. Political and Socio-Cultural Perspectives on Special Education. 3 Hours. Same as SpEd 461. Students will examine issues of access and equity through legislation, litigation, and socio-cultural perspectives and be introduced to major theoretical frameworks that influence special education programs. Field work required.

470. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the college. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the college or department of specialization.

471. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the college. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Ed 470, and approval of the college or department of specialization.

472. Promoting Academic and Prosocial Behavior I. 3 Hours. Same as SpEd 472. Explores the importance of school-wide and classroom structure and climate in the educational process. Strategies to promote academic success and desired social behavior. Field work required. Prerequisite: Ed 461 or the equivalent or consent of the instructor.

473. Teaching Math and Science with Adaptations. 3 Hours. Same as SpEd 473. Provides prospective teachers with assessment strategies and a range of adaptations, modifications, and interventions in math and science for students with disabilities. Field work required. Prerequisite: Ed 461 or the equivalent or consent of the instructor.

490. Introduction to Research Design in Education. 3 Hours. Introduction to educational research design and literature. Emphasis is placed on learning the fundamental techniques of social science inquiry as they apply to educational issues.

500. Philosophical Foundations of Educational Inquiry. 4 Hours. Philosophical foundations of various forms of educational inquiry. Epistemological and ethical dimensions of different research approaches. Prerequisites: Admission to the PhD in Education program or consent of the instructor.

501. Data and Interpretation in Educational Inquiry. 4 Hours. Data, interpretation, reliability, validity, accuracy, stability, and generalizability from different methodological perspectives; how research design, data collection, and interpretation vary with different philosophical approaches. Prerequisite: Admission to the PhD in education program or consent of the instructor.

502. Essentials of Qualitative Inquiry in Education. 4 Hours. Hands-on introduction to qualitative research methods, including foundations, practices, and ethics in qualitative research. Prerequisite: Admission to the PhD in education program or consent of the instructor.

503. Essentials of Quantitative Inquiry in Education. 4 Hours. Same as EPsy 503. Introduces theory and assumptions behind parametric statistics. Also provides hands-on experience in conducting basic quantitative research (t-test, correlation, regression, analysis of variance). Prerequisite: Admission to the PhD in education program or consent of the instructor.

543. Research on Teaching. 4 Hours. Review and analysis of history, paradigms, methods, and findings of research on teaching. Focus on the development of research questions and strategy. Prerequisites: Ed 490 or 503 or CIE 578, and consent of the instructor.

544. Research Designs for Policy Analysis. 4 Hours. Same as PPA 544. Alternative research design models and program evaluation methodologies; qualitative and quantitative approaches; ethnography and historiography; experimentation and quasiexperiential; causal modeling. Prerequisite: Admission to the PhD program in public policy analysis and one graduate-level course in statistics.

596. Independent Study. 1 to 4 Hours. Students may register for more than one section per term. Students independently study related topics not covered by course, under faculty supervision. Prerequisite: Consent of the advisor.

Educational Psychology (EPsy)

420. Social Development of Urban Children. 4 Hours. Same as Psch 420. General principles of social development and socialization during childhood and the factors common to urban children that illustrate and modify these principles. Prerequisite: Admission to the graduate program in education or psychology, or consent of the instructor.

429. Constructivist Approaches to Development: Piaget and Vygotsky. 4 Hours. Same as Psch 429. Piaget’s and Vygotsky theories of development of knowledge. Empirical and logico-mathematical forms of knowledge. Thought and action. Thought and language. Prerequisites: Graduate standing in education and Ed 422 or the equivalent, or consent of the instructor.

446. Characteristics of Early Adolescence. 3 Hours. Same as Psch 446. Physiological, social, emotional and cognitive development of early adolescence. The relationship between these developmental characteristics and success in the middle grades. Prerequisite: Admission to the PhD program in psychology, or approval of the College of Education or consent of the instructor, and Ed 210 or 421 or 422.

449. History and Philosophy of Early Childhood Education. 3 Hours. Historical and philosophical foundations of early childhood education. Emphasis on the effects of changing economic, political, and social conditions, values and views of human development. Prerequisite: Ed 210 or the equivalent.

465. Cognitive Development and Disabilities. 3 Hours. Same as SpEd 465. Theory and research on cognitive development in children with disabilities from infancy through adolescence, in the context of typical development. Models for cognitive assessment and intervention. Field work required. Prerequisite: Ed 461 or the equivalent or consent of the instructor.

466. Language Development, Diversity, and Disabilities. 3 Hours. Same as SpEd 466. Theory and research on language development in children with disabilities, in the context of typical development. Models for language assessment and intervention. Field work required. Prerequisite: Ed 461 or the equivalent or consent of the instructor.

468. Social and Emotional Development and Disabilities. 3 Hours. Same as SpEd 467. Exploration of the risk factors and different theoretical approaches associated with the social and emotional development of youth ages 5-21 with and without disabilities. Field work required. Prerequisite: Ed 461 or the equivalent or consent of the instructor.

482. Forging Collaborations with Family and Community. 3 Hours. Same as SpEd 482. Develops skills necessary to work in partnership with the families of children with disabilities, and community members. Prerequisite: Ed 461 or the equivalent or consent of the instructor.

494. Topics in Educational Psychology. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Seminar on a preannounced topic focusing on methodology, research and educational
implications of recent models of learning, problem solving, and thinking. Prerequisite: Consent of the instructor.

500. Proseminar in Educational Psychology. 2 Hours. Same as Psch 550. S/U grade only. Interdisciplinary colloquia on selected topics in educational psychology. Serves as introduction to faculty research foci. Prerequisite: Admission to the PhD in education program or the PhD in psychology program, or consent of the instructor.

501. Cognition and Instruction. 4 Hours. Same as Psch 551. Current research on relations among cognitive processes, learning, and instruction. Prerequisite: Admission to the PhD in education program or the PhD in psychology program, or consent of the instructor.

502. Social Psychology of Education. 4 Hours. Same as Psch 517. Social psychological factors influencing academic and social outcomes in schools. Achievement motivation, peer relations, social values in relation to student characteristics and school practice. Prerequisite: Admission to the PhD in education program or the PhD in psychology program, or consent of the instructor.

503. Essentials of Quantitative Inquiry in Education. 4 Hours. Same as Ed 503. Introduces theory and assumptions behind parametric statistics. Also provides hands-on experience in conducting basic quantitative research (t-test, correlation, regression, analysis of variance). Prerequisite: Admission to the PhD in education program or consent of the instructor.

519. Curriculum, Instruction, and Assessment in Early Primary Grades. 4 Hours. Art, literacy, social studies, math, and science in grades kindergarten through third. Provides extensive field experience in primary classrooms. Prerequisites: EPsy 520 and 521; and consent of the instructor.


521. Curriculum and Practice in Early Childhood Education II. 6 Hours. Instructional methods and curricula in the preschool classroom. Discussion of program and child evaluation. Includes full-time supervised teaching. Meets eight weeks of the semester. Meets Illinois State requirement for Type 04 Certification by providing supervised student teaching experience. Prerequisites: Credit or concurrent registration in EPsy 520; and consent of the instructor.

522. Student Teaching in the Primary Grades. 6 Hours. Instructional methods in curricula in primary grades. Field work required. Meets eight weeks of the semester. Meets Illinois State Board of Education requirement for Type 04 Certification. Prerequisites: EPsy 519 and consent of the instructor.

524. Parent and Staff Relations in Early Education. 4 Hours. Methods for involving parents in early childhood programs. The role of the director in program administration and in hiring, training, and supervising teachers and staff. Prerequisite: Consent of the instructor.

526. Development in Infancy and Early Childhood. 4 Hours. Same as Psch 520. Consideration of development in the preschool years. Stress on theory, research, individual child study, and educational implications. Prerequisite: Ed 422 or the equivalent.

527. Seminar in Moral Development, Character Formation, and Education. 4 Hours. Same as Psch 527. Philosophical assumptions, psychology research, and theory underlying current approaches to moral and character education. Cultural and developmental factors in value formation. Prerequisite: Ed/Psch 422 or the equivalent, or admission to the PhD program in education, PhD program in psychology, or PhD program in social work, or consent of the instructor.

529. Cognition and Instruction: Advanced Constructivist Approaches. 4 Hours. Same as Psch 552. Piaget's and Vygotsky's theories of knowledge development. Emphasis on competing approaches concerning the relation of thought to action, to language, and to social relations. Prerequisites: EPsy 429 or the equivalent, and admission into the PhD program in the College of Education or Psychology or consent of the instructor.

530. Achievement Motivation. 4 Hours. Same as Psch 525. The psychology of achievement motivation will be explored from the perspectives of personality, social, and educational psychology. Prerequisite: Graduate standing in education or psychology or consent of the instructor.

546. Educational Measurement. 4 Hours. Introduces methods based on true score theory, generalizability theory, and Rasch measurement that are used to address issues of reliability and validity. Prerequisites: Ed 501 and Ed 503/EPsy 503 or the equivalents or consent of the instructor.

547. Multiple Regression in Educational Research. 4 Hours. Introduction to multiple correlation and regression techniques as tools for the analysis and interpretation of educational and behavioral science data. Prerequisite: EPsy 503.

550. Rating Scale and Questionnaire Design and Analysis. 4 Hours. Development and administration of rating scales and questionnaires, analysis of data, and reporting of results. The focus is on rating scales. Prerequisites: Ed 501 and Ed 503/EPsy 503 or the equivalents or consent of the instructor.

554. Analysis of Content for Instruction. 4 Hours. Same as DA 502. Psychological factors influencing the analysis of content for the development of procedures, materials and systems for instruction in subject matter disciplines. Prerequisite: Consent of the instructor.

555. Instructional Design. 4 Hours. Same as DA 504. Principles and practice in instructional development, including design models for various content outcomes, student and media characteristics; formative and summative evaluation of materials. Prerequisite: Credit or concurrent registration in EPsy 554.

556. Theory and Development of Instructional Microcomputing. 4 Hours. Same as DA 505. Analysis of instructional applications of microcomputing; emphasis upon theory of courseware design, development, and implementation; courseware selection and management factors in instructional settings. Prerequisite: EPsy 555 or consent of the instructor.

557. Instructional Technology. 4 Hours. Same as DA 506. Training and laboratory work in computer-assisted instruction, audiovisual media, interactive video; development and implementation costs; problems of integrating instructional technology into educational systems. Prerequisite: EPsy 555 or consent of the instructor.

563. Advanced Analysis of Variance in Educational Research. 4 Hours. Detailed coverage of the principles of analysis of variance and the analysis of data collected from research employing experimental designs. Prerequisite: EPsy 503.

583. Multivariate Analysis of Educational Data. 4 Hours. Introduction to multivariate statistical methods in education including data screening, canonical correlation, MANOVA/MANCOCOA, DFA, profile analysis, component-factor analysis, confirmatory factor analysis, and structural equation modeling. Prerequisite: EPsy 547 or EPsy 563.

588. Current and Specialized Topics in Psychometrics. 1 Hour. May be repeated for credit. Satisfactory/Unsatisfactory grade only. Seminar on current and specialized topics in psychometrics. Extensive computer use required. Meets eight weeks of the semester. Prerequisites: Credit or concurrent registration in EPsy 546 or credit or concurrent registration in EPsy 550; and credit or concurrent registration in EPsy 503; or consent of the instructor.

589. Topics in Educational Statistics. 4 Hours. May be repeated for credit. Seminar on a pre-announced topic on educational statistical methodology for the analysis of educational data. Prerequisite: EPsy 547.

593. PhD Research Project. 1 to 8 Hours. May be repeated for a maximum of 8 hours of credit. Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. Prerequisite: Admission to the PhD in education program.

594. Special Topics in Educational Psychology. 1 to 4 Hours. May be repeated for up to 12 hours of credit. Seminar on a pre-announced topic focusing on methodology, research, and educational implications of recent models of learning, problem solving, and thinking. Prerequisites: Ed 421 and 422, or consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for up to 12 hours of credit. Students may register for more than one section per term. Students carry out independent study in educational psychology under the direction of a faculty member. Prerequisites: Ed 490 or the equivalent, and consent of the advisor and the instructor.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Research on the topic of the student's dissertation. Prerequisite: Consent of the dissertation advisor.
Electrical and Computer Engineering (ECE)

400. Introduction to Microelectromechanical Systems. 4 Hours. Previously listed as EECS 400. Definition, classification and case studies of transducers, sensors and actuators. Microfabrication methods for microelectromechanical systems (MEMS). Design, simulation and modeling of MEMS. Prerequisites: ECE 220 and ECE 346 or the equivalent.

401. Quasi-Static Electric and Magnetic Fields. 4 Hours. Previously listed as EECS 401. Static electric and magnetic fields. Material description, boundary value problems. Field energy, its conversion and scaling laws. Quasi-static fields, field diffusion, eddy currents, energy losses. Prerequisite: ECE 220 or the equivalent.


412. Introduction to Filter Synthesis. 4 Hours. Previously listed as EECS 412. Fundamentals of network synthesis, filter approximations and frequency transformations. Active filter synthesis using bi-linear and bi-quad circuits. Topics in computer-aided design. Prerequisites: ECE 225 and ECE 310.

415. Image Analysis and Machine Vision. 4 Hours. Previously listed as EECS 415. Image formation, geometry and stereo. Two-dimensional image analysis by Fourier and other 2D transforms. Image enhancement, color, image segmentation, compression, feature extraction, object recognition. Prerequisite: ECE 310 or Math 310.

418. Digital Signal Processing II. 4 Hours. Previously listed as EECS 418. Computer-aided design of digital filters; quantization and round-off effects; FFT algorithms; number-theoretic algorithms; Hilbert transform; complex cepstrum; multirate signal processing; linear filtering; system identification; matching. Prerequisite: ECE 317.

420. Introduction to Microwave Engineering. 4 Hours. Previously listed as EECS 420. TEM waves in coaxial and strip lines; TE and TM waves in rectangular and circular wave guide; components; resonators. Laboratory and computer simulation required. Prerequisite: ECE 322.

421. Introduction to Antenna Engineering. 4 Hours. Previously listed as EECS 421. Radiation; antenna parameters; theorems of antenna; radiation from linear wire and loop antennas; impedance; linear arrays; traveling wave wire antennas. Design project and computer simulation required. Prerequisite: ECE 322.

422. Wave Propagation and Communication Links. 4 Hours. Previously listed as EECS 422. Antennas and propagation; wave propagation over ground, through ionosphere and troposphere; diversity principles; propagation effects in microwave systems, satellite, space, and radar links. Prerequisites: ECE 311 and ECE 322.


429. Plasma. 4 Hours. Same as Physics 429. Previously listed as EECS 429. Single particle motion, plasma as fluids, waves in plasma, diffusion, resistivity, equilibrium, stability, introduction to kinetic theory. Prerequisite: ECE 322.

430. Communication and Signal Processing. 4 Hours. Previously listed as EECS 430. Random processes, signal to noise ratio, spectral and correlation analysis, filtering of random processes, bandpass noise, noise in communications, statistical signal processing. Prerequisites: ECE 311 and either ECE 341 or IE 342 or STAT 361 or STAT 401.

431. Analog Communication Circuits. 4 Hours. Previously listed as EECS 431. Laboratory. Analog communication circuits, oscillators, crystals, mixers, AM generation and detection. FM generators and discriminators. Phase-locked loops. Commercial communication circuits. Prerequisites: ECE 311 and ECE 340.

432. Digital Communications. 4 Hours. Previously listed as EECS 432. Source coding, quantization, signal representation, channel noise, optimum signal reception, digital modulation: ASK, PSK, FSK, MSK, M-ary modulation. Probability of error. Inter-symbol interference. Prerequisite: ECE 311 and either ECE 341 or IE 342 or Stat 381 or Stat 401.

433. Computer Communication Networks I. 4 Hours. Previously listed as EECS 433. Credit is not given for ECE 433 if the student has credit in CS 450. Overview of networks, physical layer, data link protocols, multiple access, local area networks, network layer, Internet, ATM, routing, congestion control, IP protocol, transport layer. Prerequisite: ECE 341 or IE 342 or Stat 381 or Stat 401.

434. Multimedia Communication Networks. 4 Hours. Extensive computer use required. Multimedia systems; compression standards; asynchronous transfer mode; Internet; wireless networks; television; videoconferencing; telephony; applications. Prerequisite: ECE 433.

435. Wireless Communication Networks. 4 Hours. Previously listed as EECS 435. Radio technology fundamentals; channel and propagation models; channel multiple access technologies; wireless mobile communication fundamentals; generic wireless mobile network; cellular/PCS wireless mobile network standards. Prerequisites: ECE 452 and ECE 433.

436. Computer Communication Networks II. 4 Hours. Extensive computer use required. Explores integrated network architecture of service, control signaling and management, examples of high-speed LAN/WAN, next generation Internet and mobile wireless network. Prerequisite: ECE 433.


448. Transistors. 4 Hours. Previously listed as EECS 448. Bipolar junction transistors, electronic processes in surface-controlled semiconductor and dielectric devices. Properties of MIS field-effect capacitors and transistors, surface and interface effects. Prerequisite: ECE 346.

449. Microdevices and Micromachining Technology. 5 Hours. Previously listed as EECS 449. Laboratory. Microfabrication techniques for microsensors, microstructures, and microdevices. Selected examples of physical/chemical sensors and actuators. Simulation experiments. Prerequisite: ECE 347.

451. Control Engineering. 4 Hours. Previously listed as EECS 451. State-space representation of systems; realization theory; stability; performance; modern control design techniques, including: fuzzy, learning, adaptive and nonlinear control. Prerequisite: ECE 350.

452. Robotics: Algorithms and Control. 4 Hours. Kinematic and dynamic modeling of robots; configuration space; motion planning algorithms; control of robots; sensors and perception; reasoning;
mobile robots. Prerequisites: CS 201 and either ECE 210 or ECE 225 or consent of the instructor.

458. Electromechanical Energy Conversion. 4 Hours. Previously listed as EECS 458. Electromagnetic forces and torque; magnetic circuits and transformers; DC machines; three-phase AC synchronous and induction machines; laboratory-demonstrations. Projects are required. Prerequisite: ECE 225.

465. Digital Systems Design. 4 Hours. Previously listed as EECS 465. Switching algebra, combinational circuits, Mux, ROM, PLA-based designs, minimization techniques, synchronous and asynchronous sequential circuits (minimization, hazards, races, state assignment, retiming), fault analysis, testing. Prerequisite: ECE 265, or CS 366 and either ECE 220 or Phys 142.

466. Advanced Computer Architecture. 4 Hours. Previously listed as ECE 466. Credit is not given for ECE 466 if the student has credit in CS 466. Design and analysis of high performance uniprocessors. Topics include arithmetic: multiplication, division, shifting; processor: pipelining, multiple function units. Instruction sets; memory: caches, modules; virtual machines. Prerequisite: ECE 366.

467. Introduction to VLSI Design. 5 Hours. Previously listed as EECS 467. Laboratory, MOS, CMOS circuits VLSI technology, CMOS circuit characterization and evaluation. Static and dynamic MOS circuits, system design, faults, testing, and symbolic layout. Advanced topics. Prerequisite: ECE 340.

468. Analog and Mixed-Signal VLSI Design. 5 Hours. Previously listed as EECS 468. Elementary transistor stages and analog components; low-power design; comparison of bipolar, CMOS, and BiCMOS; s-parameters and high-frequency ASIC design and modeling; RF wireless communication system components; behavioral modeling. Prerequisite: ECE 467.

469. CAD-Based Computer Design. 4 Hours. Previously listed as EECS 469. Extensive computer use required. Credit is not given for ECE 469 if the student has credit in CS 469. Use of modern CAD tools for computer system design, hardware, description languages, simulation, design verification, synthesis. Design assignments, projects using CAD. Prerequisite: ECE 467.

491. Seminar. 1 to 4 Hours. Previously listed as ECE 491. May be repeated for credit. Topics of mutual interest to a faculty member and a group of students. Offered as announced by department bulletin or the Timetable. Prerequisite: Consent of the instructor.

493. Special Problems. 2 to 4 Hours. Previously listed as EECS 493. No graduate credit for electrical and computer engineering majors. Special problems or reading by special arrangement with the faculty. Prerequisite: Consent of the instructor.


515. Image Analysis and Machine Vision II. 4 Hours. Previously listed as ECE 515. Image analysis techniques, 2-D and 3-D shape representation, segmentation, camera and stereo modeling, motion, generic object and face recognition, parallel and neural architectures for image and visual processing. Prerequisite: ECE 415 or consent of the instructor.

516. Optimal and Adaptive Digital Filters. 4 Hours. Previously listed as ECE 516. Properties of signals; optimal filters, Wiener and Kalman filters; signal modeling, adaptive filters channel equalizing, echo canceling, noise canceling, and linear prediction; filter properties. Prerequisite: ECE 317.

517. Digital Image Processing. 4 Hours. Previously listed as EECS 517. Operations on 2-D digital images such as transforms, enhancement, restoration, warping, segmentation, registration, compression, and reconstruction from projection. Prerequisite: ECE 317.


522. Advanced Microwave Theory. 4 Hours. Previously listed as ECE 522. Microwave integrated circuits: analysis, design, Microwave devices: filters, cavities and phase shifters. Millimeter waves: components and circuits, millimeter wave applications. Prerequisites: ECE 420 and 520.

523. Advanced Antenna Engineering. 4 Hours. Previously listed as ECE 523. Radiation from helix and spiral; aperture antennas; linear and planar array synthesis; Hallen’s and other methods for impedance; design of array feeds; reflector and lens antennas. Prerequisites: ECE 421 and 520.

524. High Frequency Electromagnetic Systems and Packaging. 4 Hours. Previously listed as EECS 524. Electromagnetic effects on high-frequency circuits, computer-aided design and simulation of high-frequency integrated circuits. Packaging designs for cross-talk minimization. Prerequisite: ECE 401.

526. Electromagnetic Scattering. 4 Hours. Previously listed as EECS 526. Exact solutions of exterior boundary-value problems. Low-frequency expansions. High-frequency methods, including geometrical and physical theories of diffraction. Hybrid techniques. Radar cross-sections. Prerequisite: ECE 520.


528. Fiber and Integrated Optics. 4 Hours. Previously listed as EECS 528. Propagation in thin films and fibers. Mode launching, coupling, and losses. Sources, detectors, modulators, interferometers. Fabrication and measurement techniques. Fiber optics systems. Prerequisite: ECE 520 or the equivalent.

530. Random Signal Analysis. 4 Hours. No credit given if the student has credit in EECS 530. Probability for communications, properties and series representations of random processes, random processes through linear and nonlinear systems, minimum MSE and maximum SNR systems. Prerequisite: ECE 430.


532. Advanced Digital Communications. 4 Hours. Previously listed as EECS 532. Characteristics of digitally modulated signals; digital signals in additive noise; communication over fading channels and with intersymbol interference; source and channel coding; synchronization; spread spectrum techniques. Prerequisite: ECE 432.

534. Elements of Information Theory. 4 Hours. Previously listed as EECS 534. Entropy and mutual information, asymptotic equipartition property stochastic process entropy rates, data compression Kolmogorov complexity, channel capacity, rate distortion theory, information theory applications. Prerequisite: ECE 430.

535. Advanced Wireless Communication Networks. 4 Hours. Previously listed as EECS 535. 2nd generation: IS-95-based wireless mobile network; 2nd generation: GSM-based wireless mobile network; 2.5 generation: wireless mobile data/voice network; 3rd
generation: broadband wireless mobile multimedia network. Prerequisite: ECE 435.

540. Physics of Semiconductor Devices. 4 Hours. Previously listed as EECS 540. Same as Phys 540. Electrons in periodic lattice; equilibrium carrier distribution; energy band diagrams in junctions, in homogeneous semiconductors; recombination and generation; nonequilibrium processes, radiation and electronic fields; diodes. Prerequisite: ECE 346 or the equivalent.

541. Microelectronic Fabrication Techniques. 4 Hours. Previously listed as EECS 541. Current fabrication techniques of microelectronic technology; plasma and CVD processes; etching techniques; ion implantation; surface analytical methods. Prerequisite: ECE 540.

542. Semiconductor Device Theory. 4 Hours. Previously listed as EECS 542. Theory and design of several semiconductor devices of current interest, from among unipolar devices, bipolar devices, high-speed and microwave devices, and optical devices. Prerequisite: ECE 540.

544. Advanced Theory and Technology of Devices. 4 Hours. Previously listed as EECS 544. Same as Bioe 544. Theory, design, and technology of a selected semiconductor device at current research and industrial state-of-the-art level. Prerequisite: ECE 540.


546. Chemical and Biosensors. 4 Hours. Previously listed as EECS 546. Thermodynamics, adsorption, interfaces. Membranes, biosensor principles. Chemical, gas, electrolyte sensors and their applications. Prerequisite: ECE 449 or the equivalent.


551. Optimal Control. 4 Hours. Previously listed as EECS 551. Optimal control of dynamic systems in continuous and discrete time. The maximum principle and dynamic programming, considering constraints as they arise in practical systems; optimization performance. Prerequisite: ECE 550.

552. Nonlinear Control. 4 Hours. Previously listed as EECS 552. Nonlinear phenomena, linear and piecewise linear approximations. Describing function and on-off servomechanisms, phase plane techniques, limit cycle, Lyapunov’s stability theory, bifunctions, bilinear control, vibrational control. Prerequisite: ECE 451.

553. System Identification. 4 Hours. Previously listed as EECS 553. On-line and off-line identification of control systems in frequency and time domain, considering noise effects, nonlinearity, nonstationarities and distributed parameters. Prerequisite: ECE 550.

559. Neural Networks. 4 Hours. Previously listed as EECS 559. Artificial neural networks for parallel computing including perceptrons, backpropagation and Kohonen nets, statistical methods in neural computing, Hopfield nets, associative memories, cognition and neuroman. Prerequisite: Consent of the instructor.

560. Fuzzy Logic. 4 Hours. Previously listed as EECS 560. Crisp and fuzzy sets; membership functions; fuzzy operations; fuzzy relations and their solution; approximate reasoning; fuzzy modeling and programming; applications; project. Prerequisite: Consent of the instructor.

565. VLSI Design Automation. 4 Hours. Previously listed as EECS 565. Computer-aided physical design of integrated circuits; circuit partitioning and placement; floorplanning; global and detailed routing; timing optimization; general optimization tools: local search, constraint relaxation. Prerequisites: CS 401 and ECE 465.

566. Parallel Processing. 4 Hours. Previously listed as EECS 566. Parallel processing from the computer science perspective. Includes architecture (bus based, lockstep, SIMD), programming languages (functional, traditional and extensions), compilers, interconnection networks, and algorithms. Prerequisite: ECE 466.

567. Advanced VLSI Design. 4 Hours. Previously listed as EECS 567. VLSI subsystem and system design: synthesis, design styles, design process, testing. Case studies: switching networks, graphics engine, CPU. Projects use computer-aided design tools. Prerequisite: ECE 467.

569. High-Performance Processors and Systems. 4 Hours. Previously listed as EECS 569. Instruction-level parallelism, multiple-instruction issue, branch prediction, instruction and data prefetching, novel cache and DRAM organization, high-performance interconnect, compilation issues, case studies. Prerequisite: ECE 466.

594. Special Topics. 4 Hours. Previously listed as EECS 594. May be repeated for credit. Students may register for more than one section per term. Subject matter varies from term to term and section to section, depending on the specialties of the instructor. Prerequisite: Consent of the instructor.

595. Departmental Seminar. 0 Hours. Previously listed as EECS 595. May be repeated. S/U grade only. Seminar by faculty and invited speakers.

596. Individual Study. 1 to 4 Hours. Previously listed as EECS 596. S/U grade only. May be repeated for credit. Students may register for more than one section per term. Individual study or research under close supervision of a faculty member. For ECE majors only. Prerequisite: Consent of the instructor.

597. Project Research. 0 to 9 Hours. Previously listed as EECS 597. S/U grade only. May be repeated for credit. Students may register for more than one section per term. For ECE majors only. A research design or reading project approved by the committee appointed by the director of graduate studies. Prerequisite: Consent of the instructor.

598. MS Thesis Research. 0 to 16 Hours. Previously listed as EECS 598. S/U grade only. May be repeated for credit. Students may register for more than one section per term. For ECE majors only. MS thesis work under the supervision of a graduate adviser. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. Previously listed as EECS 599. S/U grade only. May be repeated for credit. Students may register for more than one section per term. For ECE majors only. PhD thesis work under supervision of a graduate adviser. Prerequisite: Consent of the instructor.

Engineering (Engr)


English (Engl)

400. History of the English Language. 4 Hours. Development of English from its Proto-Indo-European origin to the present; detailed examination of the external and internal history of Old, Middle, and Modern English.

401. Modern English. 4 Hours. Critical study of traditional, structural, and generative-transformational grammatical descriptions, language variation, and lexicology.


403. Introduction to Old English. 4 Hours. The elements of Old English grammar and readings from the literature of England before the Norman Conquest.

404. Beowulf. 4 Hours. A detailed explication of the poem. Prerequisite: Engl 403 or the equivalent.

406. Medieval Drama. 4 Hours. English drama from its liturgical beginnings in the tenth century to the advent of humanist drama in the early sixteenth century.

409. History of Rhetorical Theory: Antiquity Through the Middle Ages. 4 Hours. Representative texts and figures such as Plato, Aristotle, Cicero, Quintilian, Augustine; consideration of historical factors that influence interpretation and practical applications of rhetorical theory. Prerequisite: Engl 402 or consent of the instructor.


412. Renaissance Drama, Exclusive of Shakespeare. 4 Hours. Tudor and Stuart drama, with emphasis on Marlowe, Jonson, and Webster.

413. Studies in Shakespeare. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of a genre, topic or period in Shakespeare’s work.

414. Studies in Renaissance Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a major author, topic, or genre of the sixteenth and seventeenth centuries.

415. Milton. 4 Hours. Same as RelS 415. Survey of Milton’s poetry and prose, with emphasis on Paradise Lost. Prerequisites: 6 hours of English from Engl 241, 242, 243, 300; or consent of the instructor.

418. History of Rhetorical Theory: Renaissance Through the Nineteenth Century. 4 Hours. Representative movements such as Ramistic, neoclassical, Romantic, bellettristic, and elocutionary rhetorics; consideration of historical factors that influence interpretation and practical applications of rhetorical theory. Prerequisite: Engl 402 or 409 or consent of the instructor.

420. English Literature of the Restoration and the Eighteenth Century. 4 Hours. Survey of significant works from 1660-1789, with emphasis on Dryden, Pope, Swift, and Johnson, and of significant literary trends.

423. Restoration and Eighteenth-Century Drama. 4 Hours. Representative plays and dramatic criticism from Dryden and Etherege to Goldsmith and Sheridan.

424. Eighteenth-Century Novel. 4 Hours. Representative novels by Defoe, Richardson, Fielding, Smollett, Sterne, and others, including the Gothic novel.

425. Topics in Restoration and Eighteenth-Century Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of an author or authors, theme, genre, or movement. Content varies.

430. British Romantic Literature. 4 Hours. Literature of Britain, 1789-1932, with emphasis on poetry and nonfiction prose of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.

431. Topics in British Romantic Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of an author or authors, theme, or genre. Content varies.

432. Victorian Literature. 4 Hours. Poetry and nonfiction prose of the Victorian era, with emphasis on Tennyson, Browning, Arnold, Carlyle, and selected later Victorian writers exclusive of the novelists.

434. Topics in Victorian Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Major Victorian authors, such as Arnold, Browning, Carlyle, Dickens, Eliot, Tennyson, Thackeray, or study of a topic, movement, or genre.

435. Nineteenth-Century British Fiction. 4 Hours. Representative selections: emphasis on Austen, Scott, Dickens, Thackeray, Trollope, Eliot, Meredith, Butler, Hardy.

436. Nineteenth-Century British Nonfictional Prose. 4 Hours. Representative selections: the prose of Wordsworth and Coleridge, other representative essayists such as Hazlitt, DeQuincy, Lamb, Carlyle, Mill, Ruskin, Newman, Arnold, Pater.

450. Modern British Literature: 1890 to 1950. 4 Hours. Representative selections, with emphasis on poetry and fiction of the period.

451. Contemporary British Literature. 4 Hours. Representative selections, with emphasis on poetry and fiction of the period.

452. Developments in Contemporary Fiction. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, movement, or genre. Content varies.

453. Developments in Contemporary Poetry. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, movement, or genre. Content varies.

454. Twentieth-Century Rhetorical Theory. 4 Hours. Survey of perspectives that comprise the interdisciplinary modern understanding of rhetoric; readings in language, philosophy, social science, literary theory, composition theory, reading theory. Prerequisite: Engl 402 or 418 or consent of the instructor.

455. Topics in Literature: 1900 to the Present. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of a major author, topic, movement, or genre of literature in English. Content varies.

456. Contemporary Literature in English. 4 Hours. Selection of readings designed to provide a global perspective on literature in English from various parts of the world.

457. Topics in Modern Drama. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of an author, topic, or genre. Content varies.

458. Postcolonial Literature. 4 Hours. Literature in English written in the context of the dismantling of colonial empires and the decolonization of indigenous people during the latter half of the twentieth century.

460. Genres in American Literature Through 1914. 4 Hours. May be repeated for a maximum of 8 hours of credit. Concentration on a single genre, such as poetry, the novel, the short story, and nonfiction prose. Content varies.

464. Modern American Literature: 1900 to 1950. 4 Hours. Representative selections, with emphasis on poetry and fiction of the period.

465. Contemporary American Literature: 1950 to the Present. 4 Hours. Representative selections with the emphasis on poetry and fiction of the period.

466. Major Authors in American Literature Through 1914. 4 Hours. May be repeated for a maximum of 8 hours of credit. Analysis of works by a single author, such as Hawthorne, Melville, Whitman, Dickinson, James, Twain, Dreiser. Content varies.

467. Periods and Movements in American Literature Through 1914. 4 Hours. May be repeated for a maximum of 8 hours of credit. A single period, such as early American literature or the Gilded Age or a single movement, such as Puritanism, Transcendentalism, or Naturalism.

468. Topics in American Literature to 1914. 4 Hours. May be repeated for a maximum of 8 hours of credit. A single topic, such as the idea of success in American literature, or the literature of the Civil War, or landscape in American literature and painting.

469. Women's Literary Traditions. 4 Hours. Same as GWS 469. An exploration of issues such as the female aesthetic, women’s popular literature, factors that enable creativity, differences of race and class.

470. Studies in Multietnic Literatures in the United States. 4 Hours. May be repeated for a maximum of 12 hours of credit. Studies in the literatures of American racial and ethnic groups. Content varies.

471. Studies in Native American Literatures. 4 Hours. Same as NASI 471. May be repeated for a maximum of 8 hours of credit. The history and development of literature by and about American Indians. Content varies.

472. Women and Film. 4 Hours. Same as AH 434 and GWS 472. Roles and representations of women in classical Hollywood, European art, and independent feminist cinemas.

473. Topics in African-American Literature. 4 Hours. Same as AAST 490. May be repeated for credit. Students may register for more than one section per term. African-American literature and culture for students with significant background in the field. Topics vary. Prerequisite: AAST 110 or 111 or 250 or consent of the instructor.

474. Studies in Popular Culture and Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of a topic or genre such as the American 1930’s or science fiction; critical approaches to the study of popular literature and culture. Content varies.
475. History of Literary Criticism. 4 Hours. Readings drawn from the entire range of the Western literary tradition from Plato to the present that provide the foundation necessary to understand the history of literary criticism.

476. Studies in the History of Literary Criticism. 4 Hours. Study of a topic, movement, or author. Content varies.

477. Studies in Literary Theory. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic or movement. Content varies.

478. The Bible as Literature. 4 Hours. Same as JS 478, RelS 478. Literary analysis of the English Bible (including the Apocrypha) in its historical and religious contexts; study of the King James Version and successive revisions of it. Prerequisites: 6 hours of English from EngL 241, 242, 243, 300; or consent of the instructor.

479. Religion and Literature. 4 Hours. Same as RelS 479. Literary works considered in the light of several religious traditions. Prerequisites: 6 hours of English from EngL 241, 242, 243, 300; or consent of the instructor.

480. Reading Black Women Writing. 4 Hours. Same as AAS 470 and GWS 470. Examines inscriptions of race, gender, class, and sexuality as they shape the literary and critical practices of nineteenth- and twentieth-century black women writers. Prerequisite: AAS 110 or 111 or 250 or consent of the instructor.

481. Teaching of English. 4 Hours. All students in the teacher education program must take this course in the term preceding their student teaching. Theory and practice; emphasis on current approaches to language and literature.

482. Campus Writing Consultants. 4 Hours. Tutoring in the Writing Center. Students are required to consult with others on their writing. Emphasis on practice and theories of writing. Appropriate for prospective teachers. Prerequisite: 9 hours of English and consent of the instructor. Students must obtain override from Writing Center.

483. Studies in Language and Rhetoric. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of a particular topic or movement in language or rhetoric. Content varies.

484. Studies in Language and Cognition. 4 Hours. Examination of relationships among theories of language structure, cognition, and discourse, with applications of such theories to the writing process. Prerequisite: EngL 401 or consent of the instructor.

485. Studies in the English Language and Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic such as language diversity and literacy, theories of grammar, literacy in society, ethnicity, and language. Content varies.


490. Advanced Writing of Poetry. 4 Hours. May be repeated for a maximum of 8 hours of credit. Advanced practice; emphasis on analysis of student work and published examples.

492. Advanced Writing of Nonfiction Prose. 4 Hours. May be repeated for a maximum of 8 hours of credit if topic is different for each registration. Advanced practice in writing essays, articles, reviews, or other forms of nonfiction prose. Content varies.

493. Internship in Nonfiction Writing. 4 Hours. Credit is not given for EngL 493 if the student has credit in EngL 593. May be repeated once for a maximum of 8 hours of credit, 4 of which may be counted toward the graduate degree in English. Individual projects in approved professional setting to practice writing skills at an advanced level. Prerequisite: EngL 202 or the equivalent and an interview with the coordinator of the internship program prior to registration. Students will be registered in this course subject to approval by the coordinator. Resume and writing samples are required by LAS CO-OP.

494. Topics in the Teaching of English. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Study of a topic in literature, composition, and/or pedagogy. The content varies with each offering. Prerequisite: Consent of the instructor.

495. Playwriting. 4 Hours. Same as Thtr 423. The development of scripts for stage performance. Prerequisites: Approval of the department and submission and approval of a playwriting sample or dialog-centered fiction prior to registration.

496. Studies in Modes, Influences, and Movements. 4 Hours. May be repeated for a maximum of 8 hours of credit. Study of a particular subject in literature.

497. Backgrounds to English and American Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Areas of mythology, mythography, the Bible, and major works of literature important to an understanding of English and American literature. Content varies.

498. Educational Practice with Seminar I. 6 Hours. S/U grade only. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

499. Educational Practice with Seminar II. 6 Hours. S/U grade only. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in EngL 498, and approval of the department.

500. Introduction to Bibliography and Research. 4 Hours. Study of bibliographic tools and research techniques.

501. Introduction to Research in Language, Literacy, and Rhetoric. 4 Hours. Surveys disciplinary foundations of research on language, literacy, and rhetoric. Issues and methods are introduced with special emphasis on work relating to culture, cognition, and rhetoric.

502. Theory and Practice of Literary Criticism. 4 Hours. Forms and theories of literary criticism, analysis of their application to specific literary genres and works, and practice in writing literary criticism.

503. Seminar in Literary Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic or movement. Content varies. Prerequisite: EngL 503.

504. Seminar in Old English. 4 Hours. A topic in Old English: emphasis on literature or philology. Content varies. Prerequisite: EngL 404 or the equivalent.

515. Seminar in Middle English Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. The works of Chaucer and other Middle English writers. Content varies. Prerequisite: A minimum of 3 hours in Middle English literature.

518. Newberry Library Seminar in Renaissance Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Late Medieval and Renaissance literature. In conjunction with the Newberry Library Center for Renaissance Studies. Prerequisites: EngL 503 and 3 hours of Medieval or Renaissance literature.

520. Seminar in Renaissance Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. English literature of the sixteenth and seventeenth centuries. Topic varies. Prerequisite: One course in Renaissance literature.

525. Seminar in Restoration and 18th Century Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Content varies. Prerequisite: One course in Restoration or 18th century literature.

530. Seminar in British Romantic Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Advanced study of author(s), topic, movement, or genre. Content varies. Prerequisite: One course in Romantic literature.

535. Seminar in Victorian Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Focus on author, topic, movement, or genre. Content varies. Prerequisite: 3 hours of Victorian literature or consent of the instructor.

540. Seminar in Modern Literature in English. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of an author, topic, movement, or genre. Content varies. Prerequisite: A minimum of three hours in modern literature.
545. Seminar in American Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Content varies. Prerequisite: One advanced course in American literature.

551. Research Practicum in Ethnography/Sociolinguistics. 4 Hours. Same as Ling 551. May be repeated for a maximum of 12 hours of credit. Conceptualization and implementation of exploratory ethnographic research project. Prerequisite: Engl 485 or previous coursework in ethnographic research.

552. Research Practicum in Language and Cognition. 4 Hours. May be repeated for a maximum of 12 hours of credit. Research design and methods examining theories of the development of literacy and relationships among learner, text, and context. Prerequisite: Engl 484.

553. Research Practicum in Discourse Analysis. 4 Hours. May be repeated for a maximum of 12 hours of credit. Theory of, and guided practice in, the analysis of written texts, both whole discourse units.

554. Seminar in English Education. 4 Hours. Critical examination of theory and practice in the teaching of English. Content varies.

555. Teaching College English. 4 Hours. S/U grade only. Methods, materials, and practice in teaching college English.

556. Teaching Creative Writing, 4 Hours. S/U grade only. Methods, materials, and practice in teaching creative writing.

Prerequisite: Admission to the Program for Writers or consent of the instructor.

559. Topics in Language and Rhetoric. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic or movement in linguistic or rhetorical theory. Content varies. Prerequisite: Engl 401 or 402 or consent of the instructor.

560. Practicum in the Teaching of English. 1 to 4 Hours. No graduation credit. S/U grade only. May be repeated for credit. For English department teaching assistants. Provides an opportunity for supervised discussion and evaluation of materials and methods used in undergraduate English instruction. Participation in appropriate departmental workshops. Prerequisite: Students may enroll only during terms in which they hold a teaching assistantship in the English department.

570. Program for Writers: Poetry Workshop. 4 Hours. May be repeated for a maximum of 12 hours of credit. Emphasis on poems written by students. Prerequisite: Admission to the Program for Writers.

571. Program for Writers: Fiction Workshop. 4 Hours. May be repeated for a maximum of 12 hours of credit. Emphasis on fiction written by students. Prerequisite: Admission to the Program for Writers.

572. Program for Writers: Novel Workshop. 4 Hours. May be repeated for a maximum of 12 hours of credit. Emphasis on novels written by students. Prerequisite: Admission to the Program for Writers.

573. Program for Writers: Translation Workshop. 4 Hours. May be repeated for a maximum of 12 hours of credit. Emphasis on translations by students. Prerequisite: Admission to the Program for Writers or consent of the instructor.

574. Program for Writers: Nonfiction Workshop. 4 Hours. May be repeated for a maximum of 12 hours of credit. Emphasis on nonfiction written by students. Prerequisite: Admission to the Program for Writers.

575. Program for Writers: Experimental Writing Workshop. 4 Hours. May be repeated for a maximum of 12 hours of credit. Emphasis on experimentation by students. Prerequisite: Admission to the Program for Writers.

576. Program for Writers: Editing and Publishing. 4 Hours. Practicum in basic procedures for students desiring careers in publishing, or who wish to understand the stages of production from proposal to publication. Prerequisite: Consent of the instructor.

580. Seminar in Genres of Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. A single genre, such as the Gothic novel, or mode, such as poetry, fiction, or drama.

581. Seminar in Literature and Related Fields. 4 Hours. May be repeated for a maximum of 12 hours of credit. Relation between literature and such fields as fine arts, philosophy, psychology, religion, science, sociology, and politics. Content varies. Prerequisite: 4 hours in area of literature to be studied.

582. Seminar in Multietnic Literatures in the United States. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a genre, movement, topic, or author in American multietnic literatures. Content varies. Prerequisite: Minimum of 3 hours in Native American literature.

583. Seminar in Popular Culture. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a theme, form, era, or methodological approach. Content varies.

584. Seminar in Film. 4 Hours. May be repeated for a maximum of 12 hours of credit. One topic or movement. Content varies. Prerequisite: Minimum of 3 hours in film.

585. Seminar in Language, Literacy, and Culture. 4 Hours. May be repeated for a maximum of 12 hours of credit. One author, topic, or movement in sociolinguistic theory and literacy studies. Content varies. Prerequisite: Engl 485 or previous coursework in sociolinguistic or ethnographic research.

586. Seminar in Language and Cognition. 4 Hours. May be repeated for a maximum of 12 hours of credit. Interdisciplinary readings relating language and cognition from writing, rhetoric, cognitive psychology, and linguistics on a particular topic. Prerequisite: Engl 484.

587. Seminar in the History of Literacy or Rhetoric. 4 Hours. May be repeated for a maximum of 12 hours of credit. One author, topic, or movement in rhetorical theory from antiquity through the 19th century. Prerequisites: Engl 409 and 418 or consent of the instructor.

588. Seminar in the Theory of Language and Rhetoric. 4 Hours. May be repeated for a maximum of 12 hours of credit. One author, topic, or movement in modern rhetorical theory. Prerequisites: Engl 409 and 418 or consent of the instructor.

592. Preliminary Examination Research, 1 to 8 Hours. May be repeated for a maximum of 12 hours of credit. S/U grade only. Supervised research and reading in preparation for the preliminary examinations. Prerequisites: Consent of the instructor and consent of the director of graduate studies.

593. Graduate Internship in Nonfiction Writing. 1 to 4 Hours. Credit is not given for Engl 593 if the student has credit in Engl 493. May be repeated for credit; a maximum of four hours of credit may be applied toward a graduate degree in English. Directed field experience in an approved professional setting to practice writing, editing and research skills at an advanced level. Prerequisites: Consent of the English department internship coordinator. Resume and writing samples are required.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Independent study and research in Literature, Creative Writing, or Language, Literacy, and Rhetoric. Prerequisites: Consent of the instructor and consent of the Director of Graduate Studies.

597. Master's Project Research in English. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. No more than 4 hours of Engl 597 may be applied toward the degree. S/U grade only. Supervised research and reading that facilitates the student in preparation of the Project research. Prerequisites: Open only to Master's degree students; and consent of the instructor and consent of the Director of Graduate Studies.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. For students involved in dissertation research and writing. Prerequisites: Consent of the instructor and the director of graduate studies.

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**English as a Second Language (ESL)**

401. Teaching Methods for International Teaching Assistants. 1 to 3 Hours. No graduation credit. S/U grade only. Basic communication and presentation skills for international teaching assistants. The culture of the American college classroom. Prerequisite: Score of 150 on the Test of Spoken English (TSE or Speak Test) and consent of the instructor. Students must obtain override from the instructor to register.
Environmental and Occupational Health Sciences (EOHS)

400. Principles of Environmental Health Sciences. 3 Hours. Environmental influences on health: population, food, energy; community hygiene and injury control; solid/hazardous wastes, air and water pollution, radiation; industrial hygiene and occupational health. Prerequisite: Enrollment restricted to public health students; other graduate and professional students admitted by consent as space permits. To obtain consent, see the SPH registrar.

405. Environmental Calculations. 1 Hour. Problem-solving techniques as applied to environmental and occupational health: dimensional analysis, mass and energy balances, trial and error solutions, numerical and graphical techniques.

411. Water Quality Management. 3 Hours. Same as CEMM 412. Water pollution; historical and current developments in problems and solutions: characterization, water purification, waste treatment, modeling, standards and criteria, public health concerns. Prerequisite: EOHS 405 or consent of the instructor.

418. Analysis of Water and Wastewater Quality. 2 Hours. Same as CEMM 413. Basic instrumentation and procedures related to measurement and surveillance of various water quality parameters.

421. Fundamentals of Industrial Hygiene. 2 Hours. Recognition, evaluation, control of chemical, biological, and physical agents in the workplace. Application to preliminary surveys, measurement of exposure, and evaluation of control measures. Prerequisite: EOHS 405 or consent of the instructor.

424. Environmental Acoustics. 2 Hours. Fundamentals of noise generation/propagation; filtering; weighting; hearing; biomechanics; health effects; audiometry; hearing control methods; sound fields; directivity; diffusion/barriers; regulations; instrumentation; control. Prerequisite: General college physics and ordinary calculus, or consent of the instructor.

428. Industrial Hygiene Laboratory I. 2 Hours. Detailed methods and experiments for measuring chemical, biological, and physical agents; and methods for evaluating the effectiveness of control measures. Prerequisites: EOHS 400, 405 and 421, or consent of the instructor.

431. Air Quality Management I. 3 Hours. Same as CEMM 419. Sources, control, dispersion and effects upon receptors of air pollution: health and other adverse effects, meteorology and dispersion estimation, photochemistry, aerosol characterization. Prerequisite: EOHS 405 or CEMM 216 or consent of the instructor.

438. Air Quality Laboratory. 2 Hours. Basic instrumentation and procedures related to measurement and surveillance of ambient air quality. Methods for collection and identification of gaseous and particulate pollutants. Prerequisite: EOHS 405 or consent of the instructor.

440. Chemistry for Environmental Professionals. 3 Hours. Same as CEMM 411. Introductory atmospheric chemistry, aspects of air pollution, chemistry related to natural water and water treatment; priority organic pollutants and heavy metals. Prerequisite: One year of college chemistry.

450. Principles of Occupational and Environmental Medicine. 2 Hours. Causes, transmission, control and prevention of the physical/chemical environmental stressors in the work environment; industrial processes and hazards, contrasts between developed and developing countries.

485. Environmental and Occupational Toxicology. 3 Hours. General and applied toxicology as it relates to environmental and occupational exposures to hazardous agents. Emphasis on basic principles, specific types of toxicity, and major classes of toxic agents. Prerequisites: Chem 232 and 234 and Bios 100 or the equivalent courses; or consent of the instructor.

457. Principles of Toxicology. 2 Hours. Same as Pcol 430. Examines the toxic effects of drugs and chemicals on organ systems. Lectures emphasize basic principles, effects on specific organ systems, major classes of toxic chemicals and specialized topics such as forensic and industrial toxicology. Prerequisite: Pcol 425 or consent of the instructor.

461. Community Health and Consumer Protection. 2 Hours. Prevention of health hazards due to infectious and chemical agents and physical processes, especially in the home and small community environments; role of health agencies. Prerequisite: EOHS 400 or consent of the instructor.

472. Management of Solid and Hazardous Wastes. 3 Hours. Same as CEMM 423 and Geog 444. Management of solid and hazardous waste, including radioactive waste: landfills, incineration, recycling, composting, source reduction, groundwater and air pollution impacts, control, regulations, siting, health impacts.

474. Topics in Resource Management and Policy. 4 Hours. Same as Geog 441. May be repeated for a maximum of 6 hours of credit. Selected topics dealing with environmental problems at local, regional or global levels. Topics vary. Prerequisite: Geog 341 or 361 or consent of the instructor.

482. Occupational Safety Science. 2 Hours. Principles of occupational safety, safety regulations, accident investigation procedures and engineering, behavioral, and administrative techniques for occupational accident control. Prerequisite: EOHS 421 or consent of the instructor.

495. Environmental/Occupational Health Seminar. 1 Hour. Discussions of current environmental health and occupational health topics, with presentations by students, faculty members, and visiting scientists.

512. Water and Wastewater Treatment. 3 Hours. Same as CEMM 522. Water and wastewater characterization: physical, chemical and biological methods of water and wastewater treatment; regulatory and control trends; and environmental impact determinations. Prerequisite: EOHS 411 or consent of the instructor.

523. Engineering Controls/Ventilation. 4 Hours. Design/evaluation of engineering control technology for workplace hazards: process modification, industrial ventilation, air cleaning, shielding, toxic air contaminants, mechanical hazards, (non)ionizing radiation, temperature. Prerequisites: EOHS 405, 421 and 428, or consent of the instructor.

529. Industrial Hygiene Laboratory II. 2 Hours. Field work: comprehensive industrial hygiene surveys of local work places. Health hazard analysis, design of sampling strategies, collection of field data, report preparation. EOHS 428 and 438, or consent of the instructor.

532. Air Quality Management II. 2 Hours. Same as CEMM 526. Air quality management: Integration of diverse aspects. Data interpretation; standards setting; policy implementation; equipment design; hazardous spill modeling; indoor air pollution; case studies. Prerequisite: EOHS 431.

542. Water Chemistry. 3 Hours. Same as CEMM 524. Chemical equilibria and kinetic principles as applied to processes occurring in natural and engineered water systems. Prerequisite: EOHS 440.


551. Occupational Diseases. 4 Hours. Diseases caused by physical, chemical, and biological agents in the workplace: toxicology, epidemiology, pathophysiology, diagnosis, treatment, prevention, high risk populations, early detection.

554. Occupational and Environmental Epidemiology. 2 Hours. Same as Epid 554. Methods and issues of environmental epidemiology: outbreak, cluster-analysis, cross-sectional, case-control, cohort, ecological, and time series designs; contemporary issues: cancer and reproductive hazards. Prerequisites: Epid 401, Bstt 401 and EOHS 400; or consent of the instructor.

556. Risk Assessment in Environmental and Occupational Health. 2 Hours. Methodologies for utilizing toxicological and epidemiological data to estimate risks of pathology and expected number of cases due to exposures to pollutants in environments. Prerequisites: EOHS 405, Bstt 401, and Epid 400, or consent of the instructor.

558. Industrial Toxicology. 2 Hours. Clinical toxicology and mechanisms of workplace toxicants: metals, fibers, dusts, and organics. Diagnosis and treatment. Prerequisite: EOHS 400 and 457.

570. Hazardous Materials Management. 3 Hours. Definition and application of methods for managing hazardous materials: site health and safety plan development; remediation technique evaluations; incinerator design; computerized hazard response
program applications. Prerequisites: EOHS 405, 421, and 428; or consent of the instructor.

575. Management of Land and Urban Resources. 3 Hours. Same as Geog 514. Man's use and misuse of the land environment with emphasis on densely populated metropolitan areas. Health, physical, social, economic aspects. Land use models and simulations. Prerequisite: EOHS 400 or Geog 441 or consent of the instructor.

584. Radiation Protection. 3 Hours. Radioactivity, energetics, kinetics, interactions, external protection, dosimetry, recommendations and standards, measurement, radon. Prerequisite: EOHS 405 or consent of the instructor.

594. Advanced Special Topics in Environmental Health. 1 to 4 Hours. Environmental/occupational topics of current importance to public health: pollution, industrial hygiene, and related topics. Variable course contents arranged to supplement the existing curriculum. Prerequisite: Consent of the instructor.

597. Advanced Laboratory Projects in Environmental Health. 1 to 4 Hours. Application and integration of sampling and measurement techniques for characterization of inside and ambient environments. Individuals or groups supervised by EOHS faculty members. Prerequisite: Consent of the instructor.

Epidemiology (Epid)

400. Principles of Epidemiology. 3 Hours. Introduction to descriptive and analytic epidemiology, determinants of health and disease in populations, and application of the epidemiologic methods to disease control; includes use of basic epidemiologic software. Prerequisite: Credit or concurrent registration in Bstt 400 or consent of the instructor. Enrollment restricted to public health students; other graduate and professional students admitted by consent as space permits. To obtain consent, see the SPI registrar.

401. Quantitative Methods in Epidemiology I. 2 Hours. Design and analysis of cohort and case-control studies, through stratified analysis. Bias, confounding and interaction effects will be closely examined. Prerequisites: Epid 400 and Bstt 400, or consent of the instructor.

402. Quantitative Methods in Epidemiology II. 2 Hours. Advanced statistical analysis for case-control and cohort studies. Includes analysis for trend, pair matching, life-tables, sample size and power, and logistic and Poisson regression. Prerequisites: Epid 401 and credit or concurrent registration in Bstt 400 or consent of the instructor.

405. Human Growth and Nutrition. 3 Hours. Same as Anth 405. Worldwide variation in human growth and the factors that contribute to differences between populations and individuals in the timing and pattern of growth and development.

409. The Epidemiology of HIV/AIDS. 2 Hours. Review of the HIV/AIDS pandemic and the global response to it focusing on patterns of transmission, risk factors and prevention/intervention. Prerequisite: Epid 400 or consent of the instructor.

410. Epidemiology of Infectious Diseases. 2 Hours. Epidemiology of selected infectious diseases, including incidence, prevalence and control of disease. Epidemic investigation is emphasized. Prerequisite: Epid 400 or consent of the instructor.

411. Epidemiology of Chronic Diseases. 3 Hours. Selected topics in chronic diseases with critical analysis of current epidemiologic literature. Prerequisite: Epid 400 or consent of the instructor.

412. Introduction to Psychosocial Epidemiology. 2 Hours. Reviews landmark studies of psychosocial and psychiatric disorders in U.S. communities; evaluates research methodology, case definition, identification, and empirical findings. Prerequisite: Epid 400 or consent of the instructor.

428. Epidemiology of Violence. 2 Hours. Reviews public health aspects of violence-related mortality and morbidity, examines existing data bases and conceptual frameworks focusing on etiology, epidemiology, surveillance and prevention. Prerequisite: Epid 400 or consent of the instructor.

471. Population. 4 Hours. Same as Soc 471. The measurement and study of major trends and differentials in fertility, mortality, migration, growth, and compositional characteristics of the population of the United States and other nations. Prerequisite: 6 hours of upper-division sociology, including Soc 201 or consent of the instructor.

494. Introductory Special Topics in Epidemiology. 1 to 4 Hours. Special topics in infectious or chronic disease epidemiology. Course content will vary from semester to semester. Prerequisite: Epid 400 or consent of the instructor.

501. Advanced Quantitative Methods in Epidemiology. 3 Hours. Advanced quantitative methods used in the analysis of case-control and cohort studies, including computer applications. Prerequisites: Epid 401 and Bstt 401, or consent of the instructor.

510. Advanced Epidemiology of Infectious Diseases. 2 Hours. Controversies regarding the etiology, transmission and prevention of selected infectious diseases. Literature reviews and study designs developed by students are a prominent part of course. Prerequisite: Epid 410 or consent of the instructor.

513. Epidemiology of Aging. 2 Hours. Current methodologic and public health issues in the epidemiology of aging will be explored. Prerequisites: Epid 401 or 411 and consent of the instructor.

514. Epidemiology of Neurological Diseases. 2 Hours. Fundamental concepts of neuroepidemiology are reviewed and descriptive, observational and experimental studies for major neurological diseases are presented. Prerequisite: Epid 411.

515. Survey of Cancer Epidemiology. 2 Hours. Survey of cancer epidemiology including nomenclature, mechanisms, descriptive data, analytic methods, etiology, prevention and control. Prerequisites: Epid 401 and 411 or consent of the instructor.

516. Advanced Cancer Epidemiology. 2 Hours. Critical review of the epidemiology of selected cancer sites to promote synthesis of knowledge, awareness of methodologic issues, and stimulate future research. Prerequisites: Epid 515 and 501, or consent of the instructor.

517. Epidemiology of Cardiovascular Diseases. 2 Hours. Epidemiology and risk factors of cardiovascular diseases. Prerequisite: Epid 411 or consent of the instructor.

518. The Epidemiology of Pediatric Diseases. 3 Hours. Familiarizes the student with issues unique to research on children. Lecture topics include epidemiology of childhood diseases, important research studies, and methodologic problems specific to studying children. Prerequisites: Epid 401 and Bstt 400 or consent of the instructor.

519. Research Protocol and Grant Development. 1 Hour. Satisfactory/Unsatisfactory grade only. A review of funding options and examples of developing fundable research proposals. Prerequisite: Epid 400.

520. Genetics in Epidemiology. 2 Hours. Topics in genetic/molecular epidemiology, including genetics, population genetics, molecular biology, molecular genetics. Familiarizes students with laboratory/statistical concepts and applications in epidemiological studies. Prerequisite: Epid 401 or consent of the instructor.

545. Reproductive and Perinatal Health. 3 Hours. Same as CHSc 545. This course focuses on the epidemiology of key reproductive and perinatal health outcomes and relevant health services and health policies. Prerequisites: Bstt 400 and CHSc 400 and Epid 400 and consent of the instructor.

554. Occupational and Environmental Epidemiology. 2 Hours. Same as EOHS 554. Methods and issues of environmental epidemiology: outbreak, cluster-analysis, cross-sectional, case-control, cohort, ecological, and time series designs; contemporary issues: cancer and reproductive hazards. Prerequisites: Epid 401, Bstt 401 and EOHS 400; or consent of the instructor.

591. Current Epidemiologic Literature. 2 Hours. S/U grade only. Student presentation of recently published scientific papers of epidemiologic interest, to promote breadth of knowledge and critical examination of evidence. Prerequisite: Epid 401 or consent of the instructor.

594. Advanced Special Topics in Epidemiology. 1 to 4 Hours. Special topics in infectious or chronic disease epidemiology or epidemiologic methods. Course content will vary from semester to semester. Prerequisite: Epid 401 or consent of the instructor.

598. Epidemiology Research Seminar. 1 to 2 Hours. S/U grade only. Thesis research of graduating students and ongoing research by faculty and outside guests will be presented and critically evaluated. Prerequisite: Epid 400 or consent of the instructor.
Finance (Fin)

412. Portfolio Management. 3 Hours. Development of portfolio theory; establishment of portfolio objectives for individuals, corporations, banks, pension and mutual funds; evaluation of portfolio performance. Prerequisite: Fin 310.

414. Security Analysis. 3 Hours. Interpretation and analysis of published financial statements for internal control and external evaluation; the financial characteristics of industrial, commercial, financial, transportation, public utility, real-estate, and nonprofit institutions. Prerequisite: Fin 310.

415. Fixed Income Securities. 3 Hours. Valuation of fixed income securities, term structure estimation and arbitrage trading with practical application using real data. Prerequisite: Fin 310.

416. Options and Futures Markets. 3 Hours. History and institutional structure of options and futures markets. Uses of futures and options for arbitrage, speculation, and hedging by managers of domestic and multinational organizations. Analysis of factors that determine futures and options prices. Prerequisite: Fin 310.

420. Corporate Financial Strategy. 3 Hours. Economic and legal factors (market dominance, oligopolistic markets, antitrust policy); organizational and behavioral factors in decision making; managerial leadership; impact of information systems and accounting policy; case studies. Prerequisite: Fin 320.

430. Introduction to Money and Banking. 3 Hours. Payment and banking systems; credit and market risk management; The Federal Reserve System; globalization of monetary, banking, and regulatory systems. Prerequisite: Fin 300.

431. Theory and Structure of Financial Markets. 3 Hours. The distribution of saving and credit over time and risk categories. The financial services industry. Administration and regulation of global money, security, and derivatives markets. Prerequisite: Fin 300.

442. International Finance. 3 Hours. Financial management within an international context. International monetary system and financial markets, management of foreign investments, working capital management, exchange risks, taxation, and earnings reports. Prerequisites: Fin 300 and 310.

444. Small Business Finance. 3 Hours. Aspects of acquiring funds for small business enterprises. Topics include the trade-off of liquidity and profitability, management of working capital, and capitalization. Prerequisite: Fin 300.

465. Property and Liability Insurance. 4 Hours. Using property and liability insurance to manage risk. Topics may include fire, marine, consequential loss, crime, title, automobile, and workers’ compensation insurance. Prerequisite: Fin 300 or consent of the instructor.

466. Life and Health Insurance. 4 Hours. Types, uses, and evaluation of life and health insurance. Economics of the industry. Regulation and taxation. Prerequisite: Fin 300 or consent of the instructor.

472. Real Estate Finance. 3 Hours. Same as Econ 472. Finance principles applied to real estate; financing of residential and income-producing real estate; real estate development finance; secondary mortgage market; taxation and real estate finance. Prerequisite: Fin 300.

494. Special Topics in Finance. 3 Hours. May be repeated for a maximum of 6 hours of credit. Content, prerequisites, and course of study will vary according to the instructor. Prerequisite: Consent of the instructor.

495. Competitive Strategy. 4 Hours. Multidisciplinary analysis of organization strategy and policy using case method and/or business simulation. Assignments involve extensive library research as well as oral and written reports. Prerequisite: Consent of the instructor.

500. Introduction To Corporate Finance. 4 Hours. No credit given if the student has credit in MBA 504. Theory of corporate finance: goal of the firm, time value of money, investment decisions (under certainty and uncertainty), net present value, capital markets, and corporate financing decisions. Prerequisites: Acct 500 and Econ 520.

510. Investments. 4 Hours. Theory and practice of investment analysis. Topics included are the institutional organization of security markets, and fundamental principles of asset valuation with application to specific securities. Prerequisite: Fin 500.

512. Portfolio Analysis. 4 Hours. Development of portfolio theory; establishment of portfolio objectives; evaluation of portfolio performance; investment objectives for individuals, corporations, banks, pension and mutual funds, and their interrelation with economic environment. Prerequisite: Fin 510.

516. Theory and Structure of Options and Futures Markets. 4 Hours. History and institutional structure of options and futures markets. Uses of futures and options for arbitrage, speculation and hedging by financial and production managers of domestic and multinational organizations. Analysis of factors that determine futures and options prices. Prerequisite: Fin 510.

520. Corporate Finance. 4 Hours. Advanced topics in corporate finance including capital structure, dividend policy, financial restructuring, bankruptcy, and leasing. Emphasis on recent developments in corporate finance and financial economics. Prerequisite: Fin 500.

522. Applications of Corporate Finance. 4 Hours. Application of corporate financial theory to business problems. Lectures on special topics and the presentation, analysis, and critique of cases. Prerequisite: Fin 520.

530. Money and Banking. 4 Hours. The functions of money; monetary standards; development and operation of commercial banking and the Federal Reserve System. Theories of the supply and demand for money; effects of monetary changes on economic activity, interest rates, and income. Prerequisite: Fin 500.


544. Entrepreneurial And New Venture Financing. 4 Hours. The financing of new business. Estimating cash needs and determining sources to finance them. This course is designed for those wanting to start their own business. Prerequisite: Fin 500.

551. Financial Decision Making I. 4 Hours. First foundation course for the study of modern financial economics. Two-period individual consumption and portfolio decisions under uncertainty and their implications for the valuation of securities. Prerequisite: Consent of the instructor.

552. Financial Decision Making II. 4 Hours. Second foundation course in the study of modern financial economics. Discrete and continuous time stochastic process models of securities, arbitrage, option pricing, optimal portfolios, consumption-investment problems. Prerequisite: Fin 551.


561. Theory of Corporate Finance. 4 Hours. Intensive review of the modern theory of corporate finance, emphasizing the integration of firm investment, financing, and dividend decisions with capital market equilibrium. Prerequisite: Consent of the instructor.

567. Money and Financial Intermediation. 4 Hours. The history, development, contemporary structure, and regulation of domestic and international money, capital markets and institutions. Emphasis is placed on theoretical analysis of models of the behavior of market participants and forecasts of interest rates. Prerequisites: Fin 500 and consent of the instructor.

571. Empirical Issues in Finance. 4 Hours. The methodology used in analyses of market efficiency, asset pricing and capital allocation. Prerequisites: Fin 500 and consent of the instructor.

581. Workshop on Financial Decision Making. 4 Hours. Individual’s portfolio consumption problem, multiperiod equilibrium in markets, pricing of contingent claims, the term structure of interest rates. Prerequisites: Fin 552 and 553.
582. Workshop on Corporate Finance. 4 Hours. Exploration of the interaction between the financial system and real business activity, both within a closed system and an open economy. Prerequisite: Fin 561.

583. Workshop on Empirical Issues in Finance. 4 Hours. A seminar on special topics in empirical work in finance. Prerequisite: Fin 571.

584. Workshop on Money and Financial Intermediation. 4 Hours. The systematic analysis and presentation of research monographs on the subject of domestic and international money and capital markets, including their participants, regulators, and price behavior. Prerequisite: Fin 567.

594. Special Topics in Finance. 4 Hours. Selected topics in finance. Topics vary. Prerequisite: Consent of the instructor.

596. Independent Study in Finance. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per semester. Independent study under the direction of a faculty member. Must be arranged before the start of the semester. Prerequisite: Consent of the department head or instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research on top approved for doctoral dissertation under supervision of faculty advisor. Prerequisite: Consent of the instructor.

French (Fr)

401. Reading French for Graduate Students. 4 Hours. Taught in English. Credit may not be applied toward a graduate degree. Grammar, vocabulary, general and specialized reading practice; for graduate students wishing to fulfill French reading requirements for the PhD. Prerequisite: Some prior experience with elementary French recommended, and consent of the instructor.

410. French Feminist Theory. 4 Hours. Same as GWS 410. Taught in English. May be used for credit in the French major with the consent of the instructor. An introduction to French feminist theory, in particular feminist theories influenced by Lacanian psychoanalysis. Prerequisite: Fr 301 or Fr 302 or consent of the instructor.

415. French Literature of the Middle Ages. 4 Hours. May be repeated for a maximum of 12 hours of credit. Introduction to major medieval genres (epic, romance, lyric, theater, allegory) works and authors, such as le Chanson de Roland, Tristan, Chretien de Troyes, Marie de France, Villon. Prerequisite: Fr 301 or consent of the instructor.

416. Topics in Sixteenth-Century French Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Intensive analysis of Renaissance literature (Rabelais, Montaigne, Marguerite de Navarra, poetry of the Pléiade, etc.) in the cultural context of Humanism and the Reformation. Prerequisite: Fr 301 or consent of the instructor.

417. Topics in Seventeenth-Century French Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Intensive study of Baroque and Classicism, with focus on major genres: theater (Corneille, Mollière, Racine); poetry (La Fontaine); prose (Pascal, de Sèveigne); novel (de LaFayette). Prerequisite: Fr 301 or consent of the instructor.

418. Topics in Eighteenth-Century French Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Introduction to the literature and philosophy of the Enlightenment through representative authors (Rousseau, Diderot, etc.) and major genres (novel, essay, conte, theater, etc.). Prerequisite: Fr 301 or consent of the instructor.

419. Topics in Nineteenth-Century French Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Major genres and works from Romanticism to realism, naturalism, and symbolism will be studied within the context of the social, cultural and political movements of the century. Prerequisite: Fr 301 or consent of the instructor.

420. Topics in Twentieth-Century French Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of major literary movements (surrealism, existentialism, nouveau roman, theater of the absurd) and intensive analysis of works by major authors from Proust to Beckett. Prerequisite: Fr 301 or consent of the instructor.

422. Francophone Novel. 4 Hours. May be repeated for a maximum of 12 hours of credit. Intensive analysis of a topic in Francophone literature. Scope includes Québec, Africa, the Antilles, and French novelists outside of France. Prerequisite: Fr 301 or consent of the instructor.

433. Advanced Oral and Written French. 4 Hours. Exercises in French pronunciation; oral interpretation of different texts (familiar style and formal discourse); discussion of newspapers, magazine articles; practice in critical writing. Prerequisite: Fr 334 or consent of the instructor.

446. Methods and Principles of Translation. 4 Hours. Techniques and intensive practice in English-French and French-English translation. Varied texts range from literary passages to expository prose. Prerequisite: Fr 232 or consent of the instructor.

461. French Civilization I: Medieval and Renaissance. 4 Hours. Lectures and discussion in French. Interdisciplinary approach to French civilization of the Middle Ages and the Renaissance including history, literature, the beaux-arts, and philosophy. Prerequisite: Fr 302 or consent of the instructor.

462. French Civilization II: Seventeenth and Eighteenth Centuries. 4 Hours. Lectures and discussion in French. Interdisciplinary approach to French civilization of the seventeenth and eighteenth centuries including history, literature, the beaux-arts, and philosophy. Prerequisite: Fr 302 or consent of the instructor.

463. French Civilization III: Nineteenth and Twentieth Centuries. 4 Hours. Lectures and discussion in French. An interdisciplinary approach to French civilization of the nineteenth and twentieth centuries, including history, literature, beaux-arts, and philosophy. Each topic focuses on a specific period between the Middle Ages and the present. Prerequisite: Fr 302 or consent of the instructor.

470. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

471. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Fr 470, and approval of the department.

481. Foreign Language Teaching Methodology. 4 Hours. Same as Span 460 and Ital 460. Theories of second language learning, Evaluative procedures emphasizing oral proficiency testing, analysis of textbooks. Preparation and presentation of micro-lessons. Twenty hours of high school observation. Prerequisite: Three courses at the 200 and 300 levels.

496. Independent Study. 1 to 4 Hours. Supervised study in an area not covered by regularly scheduled courses under the direction of a faculty member designated by the chairperson of the department. Prerequisites: French major and consent of the department.

502. Theoretical and Research Foundations of Communicative Language Teaching. 4 Hours. Same as Span 502. No credit given if student has credit in Span 450 or Fr 450 or Ger 407. This course introduces students to contemporary theory and research on second language acquisition. Emphasis is on understanding the research and examining classroom practice. Taught in English. Prerequisite: Appointment as a teaching assistant. For students outside the department: consent of the instructor.

510. Seminar in Literary Studies. 4 Hours. May be repeated for credit; beyond 12 hours of credit, consent of the director of graduate studies required. Topics vary.

530. Seminar in Language Studies. 4 Hours. May be repeated for a maximum of 12 hours of credit. Topics vary.

531. Explication de Textes. 4 Hours. Lectures, discussion, and student explications. Detailed critical and stylistic analysis of selected short pieces of French prose and poetry.

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
560. Seminar in Cultural Studies. 4 Hours. May be repeated for a maximum of 12 hours of credit. Topics vary.

575. French Abroad. 0 to 16 Hours. May be repeated for a maximum of 33 hours of credit. Lectures, seminars and practical work in francophone literature and civilization in France. Prerequisite: Consent of the department.

596. Independent Study. 1 to 4 Hours. Supervised study in an area not covered by regularly scheduled courses under the direction of a faculty member designated by the chairperson of the department. Prerequisite: Graduate standing in French and approval of the department.

598. Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for a maximum of 8 hours of credit. Prerequisite: Approval of the director of graduate studies.

Gender and Women's Studies (GWS)

[Previous name and rubric: Women's Studies (WSI)]

403. Culture and Sexuality: Cultural History of Same-Sex Relations. 4 Hours. Lesbian/gay studies; issues in the history of (homosexuality); cultural and historical analysis of same-sexuality in several periods, including our own.

410. French Feminist Theory. 4 Hours. Same as Fr 410. Taught in English. May be used for credit in the French major with the consent of the instructor. An introduction to French feminist theory, in particular feminist theories influenced by Lacanian psychoanalysis.

412. Women and the Environment. 4 Hours. Same as Arch 412. Women's place in the built environment; the role of gender in environmental experience including women as users, designers, planners, policy makers, and critics.

419. Public Health Aspects of Sexuality and Women's Health. 3 Hours. Same as CHSc 419. An overview of human sexuality from a public health view with special emphasis on family planning, sexuality, and behavior effects on women's health.

424. Gender, Crime, and Justice. 4 Hours. Same as CrJ 424. An in-depth examination of the etiology of female crime and the involvement of females in the criminal justice system as offenders, victims, and workers/professionals. Prerequisites: CrJ 101 and 220 or consent of the instructor.

425. Sociology of Gender. 4 Hours. Same as Soc 424. Variety and change in gender roles; patterns and consequences of gender inequality; gender and sexuality; gender and social institutions such as family; economy. Prerequisite: 6 hours of upper-division sociology or gender and women's studies courses or consent of the instructor.

439. Gender and Cultural Production. 4 Hours. Same as Ger 439. May be repeated for a maximum of 8 hours of credit if topic is different for each registration. Issues of gender representation and gender politics examined through the use of theoretical texts or through the study of women authors. Taught in English. Students who intend to use Ger 439 toward a degree offered by the Department of Germanic Studies will do assignments in German. Area: literature/culture. Prerequisite: Ger 212; or consent of the instructor.

441. Introduction to Maternal and Child Health. 3 Hours. Same as CHSc 441. Title V maternal and child health programs; concepts of delivery risks by age; effective interventions and public sector organization for delivery of MCH services. Prerequisite: Consent of the instructor. Recommended background: Some knowledge of maternal and child health issues.

450. Women and Mental Health Nursing. 3 Hours. Same as NuPs 450 and NuSc 450 and NuWH 450. Theories of female psychology: women's daily lives and mental health; gender differences in mental illness; strategies for improving women's mental health. Prerequisite: Consent of the instructor.

456. Language and Gender. 4 Hours. Same as Ling 456. Examination of current sociolinguistic research and theories on the function of sex categories in linguistic systems and male-female differences in patterns of linguistic usage. Prerequisite: Ling 405 or consent of the instructor.

469. Women's Literary Traditions. 4 Hours. Same as Engl 469. An exploration of issues such as the female aesthetic; women's popular literature; factors that enable creativity; differences of race and class.

470. Reading Black Women Writing. 4 Hours. Same as AASt 470 and Eng 480. Examines inscriptions of race, gender, class, and sexuality as they shape the literary and critical practices of nineteenth- and twentieth-century black women writers. Prerequisite: AASt 110 or 111 or 250 or consent of the instructor.

472. Women and Film. 4 Hours. Same as AH 434 and Eng 472. Roles and representations of women in classical Hollywood, European art and independent feminist cinemas. Prerequisite: 6 hours of English from Eng 241, 242, 243, 300; or consent of the instructor.

474. History and Archives. 4 Hours. Same as Hist 474. Introduction to archival preservation and management. Under faculty supervision, students will create a records management plan for an organization to preserve documents of historical importance. Includes internship at an external agency. Prerequisite: 3 hours of history or consent of the instructor.

478. Women in Chinese History. 4 Hours. Same as AsSt 478 and Hist 478. Focuses on scholarship on women in Chinese society throughout history, dealing with topics such as marriage and family, literacy, career options, women in revolution and the historiography of the field.

484. Topics in the History of Women. 4 Hours. Same as Hist 484. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history or gender and women's studies or consent of the instructor.

485. Gender and Politics. 4 Hours. Same as PolS 485. Impact of gender on basic categories of Western political thought. Distinctions between reason and emotion, public and private, among others, examined from feminist perspective. Prerequisites: PolS 190 and one 200-level course in political theory, or consent of the instructor.

490. Advanced Topics in the Study of Sexuality. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Special study at an advanced level of a topic concerning sexuality. Prerequisite: 3 hours in gender and women's studies or consent of the instructor.

494. Advanced Topics in Women's Studies. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specialized study of a problem, topic or issue relevant to the interdisciplinary area of gender and women's studies at the advanced level. Content varies.

501. Feminist Theories. 4 Hours. An analysis of important trends in historical and contemporary feminist theories.

502. Feminist Methodologies. 4 Hours. An exploration of feminist methodologies and pedagogy from an interdisciplinary perspective.

514. Gender Issues in Cross-Cultural Perspective. 4 Hours. Same as Anth 514. Selected substantive and theoretical issues in the cross-cultural study of gender roles, conceptions, and relations. Prerequisite: Anth 500, or consent of the instructor.

515. Theoretical Perspectives on Women and Gender. 3 Hours. Same as Psch 515. Critical examination of psychological theories and research on women and gender, including biological, psychoanalytic, socialization, power, and social constructionist perspectives. Prerequisite: Graduate standing in Psychology or GWS 315 and consent of the instructor.

525. Social Work with Women. 3 Hours. Same as SocW 525. Research, policy, and practice approaches to working with women in diverse urban settings; empowerment and diversity perspectives. Prerequisites: SocW 410; or consent of the instructor.

547. Race, Class, and Gender Dimensions of Crime and Justice. 4 Hours. Same as CrJ 547. Theories addressing the intersections of race, class, gender, crime and justice. Specifically, students examine criminological theories, social construction of race, class, and gender, legal decision-making, and implications of this for justice in our society.

552. Economic Demography. 4 Hours. Same as Econ 552. Economic analysis of fertility (number and timing of children), mortality, marriage and divorce, population age structure, the relationship between population growth and economic development. Prerequisite: Econ 501 or 520.

583. Women in Education. 4 Hours. Same as PS 583. An overview of girl's and women's educational experiences and placement within the academic structure (as students, professionals and intellectuals). The impact of gender on the realization of educational, economic and social opportunities. Prerequisite: Consent of the
instructor, or enrollment in the PhD in policy studies in urban education program.

594. Special Topics in Gender and Women's Studies. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Study of a topic, or issue relevant to the interdisciplinary area of gender and women's studies. Content varies. Prerequisite: Consent of the instructor or one course in gender and women's studies.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Topics and plan of study must be approved by the instructor. Prerequisite: Consent of the instructor.

Geography (Geog)

401. Topics in Regional Geography. 4 Hours. May be repeated for a maximum of 6 hours of credit. Geographic analysis of cultural and environmental systems of a political, economic, or climatic region of the world as defined by the instructor. Prerequisites: One upper-division course in each of the areas of skills, systematic and regional/urban geography.

411. Areal Organization of Urban Systems. 4 Hours. The physical, economic, social, and political aspects of the internal patterns and external arrangements of cities in the Western world. Prerequisite: One 200-level course in either urban or economic geography.

421. Systematic Climatology. 4 Hours. Emphasis on fluxes of energy and mass at the earth-atmosphere interface; climatic environments of the biosphere including the urban water budget. Prerequisite: Geog 221 or consent of the instructor.

431. Advanced Landform Geography. 4 Hours. Genesis of surficial landforms and processes that sculpt them. Prerequisite: Geog 131 or Geol 101 or consent of the instructor.

432. Geomorphology and Archaeology. 4 Hours. Same as Anth 421. Relevance of geomorphic processes and landform development to archaeology; role of geomorphology in archaeological surveys, paleogeographic reconstruction, and archaeological interpretation. Elements of geoarchaeology. Prerequisite: Geog 131 or Geol 101 or consent of the instructor.

441. Topics in Resource Management and Policy. 4 Hours. Same as EOHS 474. May be repeated for a maximum of 6 hours of credit. Selected topics dealing with environmental problems at local, regional or global levels. Topics vary. Prerequisite: Geog 341 or 361 or consent of the instructor.

442. Environmental Hazards and Risks. 4 Hours. Environmental risks of natural and technological hazards; causes and consequences to people; social theories of risks; coping mechanisms used to reduce risk. Prerequisite: Geog 251 or 441 or consent of the instructor.

444. Management of Solid and Hazardous Wastes. 3 Hours. Same as EOHS 472 and CEMM 423. Management of solid and hazardous waste: landfill, incineration, recycling, composting, source reduction, groundwater and air pollution impacts, control, regulations, siting, health impacts.

453. Seminar in Cultural Ecology. 4 Hours. Same as Anth 453. Cultural ecology and cultural evolution, emphasizing peasant farming and other subsistence systems. Soil management under shifting and sedentary agriculture. Prerequisite: Anth 101 or Geog 151 or consent of the instructor.

461. Location and Land Use. 4 Hours. Environmental, demographic, and institutional influences on land availability/use at global/local scales; geographies of production/use intensity; market/governmental controls over land/users. Prerequisite: Geog 361 or consent of the instructor.

464. Geographic Modeling of Transportation Systems. 4 Hours. Discussions of the principles of spatial interaction, emphasizing passenger movements, commodity flows, the practicality of network analysis, and the impact of transportation facilities on land use and regional development. Prerequisites: Geog 100 and 161.

470. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

471. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Geog 470, and approval of the department.

472. The Learning and Teaching of Geography. 3 Hours. A consideration of instructional strategies in teaching geographical content, with regard for known behavioral and learning characteristics of students. Emphasis is on material presentation in contemporary urban schools. Prerequisite: Declared major in teacher education.

475. Thematic Cartography. 4 Hours. Discussion and projects involving representation of real-world areal patterns; preservation of geodetic, locational and informational relationships; information generalization and reconstruction; computer software, and programs for computer-assisted cartography. Prerequisite: Geog 276 or 278 or consent of the instructor.

478. Mapping with Microcomputers. 4 Hours. Same as Anth 484. Microcomputer applications including computer principles for mapping, alternative design for coordinate files, kinds of devices for mapping, direct control of devices for mapping, characteristics and limitations of mapping programs. Prerequisite: Geog 475 or consent of the instructor.

481. Geographic Information Systems I. 4 Hours. Same as Anth 481. Components and performance properties of geographic information systems. Geographic hierarchies and data structures. Problems and solutions in handling large geographic files. Geocoding. Prerequisites: Geog 100 and one from Geog 278 or 386 or IDS 100, or consent of the instructor.

482. Geographic Information Systems II. 4 Hours. Same as Anth 482. Application of inferential statistical techniques and probability models in geographic research. Topics include use of descriptive parameters in recognizing geographic relationships, tests of significance, and recognition of areal patterns. Prerequisite: Geog 481 or consent of the instructor.

483. Geographic Information Systems III. 4 Hours. Same as Anth 483. Problems encountered in the analysis and portrayal of geographic data. Topics include taxonomy, regionalization, trend surface analysis, time series, markov probabilities, and computer cartographic procedures for displaying output from analytic procedures. Prerequisite: Geog 482 or consent of the instructor.

484. Qualitative Methods in Geographic Research. 4 Hours. Use of qualitative methods in geographic research. Research design choices, data collection and analysis, writing. Applications in environmental and urban geography. Prerequisite: Geography major or minor or Geog 481 or consent of the instructor.

486. Analysis of Geographic Patterns. 4 Hours. Analytical methods for evaluating arrangements of points, lines and subareas across regions. Development of noncentral measures of spatial association as an alternative to correlation analysis. Prerequisite: Geog 482 or consent of the instructor.

491. History and Philosophy of Geography. 4 Hours. The philosophy of geography, its theory and research techniques. Analysis of bibliographic sources; criticism of papers on assigned topics. Prerequisite: Declared major or minor in geography or consent of the instructor.

496. Internship in Geography. 1 to 3 Hours. Only 3 hours of credit may be counted toward the research requirement in the MA thesis program. Professional field experience with an agency or organization in the private or public sector on projects related to the student's area of specialization. Prerequisites: Declared major or full graduate standing in geography and consent of the faculty advisor and the director of internship programs.

505. Seminar on the Geography of Colonialism and Neocolonialism. 3 Hours. May be repeated for a maximum of 6 hours of credit. Colonialism: historical, political and development geographies. Colonialism in the evolution of Europe and the Third World. Anticolonial liberation movements. Theories of neocolonialism, underdevelopment, dependency. Prerequisite: Geog 353 or 401 or consent of the instructor.
511. Topics in Urban Geography. 3 Hours. May be repeated for a maximum of 9 hours of credit. Critical analysis of selected theories, methods and problems of urban and settlement geography. Prerequisite: One 400-level course in urban, economic, or transportation geography.

530. Seminar in Physical Geography. 3 Hours. May be repeated for a maximum of 6 hours of credit. General topic to be defined by instructor; specific approved topic to be defined, researched and discussed by student. Prerequisite: Geog 431 or 421 or consent of the instructor.

541. Seminar on Resource Management and Policy. 3 Hours. May be repeated for a maximum of 6 hours of credit. Social policy issues in the resolution of resource management conflicts. Topics will vary. Prerequisite: Geog 441 or Geog 481 or consent of the instructor.

551. Research Seminar on the Ecology of Mapping Behavior. 4 Hours. Mapping behavior examined cross-culturally, historically, and developmentally. Ecological functions of mapping in macro-spatial behavior. Prerequisite: Consent of the instructor.

575. Seminar in Cartography. 3 Hours. May be repeated for a maximum of 6 hours of credit. Review of recent developments in computer mapping and identification of mapping needs. Research on conceptual and program solutions to computer mapping problems. Prerequisites: Geog 475 and Geog 481; or consent of the instructor.

589. Geographic Information Systems for Planning. 4 Hours. Same as UPP 508. Applications of Geographic Information Systems to urban planning and policy making. Prerequisite: Graduate standing in urban planning and policy consent of the instructor.

592. Research Proposal Design. 1 Hour. Research techniques, including problem definition, literature search, and methodological design. Prerequisite: Geog 595.

595. Departmental Seminar. 3 Hours. S/U grade only. Review of contemporary geographic theory in academic research and professional practice. Prerequisite: Graduate standing in geography.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Independent research on approved topic not related to thesis preparation. Prerequisite: Consent of the faculty advisor and the instructor.

598. Master's Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for a maximum of 16 hours of credit. Independent research on a topic approved for a graduate thesis. Prerequisite: Consent of the thesis research advisor.

Germanic Studies (Ger)

400. German for Reading Knowledge. 4 Hours. Credit may not be applied toward a degree or minor offered by the Department of Germanic Studies. Does not satisfy the graduation requirement in foreign languages. Preparation for the Graduate Proficiency Exam. Basic components of German grammar, sentence structure, and vocabulary. Selected texts in humanities, social sciences, and natural sciences.

401. Advanced Practice in Germanic Language Skills. 4 Hours. Majors and minors outside the Department of Germanic Studies may repeat this course for a maximum of 6 hours of credit. Communicative use of German techniques for understanding written and spoken texts, practicing conversation and writing texts such as essays, compositions, letters, and email. Area: language. Prerequisite: Ger 211 or the equivalent.

404. Yiddish for Reading Knowledge. 4 Hours. Basic components of Yiddish grammar, sentence structure, and vocabulary. Selected texts in the original language will be studied. Preparation for the Graduate Proficiency Exam. Prerequisite: Ger 211 or consent of the instructor or graduate standing.

407. Theoretical and Research Foundations of Communicative Language Teaching. 4 Hours. This course focuses on theory and practice of communicative language teaching and explores current approaches of task-based instruction, testing, and media-enhanced instruction. Taught in English. Pedagogical examples are in German. Ten hours of high school observation required. Area: language. Prerequisite: Ger 211 or the equivalent.

408. Introduction to Translation Theory. 4 Hours. The study of translation theory and its application to translating German texts of various types into English. Appropriate for students who want to become translators. Area: language.

411. The City as Cultural Focus. 4 Hours. May be repeated for a maximum of 8 hours of credit. Taught in English. No knowledge of German required. Students who intend to use Ger 411 toward a degree offered by the Department of Germanic Studies will do assignments in German. Interdisciplinary study of urban culture with focus on German-speaking countries. Area: literature/culture. Prerequisites: For majors and minors in the Department of Germanic Studies only: Ger 212 or the equivalent; or consent of the instructor.

420. Germanic Cultural Studies I: Genres. 4 Hours. May be repeated for a maximum of 12 hours of credit if topic is different for each registration. Critical analysis of texts in the biographical, social, cultural, and historical context. Students who intend to use Ger 420 toward a degree offered by the Department of Germanic Studies will do assignments in German. Area: literature/culture. Prerequisite: Ger 212; or consent of the instructor.

421. Germanic Cultural Studies II: Authors, Movements, Periods. 4 Hours. May be repeated for a maximum of 12 hours of credit if topic is different for each registration. Critical analysis of texts in the biographical, social, cultural, and historical context. Students who intend to use Ger 421 toward a degree offered by the Department of Germanic Studies will do assignments in German. Area: literature/culture. Prerequisite: Ger 212; or consent of the instructor.

422. Germanic Cultural Studies III: Themes. 4 Hours. May be repeated for a maximum of 12 hours of credit if topic is different for each registration. Explores themes in German-speaking societies, such as the family, xenophobia, crime, and science, with stress on literary analysis and interpretation. Students who intend to use Ger 422 toward a degree offered by the Department of Germanic Studies will do assignments in German. Area: literature/culture. Prerequisite: Ger 212; or consent of the instructor.

430. Classical German Philosophy. 4 Hours. Introduction to German philosophy and intellectual history through the critical analysis of major authors and texts. Prerequisite: one 300-level course in germanic studies or consent of the instructor.

437. Contemporary Germanic Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit if topic is different for each registration. Literature of the German-speaking world since World War II, with emphasis on current issues and recent critical approaches to literature. Area: literature/culture.

438. The Faust Legend. 4 Hours. Discusses Goethe’s Faust within the context of European and non-European literatures. Traces the origins, significance, and interpretation of the Faust figure. Area: literature/culture.

439. Gender and Cultural Production. 4 Hours. Same as GWS 439. May be repeated for a maximum of 8 hours of credit if topic is different for each registration. Issues of gender representation and gender politics examined through the use of theoretical texts or through the study of women authors. Taught in English. Students who intend to use Ger 439 toward a degree offered by the Department of Germanic Studies will do assignments in German. Area: literature/culture. Prerequisite: Ger 212; or consent of the instructor.

450. Business Operations in German-Speaking Countries. 4 Hours. The political, cultural, historical, and economic environment in which business operates in the German-speaking countries; the effects of this environment on international business. Knowledge of German not required.

461. German Abroad. 0 to 17 Hours. May be repeated for a maximum of 34 hours of credit. Taken in a German-speaking country. Lectures, seminars, and practical work in German language, literature, and civilization. Prerequisites: Ger 104 or the equivalent; a 2.75 overall grade point average and a 3.00 grade point average in German; and approval of the department.

470. Exploring the Field of Germanic Studies. 4 Hours. Team-taught. Research in film studies, gender studies, Jewish culture, minoritites, literary studies, intellectual history, applied linguistics in germanic studies. Each unit taught by different faculty member from Department of Germanic Studies.

490. Topics in Second Language Acquisition. 1 to 4 Hours. May be repeated for credit. This course provides an overview of theory and research in one focus area of second language acquisition. Taught in English. Area: language. Prerequisite: Consent of the instructor.

492. Internship in International Business. 0 to 12 Hours. May be repeated for credit with approval of the department.
S/U grade only. Student placement in an international organization or firm in a German-speaking country or its U.S. subsidiary or division. Prerequisites: Ger 211; and a GPA of 2.00; and consent of the instructor.

493. Internship Seminar: Business. 1 to 4 Hours. May be repeated for credit with approval of the department. A maximum of 4 hours of credit may be applied toward a graduate degree offered by the Department of Germanic Studies. Academic component of the internship experience. Studies in the field of the internship and further investigation of related topics. Students will attend a seminar or submit frequent reports, depending upon remoteness of internship site. Prerequisite: Ger 211; and credit or concurrent registration in Ger 492; and a GPA of 2.00; and consent of the instructor.

494. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and the consent of the department. Credit or concurrent registration in Ger 494, and approval of the department.

513. Germanic Culture from the Enlightenment to the 1848 Revolution. 4 Hours. May be repeated for credit if topic is different for each registration. Representative works and authors studied in a cultural context.

514. Germanic Culture from the Industrial Revolution to the Present. 4 Hours. May be repeated for credit if topic is different for each registration. Representative works and authors are studied in a cultural context.

515. Film and Media Culture. 4 Hours. This seminar will explore the theory and history of film and other visual media. Emphasis will be given to the status of media texts in their cultural contexts, as well as to their function as components of modern social institutions. Taught in English. Students will be asked to watch films outside of class.

531. Seminar in Special Topics. 4 Hours. May be repeated for a maximum of 12 hours of credit if topic is different for each registration. In-depth study of a theme, genre or other element in Germanic literature and culture not confined to a single historical period. Topics vary.

572. The Role of Reading in Second Language Acquisition. 4 Hours. This course analyzes current theoretical and research directions in text comprehension processes as well as reading as a source of input for second language acquisition. Taught in English.

593. Internship Seminar: Academic Training. 4 Hours. Training in instruction of literature and culture courses at the college level. Students will be involved in a faculty-taught culture/literature course.

596. Independent Study for Graduate Students. 1 to 4 Hours. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research under faculty supervision on a topic approved by the Graduate Program Committee. Prerequisites: Consent of the supervising faculty member and committee approval.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Prerequisites: Departmental approval and consent of the instructor.

Graduate College (GC)

401. Scientific Integrity and Responsible Research. 0 Hours. S/U grade only. Meets during the first seven weeks of the term on the west side of campus, and on the east side of campus during the last seven weeks. Designed to meet NIH requirements for formal training in the responsible conduct of research. Ethical and legal issues in the conduct of research; University of Illinois at Chicago research standards, regulations, and procedures.

470. Essentials for Animal Research. 1 Hour. S/U grade only. This course will acquaint the students with the regulations, sources of information, humane principles, and ethical considerations involving the appropriate use of animals for research and teaching purposes.

471. Experimental Animal Techniques. 2 Hours. Animals used in instruction. S/U grade only. Noninvasive and invasive techniques commonly used in laboratory animals are performed with emphasis placed upon the proper use of anesthetic, analgesics, and aseptic techniques. Prerequisite: GC 470.

473. Seminar in Comparative Medicine. 1 to 2 Hours. S/U grade only. Selected fields of interest and research in comparative medicine will be presented in the areas of comparative biology, model development and experimental techniques. Prerequisite: GC 471 or consent of the instructor.

491. Graduate Study Abroad. 0 to 16 Hours. May be repeated for a maximum of 32 hours of credit. Lectures, seminars, and independent travel/study abroad in conjunction with an approved graduate program. Prerequisites: Approval of the Graduate College.

Health Policy and Administration (HPA)

400. Principles of Management in Public Health. 3 Hours. A detailed discussion of the conceptual and theoretical foundations to the principles of management with an emphasis on public health and health care settings. Prerequisite: Enrollment restricted to public health students; other graduate and professional students admitted by consent as space permits. To obtain consent, see the SPH registrar.

401. Behavioral Sciences in Public Health. 2 Hours. Provides grounding in the behavioral sciences with applications to public health. Examines individual, institutional, and societal responses to the psychosocial factors influencing health and illness. Prerequisite: Enrollment restricted to public health students; other graduate and professional students admitted by consent of the SPH registrar as space permits.

402. Social Ethics and Public Health. 3 Hours. Applications of ideas from philosophy, law, political science and economics to analyze the ethical basis of public health policies and programs.

403. U.S. Health Care System. 3 Hours. Overview of the U.S. health care system, including its evolution, utilization patterns, providers—human, institutional, and organizational—financing, regulating, evaluating and reforming.

405. Leadership in Public Health Practice. 3 Hours. Same as CHSc 405. Utilizing public health core functions, this course explores leadership style and practice through case studies and techniques which enhance leadership development. Prerequisites: CHSc 400 and consent of the instructor.

417. Quality Management in Health Services. 2 Hours. Surveys development of quality management in health services, and theoretical basics and diverse perspectives of quality management and regulation. Presents relevant research and management methodologies. Prerequisites: HPA 400 and CHSc 400.

429. Introduction to Health Services Research. 2 Hours. Introduction to health services research using classic studies and current trends which examine access, cost, quality, and organization of health care. Prerequisite: HPA 400.

430. Introduction to Public Health Policy Analysis. 3 Hours. Identifies and discusses health status as a function of public policy; policymaking to improve the public’s health; current health policy topics and methodology.

431. Law and Public Health. 3 Hours. Surveys basic concepts and content in major areas of health law; explains the sources of legal authority; and develops familiarity with legal language and thinking.

432. Public Health Advocacy. 3 Hours. Examination of the courts, government agencies, legislatures and public opinion and an analysis of their decision making; planning an advocacy campaign using strategic analysis.

433. Negotiations for Public Health Professionals. 1 Hour. Principles of negotiation strategy and tactics; and methods for effective preparation, implementation and analysis of a negotiation. Emphasizes theoretical and practical skills.

437. Health Care Data. 3 Hours. Same as BHIS 437. Review of fundamentals constituting a health care information system. How data
is transformed into information and then again transformed into knowledge through integrated computer systems.

444. Health Care Budgeting and Strategic Planning. 3 Hours. Budgeting systems in health care; budgeting techniques, flexible budgeting, cost behavior and forecasting, revenue and expense analysis; strategic planning in health care agencies; continuous quality improvement.

463. Managerial Health Economics. 3 Hours. Uses managerial economics to study the health care system: demand for medical services; role of health insurance; productivity/cost measurement; labor markets and competition. Prerequisite: HPA 400 or consent of the instructor.

465. Health Information and Decision Support Systems. 4 Hours. Introduction to computer assisted management information and decision systems in health organizations: analysis and design of databases; data and information flow; reports; and uses microcomputers. This is an on-line course.

494. Introductory Special Topics in Health Policy and Administration. 1 to 4 Hours. Introductory topics in health administration, policy analysis, health care financing, cost-effectiveness evaluation. Topics vary by semesters.

510. Health Care Information Systems I. 4 Hours. Same as BHIS 510. Examination, through case studies, of current information technologies and systems currently in place and on the horizon, in health care organizations and in health science libraries. Prerequisite: Consent of the instructor.

511. Organization Theory Applied to Health Programs. 3 Hours. Classical and modern organization theories applied to health programs. Includes organization structure and goals, management functions and processes, and managerial controls and evaluation. Prerequisite: HPA 400 or consent of the instructor.

516. Health Personnel Management. 3 Hours. Health personnel policies and programs, human resource requirements, recruitment, development, performance appraisal, salary and wage administration, and management/labor relations in the health industry. Prerequisites: HPA 400 and consent of the instructor.

520. Management of Health Care Communication Systems. 4 Hours. Same as BHIS 515. Examination and management of data communications in and between health care facilities including examination of issues, standards, technologies, and system configurations. Prerequisite: HPA 510 or consent of the instructor.

521. Principles and Practices of Planning in Health Care. 3 Hours. Principles and practices of health planning relevant to organizations and systems; planning at national, regional, community levels; quantitative and qualitative techniques of planning. Prerequisite: HPA 400 or equivalent basic management course.

522. Health Evaluation Methods. 3 Hours. Applies social science research methods and theory to the evaluation of health interventions. Uses quasi-experimental designs to evaluate program effectiveness. Students design their own studies. Prerequisite: Bstt 401, and HPA 400 or consent of the instructor.

523. Evaluating the Cost Effectiveness of Health Programs. 3 Hours. Development of analytic tools to support management/policy decisions with respect to cost effectiveness of health services; measurement of effectiveness, resource utilization, resource costs and analysis. Prerequisites: HPA 400 and either 463 or 444, and Bstt 401, or consent of the instructor.

524. Case Management and Managed Care: Theory and Practice. 3 Hours. Case management as a public health and managed care intervention is applied to such problems as chronic diseases, mental illness, AIDS, and maternal and child health.

527. Critical Issues in Long Term Care Policy. 3 Hours. Same as CHSc 527. Long-term care organization, financing, delivery, utilization and policy, emphasizing affordability, access and quality in a managed care environment. Prerequisites: CHSc 400 and 425 or consent of the instructor.

529. Multidisciplinary Research Methods in Clinical Practice I. 2 Hours. Overview of research methods used in surveys and the study of outcomes in clinical practice. Includes developing a research proposal in a clinical setting. Prerequisites: Graduate standing in the School of Public Health and HPA 400, EpId 400, and Bstt 400, or consent of the instructor.

530. Public Health and the Political Process. 3 Hours. Analyzes theoretical basis of political action in public health and the potential justifications for public health regulations and policies. Prerequisite: HPA 402, 430, or 432, or consent of the instructor.

531. Health Information Systems Analysis and Design. 4 Hours. Same as BHIS 520. A project course applying systems analysis and design theory to health care systems evaluation, modeling and implementation. Prerequisite: HPA 510 or consent of the instructor.

540. Applications in Health Informatics. 4 Hours. Same as BHIS 525. Covers the application of theory through case study analysis, and the use of information systems for quality assurance and management. Prerequisites: HPA 510; and 520 or BHIS 515 or 530; or consent of the instructor.

543. Advanced Health Economics. 4 Hours. Same as Econ 555. Topics in the supply and demand for health services; the role of insurance in the medical care industry; public policy issues of cost and quality regulation. Prerequisite: Econ 501 or 520 or consent of the instructor.

550. Topics in Health Informatics. 4 Hours. Same as BHIS 530. The study of advanced topics in various areas of health informatics. Prerequisites: HPA 510; and 520 or BHIS 515 or 525; or consent of the instructor.

551. Marketing Health Programs. 3 Hours. Concepts of marketing as a management tool; application of marketing to health care: the marketing process, marketing resources, and strategies for accomplishing marketing objectives. Prerequisite: HPA 400 or Mkgt 563 or consent of the instructor.

554. Measuring and Improving Quality in Health Care. 3 Hours. Provides theoretical and practical examination of the key measurement methods currently in use in the quality management field. Focus is on skills development in quality improvement methods. Prerequisites: Bstt 400, EpId 400, and HPA 417, or consent of the instructor.

555. National Health Assurance. 2 Hours. An examination of American society, its effect on the evolution of U.S. health care system, efforts/proposals to reform it, and predictions for the future. Prerequisite: HPA 403 or consent of the instructor.

556. U.S. Mental Health Policy. 2 Hours. Public policies which have supported the U.S. mental health service system from 1946 to the present. Theory, development, and evaluation of mental health policy in the US. Prerequisites: HPA 400 and HPA 430; and either EpId 400 or Bstt 400.

557. Measurement in Health Services Research. 3 Hours. Presents measurement, reliability and validity theory and assessment using correlation, internal consistency, factor analysis and other. Application in developing analyzing and reporting behavioral and/or organizational measures. Prerequisites: Bstt 400 and 401 or consent of the instructor.

558. Behavioral Measures in Public Health. 3 Hours. Examination of methodology, statistical analyses and reporting of behavioral measures used in public health. Criteria given for measurement selection, sources of information and psychometric descriptions. Prerequisites: Bstt 400 and 401 or consent of the instructor.

559. U.S. Mental Health Services Research. 2 Hours. The development, conduct, and evaluation of mental health programs in the U.S. from 1946 to the present. Program theory and evaluative research on the spectrum of services. Prerequisites: HPA 400, 430, and either EpId 400 or Bstt 400.

564. Geographic Information System Application in Public Health. 4 Hours. Examination of GIS applications in Public Health and the process of designing a GIS-based public health investigation. This is an on-line course. Prerequisites: Bstt 400 and HPA 465; and consent of the instructor.

571. Measuring Performance and Improving Quality in Public Health. 3 Hours. Explores the need and the use of tools to measure performance and reengineer systems in public health and in health care. Prerequisite(s): HPA 400 and CHSc 400 or consent of the instructor.

594. Advanced Special Topics in Health Policy and Administration. 1 to 4 Hours. Advanced topics in health administration, policy analysis, health care financing, cost-effectiveness evaluation. Topics vary by semester. Prerequisite: Consent of the instructor.
401. General Histology. 5 Hours. Comprehensive learning experiences in the structure and function of human tissues, organs, and organ systems. Microscopic slides are utilized in both lecture and laboratories. Prerequisite: Consent of the instructor.

451. Oral Histology. 3 Hours. Animals used in instruction. Microscopic anatomy and physiology of teeth, their supporting tissues, and the associated tissues of the orofacial complex. Prerequisite: Hist 401 or the equivalent or consent of the instructor.

501. Advanced Oral Histology. 2 Hours. Lectures and discussions on special subjects and problems in oral histology. Prerequisites: Hist 401 or the equivalent and consent of the instructor.

503. Biology of Mineralized Tissues. 2 Hours. Lectures and discussion on the formation, structure, and functions of bone, dentin, and enamel. Emphasizes the mechanisms of mineralization. Prerequisites: A basic course in histology and consent of the instructor.

504. Fine Structure of Oral Soft Tissues. 2 Hours. Discussions of electron microscopic research methodologies as applied to oral biology with special emphasis on structural-functional relationships in oral soft tissues. Prerequisites: Hist 401 and 451 or the equivalents and consent of the instructor.

506. Advanced Oral Histology-Lymphoid Tissues. 2 Hours. Lectures and discussions on the structure and functions of lymphoid tissues with special interest in orally related diseases. Prerequisites: Hist 401, a course in microbiology and consent of the instructor.

507. Physiological Basis of Pathology. 2 Hours. Same as Path 507. Subject matter allied to general pathology but going deeper into physical chemistry and physiological principles, as set forth in N.R. Joseph's Comparative Physical Biology. Prerequisite: Hist 401 or Path 421 and 422.

514. Oral Biology Seminar. 1 Hour. Same as OMDS 527. S/U grade only. Invited speakers present the progress of current research work in their field of interest related to oral tissues. Prerequisite: Consent of the instructor.

515. Electron Microscopy in Dentistry. 1 Hour. Same as OMDS 529. Principles, theory, and practice of transmission and scanning electron microscopy, and energy dispersive X-ray microanalysis. Processing, sectioning, staining and examination of tissues. Prerequisite: Consent of the instructor.

598. Research in Histology. 0 to 16 Hours. S/U grade only. Thesis research in histology.

History (Hist)

400. Topics in Ancient History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

401. Topics in Greek History. 4 Hours. Same as Cl 401. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history or classics.

402. Topics in Roman History. 4 Hours. Same as Cl 402. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history or classics.

404. Roman Law and the Civil Law Tradition. 4 Hours. Same as Cl 404 and Clj 404. Roman law and its relationship to values and social structure: social analysis through law; continental law tradition. Prerequisite: Clj 200 or Hist 203 or consent of the instructor.

406. Topics in Medieval History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term.

409. Topics in Early Modern European History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

410. Topics in Modern European History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

418. Topics in German History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of European history or consent of the instructor.

421. Topics in British and Irish History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 6 hours of history or consent of the instructor.

424. Topics in French History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: One 200-level course in French or European history or consent of the instructor.

429. Topics in Italian History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of European history or consent of the instructor.

433. Topics in Eastern European History. 4 Hours. Same as Slav 433. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of European history or consent of the instructor.

435. Topics in Russian History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of European history or consent of the instructor.

441. Topics in African History. 4 Hours. Same as AAST 441. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of African history, African-American studies, or consent of the instructor.


451. Topics in Colonial American History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of U.S. history or consent of the instructor.

452. Topics in Revolutionary and Early National United States History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

453. Topics in Nineteenth-Century United States History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

454. Topics in Twentieth-Century United States History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of U.S. history or consent of the instructor.

455. Topics in Southern History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history.

461. Topics in Latin American History. 4 Hours. Same as LALS 461. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history, Latin American and Latino Studies, or consent of the instructor.

471. Topics in East Asian History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of East Asian history or consent of the instructor.

472. Issues and Events in Twentieth-Century China. 4 Hours. Same as AsSt 472. Covers the events, places, people, political movements, ideologies, and issues that shaped twentieth-century China, and considers different approaches to the writing of that history.

473. Topics in East Asian History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Same as AsSt 473. Previously listed as: Hist 471. Specific topics are announced each term. Prerequisite: 3 hours of East Asian history or consent of the instructor.

474. History and Archives. 4 Hours. Same as GWS 474. Introduction to archival preservation and management. Under faculty supervision, students will create a records management plan for an organization to preserve documents of historical importance. Includes internship at an external agency. Prerequisite: 3 hours of history or consent of the instructor.

475. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a
two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

476. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Hist 475, and approval of the department.

477. Topics in Middle Eastern History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history.

478. Women in Chinese History. 4 Hours. Same as AsSt 478 and GWS 478. Focuses on scholarship on women in Chinese society throughout history, dealing with topics such as marriage and family, literacy, career options, women in revolution and the historiography of the field.

479. Culture and Colonialism in South Asia. 4 Hours. Same as Anth 479 and AsSt 479. Examines the emergence of colonial cultures of domination and resistance on the Indian subcontinent from the 18th century to 1947.

480. Topics in Economic History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history or consent of the instructor.

481. Topics in Social History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

482. Topics in Migration History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history.

483. Topics in the History of Public Policy. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history.

484. Topics in the History of Women. 4 Hours. Same as GWS 484. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history or gender and women's studies or consent of the instructor.

485. Topics in African-American History. 4 Hours. Same as AsSt 481. May be repeated for credit. Students may register for more than one section per term if topic is different for each registration. African-American history for students with significant background in the field. Topics vary. Prerequisite: Hist 104 or 247 or 248 or consent of the instructor.

486. Topics in the History of Science. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours in history.

487. Topics in the History of Sexuality. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours in history or consent of the instructor.

488. Topics in Urban History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history.

489. Topics in Military History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

490. Topics in Diplomatic History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Prerequisite: 3 hours of history.

491. Topics in Constitutional History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

492. Topics in Intellectual History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

493. Topics in Historiography. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

494. Topics in Political History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history.

495. Topics in Religious History. 4 Hours. Same as RelS 495. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history or consent of the instructor.

496. Topics in Race, Ethnic, and Minority History. 4 Hours. Same as AsSt 496. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history or consent of the instructor.

497. Topics in Cultural History. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history or consent of the instructor.

498. Topics in Quantitative Methods. 4 Hours. May be repeated for credit. Specific topics are announced each term. Prerequisite: 3 hours of history or consent of the instructor.

500. Colloquium on the Teaching of History. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading in topics. Prerequisite: Consent of the instructor.

501. Introduction to Graduate Study in History. 4 Hours. Required for graduate students in the MA and PhD in History programs. Introduction to history as a discipline and profession. Approach is comparative and by topic. Prerequisite: Graduate standing in history.

502. Seminar on Ancient History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Research in topics. Prerequisite: Consent of the instructor.

507. Colloquium on Medieval History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Topics on themes of medieval history. Specific topics are announced each term.

508. Seminar on Medieval History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Research in topics. Prerequisite: Consent of the instructor.

511. Colloquium on European History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading in topics. Prerequisite: Consent of the instructor.

512. Seminar on European History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Research in topics. Prerequisite: Consent of the instructor.

521. Colloquium on British History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading in topics. Prerequisite: Consent of the instructor.

522. Seminar on British History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Research in topics. Prerequisite: Consent of the instructor.

531. Colloquium on Russian History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading in topics. Prerequisite: Consent of the instructor.

532. Seminar on Russian History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Research in topics. Prerequisite: Consent of the instructor.

541. Colloquium on African History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Readings on select topics in African history.

542. Seminar on African History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading in topics. Prerequisite: Consent of the instructor.

551. Colloquium on American History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading in topics. Prerequisite: Consent of the instructor.

552. Seminar on American History. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Research in topics. Prerequisite: Consent of the instructor.
Human Nutrition (HN)

410. Nutritional Biochemistry. 3 Hours. Biochemical basis for nutritional principles and concepts. Prerequisites: HN 310; or both HN 196 and CHSC 414; or the equivalent courses; or consent of the instructor.

413. Principles of Delivering Public Health Nutrition Services. 3 Hours. Same as CHSc 413. Assessment, planning, and evaluation of community nutrition programs using a systems approach. Prerequisite: CHSc 411 or consent of the instructor.

420. Clinical Nutrition II. 3 Hours. Principles of nutrition, biochemistry, physiology, pathology, education, and psychology related to management of selected diseases (gastrointestinal diseases, hypermetabolic states and cancer). Prerequisites: HN 310 and 320, or consent of the instructor.

421. Clinical Practice II. 4 Hours. Practical experiences in the nutritional management and support of selected disease processes such as cancer, gastrointestinal and hypermetabolic states. Prerequisites: HN 321, and concurrent registration in HN 420 or consent of the instructor.

422. Clinical Nutrition III. 3 Hours. Principles of nutrition, biochemistry, physiology, and pathology related to the management of critically ill patients and selected disease processes such as pediatrics and renal disorders. Prerequisites: HN 309 and HN 420 or consent of the instructor.

423. Clinical Practice III. 5 Hours. Clinical practicum which focuses on the nutritional management of critically ill patients or specialized patient populations (renal and pediatric patients). Prerequisites: HN 421 and credit or concurrent registration in HN 422 or consent of the instructor.

430. Management in Human Nutrition. 2 Hours. Tools of management and management systems. Prerequisite: HN 332 or consent of the instructor.

450. Professional Practice. 6 Hours. Extended practicum that integrates acquired skills, knowledge, and attitudes in dietetics. Special emphasis on current dietary issues facing the health care professional. Prerequisite: HN 423 or consent of the instructor.

461. Nutrition Laboratory. 2 Hours. Chemical analysis of food, blood, and urine for certain predetermined constituents; nutrient balance study. Prerequisite: Bche 307 or the equivalent or consent of the instructor.

480. Field Study. 2 Hours. Provides practical experience to develop/strengthen the student’s knowledge and skills in an area of nutrition practice. Prerequisite: HN 410 or consent of the instructor.
interaction, protein metabolism, nutrition and behavior, nutrition and exercise. Prerequisite: HN 410 or consent of the instructor.

595. Seminar in Human Nutrition. 1 Hour. May be repeated for credit with the approval of the department. S/U grade only. Topics of current interest in human nutrition. Includes discussions of current journal articles and important new developments in the specific disciplines. Prerequisite: HN 410 or consent of the instructor.

596. Independent Study in Human Nutrition. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Study in selected areas of human nutrition is carried out under the direction of a faculty member. Modes of investigation are determined by the nature of the problem selected. Prerequisites: Admission to the HN graduate program and consent of the instructor.

597. Project Research. 1 to 4 Hours. May be repeated for a maximum of 4 hours of credit. Students may register for more than one section per term. S/U grade only. For graduate students who wish to pursue a project other than thesis research. Prerequisite: Consent of the instructor.

598. Research in Human Nutrition. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent research in one area of human nutrition. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent dissertation research by the student, under the guidance of the adviser. Prerequisite: Consent of the faculty adviser.

Industrial Engineering (IE)

412. Dynamic Systems Analysis I. 4 Hours. Same as ME 412. Classical control theory, concept of feedback, laplace transform, transfer functions, control system characteristics, root locus, frequency response, compensator design. Prerequisite: ME 308.

446. Quality Control and Reliability. 4 Hours. Principles of statistical quality control including control by variable and by attribute, construction and use of control charts for variables, fraction defectives and number of defects and use of standard plans, reliability and life cycle testing. Prerequisite: IE 342.

450. Stochastic Processes. 4 Hours. Description and analysis of probabilistic systems; recurrent event models, Markov processes, and queuing systems; simulation of stochastic processes; applications to engineering systems. Prerequisite: IE 342.

461. Safety Engineering. 4 Hours. Accident losses; standards and codes; hazards control; accident investigations; mechanical injuries; heat, pressure, and electrical hazards; fires and explosions; toxic materials and radiation; vibration and noise; course project. Prerequisite: IE 342.

463. Plant Layout and Materials Handling. 4 Hours. Facilities design functions, computer-aided plant layout, facility location, warehouse layout Minimax location, deterministic and probabilistic conveyor models. Prerequisite: IE 471.


465. Manufacturing Information Systems. 4 Hours. Design and implementation of supervisory control and data acquisition systems; manufacturing systems controller and communication networks. Prerequisites: Consent of the instructor; and familiarity with computer programming.

466. Production Planning and Inventory Control. 4 Hours. Principles of demand forecasting, production planning, master scheduling, critical path scheduling, job sequencing, design and control of deterministic and stochastic inventory systems, material requirement planning. Prerequisites: IE 345 and 471.


468. Virtual Manufacturing. 4 Hours. Same as ME 468. Virtual realizations in manufacturing systems design, manufacturing applications of networked virtual reality, virtual reality modeling of occupational safety engineering. Prerequisite: Consent of the instructor.

471. Operations Research I. 4 Hours. Introduction to operations research, formulation of linear programming problems, simplex methods, duality theory, sensitivity analysis, and integer linear programming. Prerequisite: IE 342.


494. Special Topics in Industrial Engineering. 4 Hours. May be repeated for credit. Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. Prerequisite: Consent of the instructor.

520. Maintenance Engineering. 4 Hours. Decision making and failure statistics, reliability engineering and maintenance, queuing theory in maintenance, spares inventory control, maintenance network planning, condition-based maintenance. Case studies. Prerequisites: IE 342 and 446.


545. Statistical Modeling of Time Series. 4 Hours. An engineering approach to time series analysis and applications. Identification, forecasting, control, characterization, design, etc. of industrial and physical systems. Prerequisite: IE 345.

546. Reliability and Maintainability. 4 Hours. Stochastic models of failure for components and systems, reliability measures, reliability testing, estimation of failure distributions, design reliability concepts, fundamentals of maintainability and availability. Prerequisite: IE 446.


552. Applied Stochastic Processes II. 4 Hours. Same as IDS 547. Stationary point processes; Markov renewal theory; semi-Markov processes; regenerative processes; computational methods and applications to queues, inventories, dams, and reliability. Prerequisite: IE 450.

561. Advanced Safety Engineering. 4 Hours. System analysis and synthesis, hazard analysis, cost effectiveness, logical analysis, probabilistic reliability considerations, fault tree analysis, statistical analysis, information system design, budget allocating. Prerequisite: IE 461.

562. Supervisory Control of Discrete Event Systems. 4 Hours. Discrete event systems; languages and automata, supervisory control, timed models, supervisory control applications. Extensive computer use required.

564. Advanced Industrial Automation. 4 Hours. Advanced topics in industrial automation, including automatic process planning, computer control of manufacturing systems, CAD/CAM and robotics, CNC/DNC, and FMS. Prerequisite: IE 464 and 380.

565. Expert Systems in Manufacturing. 4 Hours. Industrial uses of expert systems; applicability to industrial processes; availability of commercial expert systems; design and implementation of expert systems; knowledge engineering, research uses of expert systems.

566. Advanced Quality Control. 4 Hours. Advanced analysis of various acceptance sampling plans and process control techniques, including Bayesian and non-Bayesian models, risk and cost based approaches. Prerequisites: IE 342 and 446.

567. Statistical Analysis of Simulation Outputs. 4 Hours. Principles and techniques of analyzing the outputs of stochastic simulated models, including determination of run lengths, reduction of variance, time-series methods, experimental design. Prerequisite: IE 467.

568. Advanced Production and Inventory Control. 4 Hours. Design and analysis of deterministic and stochastic production and inventory systems, computerized processing of production and inventory, material requirement planning (MRP), and manufacturing resource planning. Prerequisite: IE 466.
569. Advanced Virtual Manufacturing. 4 Hours. Same as ME 569. Manufacturing systems design optimization using virtual environments, optimization of manufacturing decision support using virtual reality interfaces, analysis and evaluation of virtual environments. Prerequisite: Consent of the instructor.

571. Statistical Quality Control and Assurance. 4 Hours. Same as IDS 571. The importance of quality in products and services, quality surveillance, Denning's management method, Ishikawa's seven tools, control charts, acceptance sampling, quality improvement using directed experiments. Prerequisite: At least one term of statistics.

575. Advanced Optimization Techniques I. 4 Hours. Same as IDS 545. Theoretical foundations of linear and integer programming; convex sets; linear inequalities; linear programming theory and algorithms; integer programming; applications in production scheduling and inventory control. Prerequisites: Math 413 and 310 and IDS 435 or IE 471 or Math 461.

576. Advanced Optimization Techniques II. 4 Hours. Same as IDS 546. Nonlinear programming; optimality conditions; convex programming; Rockafellar and Lagrange duality; algorithms and numerical methods; applications to engineering design and economics. Prerequisite: IE 575.

594. Current Topics in Industrial Engineering. 4 Hours. May be repeated for credit. Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. Prerequisite: Consent of the instructor.

595. Seminar on Industrial Engineering Research. 1 Hour. S/U grade only. Advances in industrial engineering research will be discussed in a seminar setting. Students will be expected to make presentations in various areas, as well as invited faculty speakers. Prerequisite: Graduate standing in industrial engineering.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 4 hours of credit. Students may register for more than one section per term. Individual study under close supervision of a faculty member. Prerequisite: Consent of the instructor.

598. MS Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual research in specialized problems under close faculty supervision. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual research on specialized problems under close faculty supervision. Prerequisite: Consent of the instructor.

Information and Decision Sciences (IDS)

400. Advanced Business Programming Using Visual Tools. 4 Hours. Visual extended business language capabilities, including creating and using controls, menus and dialogues, objects and instances, mouse events, graphics, file-system controls. Prerequisite: IDS 201 or a programming course in mathematics or computer science, or consent of the instructor.

401. Business Computing II: Data Structures and Operating Systems. 4 Hours. Data structures; file structures. Searching and sorting; algorithm design and analysis. Operating systems; process management; memory management; processor management; file systems; case studies; programming projects. Prerequisite: IDS 201.

405. Business Systems and Analysis Design. 4 Hours. Theory of analysis, design and development of information systems; information management and database management systems; data management and analysis; case studies in systems implementation and evaluation. Prerequisites: IDS 100 and 201 and credit or concurrent registration in IDS 410 or the equivalent courses.

406. Business Systems Design Project. 4 Hours. Selected issues in the design, development, and evaluation of computer-based business information systems: forms design, general software systems, user interfaces, research systems, quality control, and documentation standards. Includes a project at an outside company or University office. Prerequisites: IDS 201 and 405 or the equivalent courses; or consent of the instructor. Business administration students must have declared a major.

410. Business Database Design. 4 Hours. Computer software techniques used in business with emphasis on information management and database management systems. Data management and analysis. Major types of database management systems, query languages. Prerequisite: IDS 100 and 201 or the equivalent courses.

412. Distributed Business Systems. 4 Hours. Organizational aspects and underlying concepts of distributed business systems, decentralization versus centralization issues, costs of distributed computing, and performance evaluation measures. Prerequisite: IDS 400 or 401 and credit or concurrent registration in IDS 410; or consent of the instructor.

420. Business Systems Simulation. 4 Hours. Simulation analysis of the operations of a system from the perspective of the entire company; optimal decisions are generated for the controllers of the systems. Prerequisites: IDS 201 and IDS 355 and Math 205 or the equivalent courses.

422. Decision Support and Expert Systems. 4 Hours. Judgement, knowledge, and experience-based systems; components of decision support systems (DSS) and expert-systems (ES); languages and tools for development of DSS/ES: active decision and problem-solving support in semi-structured or unstructured situations; hands-on experience. Prerequisite: IDS 355 and 410 or consent of the instructor.

425. Computer Performance Evaluation and Modeling. 4 Hours. Probabilistic, simulation, and statistical techniques for modeling computer systems with a view to evaluating their performance. Models of multiprogramming systems, multi-access systems, input/output systems, scheduling algorithms, and paging systems are described. Prerequisites: IDS 371 and either IDS 405 or 410, and a business core computer language course, or the equivalents, or consent of the instructor. Credit in IDS 420, while not required, is recommended. Business administration students must have declared a major.

435. Operations Research I. 4 Hours. Linear programming, simplex algorithm, duality, sensitivity analysis, convex programming, parametric programming. Transportation and assignment problems, goal programming. Prerequisites: IDS 355, and Math 205 or the equivalent. Business administration students must have declared a major.

436. Operations Research II. 4 Hours. Nonlinear operations research. Nonlinear programming: optimality conditions, convexity, heuristic methods, applications. Inventory control theory: classical models, stochastic complications. Integer programming: enumerative techniques, cutting plane techniques. Prerequisite: IDS 435 or the equivalent, or consent of the instructor. Business administration students must have declared a major.

437. Operations Research III. 4 Hours. Markov chains, queueing theory, stochastic inventory control theory, dynamic programming. Prerequisites: IDS 355 and Math 205 or the equivalent. Business administration students must have declared a major.

446. Decision Analysis. 4 Hours. Prior and posterior distributions, conjugate priors, value of information, applications to decision making in business. Prerequisite: IDS 371.

450. Operations Management II. 4 Hours. Extensive computer use required. Application of management science to the operation and control of production, distribution, and service systems. Emphasis on inventory management, production planning, capacity expansion, and demand forecasting. Prerequisite: IDS 355 or the equivalent. Business administration students must have declared a major.

454. Supply Chain Management. 4 Hours. Supply Chain Management is studied as an information-intensive, integrated system for managing material flows, logistics and inter-organizational partnership to deliver products and services. Prerequisite: IDS 450.

460. Survey Sampling: Theory and Methods. 4 Hours. Planning and analyzing surveys. Topics include simple random sampling, stratified sampling, systematic sampling, ratio estimation and cluster sampling. Case studies with applications to real situations are discussed. Prerequisite: IDS 371.

462. Statistical Software for Business Applications. 4 Hours. Statistical software in business applications and data mining. SAS and other packages such as SPSS, MATLAB, Maple, Splus, B34S, SCA. Prerequisite: IDS 371 or consent of the instructor.

465. Analysis of Variance and Experimental Design. 4 Hours. General theory of design and analysis of experiments. Least squares estimation, multiple regression, analysis of variance, randomization, randomized blocks, Latin squares, factorial designs, replication, incomplete blocks. Prerequisites: IDS 371; and Math 205 or 310 or 320.

470. Multivariate Analysis I. 4 Hours. Introduction to the structure and analysis of multivariate data. Emphasis on the multivariate normal model. Regression, tests concerning multivariate means,
classification, discriminant analysis, principal components. Prerequisites: IDS 371; and Math 205 or 310 or 320.

472. Statistical Methods for Mgmt Information Systems & Data Mining. 4 Hours. Updating statistical databases. Cluster analysis, logistic regression, classification and regression trees, neural networks, path analysis. Applications to marketing, quality assurance, operations management, human resources management. Prerequisite: IDS 371 or the equivalent.

474. Quality and Productivity Improvement Using Statistical Methods. 4 Hours. Directed experimentation for quality and productivity improvement, quality surveillance, design and analysis of two-level factorial experiments and multilevel experiments, data transformation. Prerequisite: IDS 371 or consent of the instructor.

476. Business Forecasting Using Time Series Methods. 4 Hours. Same as Econ 450. Autoregressive, moving average, and seasonal models for time series analysis and business forecasting. Forecasting using multivariable transfer function models is also included. Prerequisite: IDS 371 or Econ 445 or consent of the instructor.

478. Regression Analysis. 4 Hours. Data collection and exploration; model building; variable least squares; residual analysis; variable selection; multicollinearity; ridge regression; nonlinear regression; nonparametric regression. Prerequisite: IDS 371.

480. Cluster Analysis with Applications in Business. 4 Hours. Clustering individuals. Clustering variables. Block clustering. Empirical investigations. Applications of cluster analysis on market research, stock market analysis, or other fields. Prerequisite: IDS 371 or consent of the instructor.

494. Topics in Information and Decision Sciences. 3 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Topics vary, selected readings, case analysis. Prerequisite: Consent of the instructor.

495. Competitive Strategy. 4 Hours. Multidisciplinary analysis of organizational strategy and policy using case method and/or business simulation. Assignments involve extensive library research and oral and written reports. Prerequisite: Consent of the instructor.

499. Independent Study in Information and Decision Sciences. 1 to 3 Hours. May be repeated for a maximum of 9 hours of credit. Intensive study of selected topics determined in consultation with the instructor and department head. Prerequisites: Major in information and decision sciences and consent of the instructor.

500. Information Technology for Management. 4 Hours. Use of information technology in business, planning, management, and strategic use of information technology including the role of enterprise-wide systems, the Internet, and electronic commerce. Prerequisite: Admission to the MBA Program.

504. Introduction to Electronic Commerce. 4 Hours. Addresses issues on electronic commerce for businesses and consumers, considering topics such as competition, distribution, infrastructure on the Internet, shopping, and product characteristics.

505. Business Information Systems Analysis and Design. 4 Hours. A student who has taken IDS 405 must see an adviser to determine whether another graduate course from IDS, Math, or Computer Science must be substituted for IDS 505. Analysis, design and development of information systems. Management concerns in systems design, development, and evaluation. Includes a project at an outside company or University office. Prerequisite: IDS 500; or consent of the instructor.

507. Advanced Systems Analysis and Design Project. 4 Hours. Principles and concepts of analysis, design and development of information systems including project management. Includes a project at an outside company or University office. Prerequisite: Consent of the instructor, and completion of three MS in MIS courses.

508. E-Commerce Project. 4 Hours. Electronic commerce project initiated by local small and medium enterprises, teaming students with technical or entrepreneurial skills/interests, supervised by faculty on board of directors. Prerequisites: IDS 504 or Mgmt/Mktg 558 and consent of the instructor.

509. Advanced Systems Analysis and Design. 4 Hours. Principles and concepts of analysis, design and development of information systems using structured and object oriented methodologies, tools and techniques. Prerequisite: IDS 401.

510. Administrative Computer Technology. 4 Hours. A student who has taken IDS 410 must see an adviser to determine whether another graduate course from IDS, Mathematics, or CS must be substituted for IDS 510. Software technology as used in business, emphasizing information management and database systems. Data management, data analysis, major types of database systems, query languages, security, and control. Applications to business systems. Prerequisite: IDS 500.

511. Query Processing in Database Systems. 4 Hours. Same as CS 580. Query processing in deductive databases and in distributed/parallel databases systems. Prerequisite: CS 480.

514. Management of Information Systems. 4 Hours. Administration, control, and management of computer-based information systems, projects, and relationships with the organization. Scheduling of operations; management of computer professionals; planning and control of the systems activity. Prerequisite: IDS 505 or IDS 510.

516. Planning Models and Decision Support Systems. 4 Hours. Analysis, design and development of decision support systems. Managerial and behavioral concerns in decision support system design, development and evaluation. Prerequisite: IDS 505 or IDS 510.

518. Electronic Marketing. 4 Hours. Same as Mktg 518. Overview of the electronic marketing value chain. Internet and web technologies, system design, payment systems, business requirements for e-marketing, design and ethical issues. Prerequisite: Mktg 500 or MBA 506 or consent of the instructor.

519. Topics in Information Systems. 4 Hours. May be repeated for credit. Selected topics in information systems, information management and information technology. Content varies. Topics will be announced. Prerequisites: IDS 505 or IDS 510; and consent of the instructor.

520. Distributed Processing and Telecommunication Systems. 4 Hours. Topics include components of telecommunications and distributed information systems, data communication devices, computer networks, configuration management and distributed databases. Prerequisite: IDS 505 or IDS 510.

521. Advanced Database Management. 4 Hours. Data analysis for database design; logical data modeling, transaction modeling; implementation models; physical database design; database tuning and performance evaluation; database decomposition; distributed database; database security. Prerequisite: IDS 505 or IDS 510.

522. Expert Systems for Business Applications. 4 Hours. Components of expert systems; languages and tools for development of expert systems; representation of business knowledge such as marketing, accounting, and finance. Prerequisite: IDS 505 or IDS 510.

523. Audit and Control of Information Systems. 4 Hours. Modeling and analysis of information systems application in organizations; measurement of effectiveness; strategies for implementation and updating; interface with other management control systems. Prerequisite: IDS 505 or IDS 510.

526. Computer Performance Evaluation and Modeling. 4 Hours. A student who has taken IDS 426 must see an adviser to determine whether another graduate course from IDS, Mathematics, or CS must be substituted for IDS 526. Probabilistic, simulation and statistical techniques for modeling computer systems with a view to evaluating their performance. Models of multi-programming systems, multi-access systems input/output systems, priority queues, and paging systems. Prerequisites: IDS 532; and IDS 505 or IDS 510.

527. Seminar on System Development and Management. 4 Hours. May be repeated for credit. Current topics in system development and management. Topics vary from term to term depending on the interests of the instructor and students. Prerequisites: IDS 505 and consent of the instructor.

528. Seminar on Database Design. 4 Hours. May be repeated for credit. Selected topics in logical and physical database modeling and design. Topics vary. Prerequisite: Consent of the instructor.

529. Seminar on Management Information Systems. 4 Hours. May be repeated for credit. Special research topics in management information systems. Topics vary from term to term depending on the interests of the instructor and students. Prerequisite: IDS 505 or IDS 510.

532. Decision Models and Information Systems II. 4 Hours. Credit is not given for IDS 532 if the student has credit in
MBA 507 and 509. MBA core course that integrates decision sciences and information systems. Emphasizes forecasting and decision models. Prerequisite: Admission to the MBA Program.

**545. Advanced Optimization Techniques I. 4 Hours.** Same as IE 575. Theoretical foundations of linear and integer programming; convex sets; linear inequalities; linear programming theory and algorithms; integer programming; applications in production scheduling and inventory control. Prerequisites: Math 413 and 310 and IDS 435 or IE 471 or Math 461.

**546. Advanced Optimization Techniques II. 4 Hours.** Same as IE 576. Nonlinear programming; optimality conditions; convex programming; Rockefeller and Lagrange duality; algorithms and numerical methods; applications to engineering design and economics. Prerequisite: IDS 545.

**547. Applied Stochastic Processes II. 4 Hours.** Same as IE 552. Stationary point processes; Markov renewal theory; semi-Markov processes; regenerative processes; computational methods and applications to queues, inventories, dams, and reliability. Prerequisite: IE 550.

**551. Operations Management in the Service Sector. 4 Hours.** Comparison of service and manufacturing operations; analysis of effects of capacity, quality, and service firm life cycle on operations. Prerequisite: Credit or concurrent registration in IDS 532, or consent of the instructor.

**552. Inventory Management. 4 Hours.** Structure of inventory decision and operating procedures; single event and continuous systems for both single and multiple products; order quantity and periodic review models; demand forecasting. Prerequisite: Credit or concurrent registration in IDS 532, or consent of the instructor.

**553. Production Management and Control. 4 Hours.** Project scheduling and resource allocation; capacity planning; aggregate planning, scheduling and dispatching; plant layout; material requirement planning; production flow and line balancing. Prerequisite: IDS 532.

**570. Statistics for Management. 4 Hours.** Survey of statistical methods with applications for business and management. Prerequisite: Admission to any business graduate program or consent of the instructor.

**571. Statistical Quality Control and Assurance. 4 Hours.** Same as IE 571. The importance of quality in products and services, quality surveillance, Deming's management method, Ishikawa's seven tools, control charts, acceptance sampling, quality improvement using directed experiments. Prerequisite: At least one term of statistics.

**577. Research Methodology I. 4 Hours.** Use of statistics and computers in research. Data collection and organization, survey sampling, questionnaire design, experimental design. Prerequisites: IDS 532 or the equivalent and admission to the PhD program in Business Administration.

**578. Research Methodology II. 4 Hours.** Data analysis, including estimation, hypotheses testing, nonparametric methods, analysis of variance, regression analysis, economic forecasting, and time series. Prerequisite: IDS 577 or the equivalent.

**582. Business Research and Forecasting I. 4 Hours.** Same as Econ 537. The role of research in business; forecasting methods and techniques, including models and their applications. Prerequisites: Econ 534 and at least one statistics course with regression analysis at the 300-level or above.

**583. Business Research and Forecasting II. 4 Hours.** Same as Econ 538. The role of research in business; forecasting methods and techniques, including multivariate time series models and their applications. Prerequisite: IDS 476 or 582.

**594. Special Topics in Information and Decision Sciences. 4 Hours.** Intensive study of a selected topic. Content varies. Topics are announced. Prerequisite: Consent of the instructor.

**596. Independent Study in Information and Decision Sciences. 1 to 4 Hours.** Students may register for more than one section per term. Independent study under the direction of a faculty member. Prerequisite: Consent of the instructor.

**599. PhD Thesis Research. 0 to 16 Hours.** S/U grade only. May be repeated for credit. Students may register for more than one section per term. Research on topic of the doctoral dissertation. Prerequisite: Consent of the instructor.

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**Interdisciplinary Public Health (IPHS)**

**420. Resource Databases in Public Health. 1 Hour.** S/U grade only. Use of print and electronic data bases of the U.S. Public Health Service, including CDC and NCHS and health care bibliographic databases.

**440. Public Health Practices. 3 Hours.** Explores in detail one major Illinois public health problem, utilizing community public health leaders as instructors.

**464. Introduction to Injury Control. 2 Hours.** Public health aspects of injury control. Pre-event: human-environment interactions; event: biomechanics, protective techniques; post-event: emergency medical systems, injury assessment; societal costs; legal and policy aspects. Prerequisite: Epid 400 or Bstt 400 or another graduate-level course in statistics or consent of the instructor.

**494. Introductory Special Topics—Interdepartmental. 1 to 4 Hours.** May be repeated for credit. Students may register for more than one section per term. Introductory special topics in public health. Course content will vary from semester to semester.

**530. Practicum in Mental Health Diagnosis. 4 to 8 Hours.** Review of mental health diagnostic process. Students in psychosocial epidemiology participate with medical students in a psychiatry clerkship. Prerequisites: CHSc 460 and consent of the instructor.

**540. Advanced Public Health Practices. 3 Hours.** Develop a proposal for the solution or alleviation of the public health problem studied in IPHS 440 by a team of health professionals, faculty, and students. Prerequisite: IPHS 440.

**594. Advanced Special Topics—Interdepartmental. 1 to 4 Hours.** May be repeated for credit. Students may register for more than one section per term. Advanced special topics in public health. Course content will vary from semester to semester.

**595. Seminar in Interdisciplinary Public Health Sciences. 1 to 3 Hours.** May be repeated for credit. Students may register for more than one section per term. S/U grade only. Analysis of current research in public health. Course content will vary from semester to semester. Prerequisite: Consent of the instructor.

**596. Independent Study in Public Health. 1 to 4 Hours.** May be repeated for credit. Students may register for more than one section per term. Selected aspects of specific public health problems; independent study under close supervision of faculty. Prerequisite: Consent of instructor who has supervised at least one course in the area of the independent study.

**598. Research in Public Health Sciences—MS 0 to 16 Hours.** May be repeated for credit. Students may register for more than one section per term. S/U grade only. Individual research in public health directed by a faculty member. Directed toward the thesis requirements for the Master of Science degree. Prerequisite: Consent of the instructor.

**599. Research in Public Health Sciences—PhD 0 to 16 Hours.** May be repeated for credit. Students may register for more than one section per term. S/U grade only. Individual research in public health directed by a faculty member. Directed toward the dissertation for the Doctor of Philosophy degree. Prerequisite: Consent of the instructor.

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**Italian (Ital)**

**402. Italian Syntax. 4 Hours.** Structure of the grammatical system of Italian. Analysis of the most important syntactic phenomena with emphasis on the meanings and functions of verb forms. Prerequisite: Ital 305 or consent of the instructor.

**410. Italian Medieval Literature. 4 Hours.** Representative literary movements and figures from the origins through the fourteenth century. Emphasis on Dolce Stil Novo, Dante’s minor works, Petrarch, and Boccaccio. Prerequisite: Ital 310.

**411. Literary Forms in Early Renaissance. 4 Hours.** The development of epic poetry (Pulci, Boiardo, Ariosto) within the literary, political, and social context (Machiavelli and Castiglione). Prerequisite: Ital 310 or consent of the instructor.

**421. Literary Forms in Late Renaissance and Baroque. 4 Hours.** Representative literary works of the genres of the late sixteenth and seventeenth centuries: epic poem of Tasso and poetry of Marino. The birth of the Commedia dell’Arte form. Prerequisite: Ital 310 or consent of the instructor.
420. Modern Italian Literature I. 4 Hours. Eighteenth-century theater: Metastasio, Goldoni, Alfieri. Literary development from Vico to Foscolo. Prerequisite: Ital 311 or consent of the instructor.

421. Modern Italian Literature II. 4 Hours. From Romanticism to Decadentism: emphasis on the work of Leopardi and Manzoni; analysis of poems by Carducci, Pascoli, D’Annunzio, Gozzano. Prerequisite: Ital 311 or consent of the instructor.

422. Contemporary Italian Literature. 4 Hours. The Novel from Verismo to Umberto Eco: readings from Verga, Svevo, Moravia, Calvino. Hermetic poetry: emphasis on Ungaretti, Montale, Sereni, Luzi. Theater: from Pirandello to Fo. Prerequisite: Ital 322 or consent of the instructor.

450. Divina Commedia I. 4 Hours. An in-depth study of the Divine Comedy against the philosophical and theological background of the Middle Ages. Covers Inferno and half of Purgatorio. Prerequisite: Ital 310 or consent of the instructor.

451. Divina Commedia II. 4 Hours. An in-depth study of the Divine Comedy against the philosophical and theological background of the Middle Ages. Covers Paradiso and half of Purgatorio. Prerequisite: Italian 310 or consent of the instructor.

460. Foreign Language Teaching Methodology. 4 Hours. Same as Span 450 and Fr 481. Theories of second language learning. Evaluative procedures emphasizing oral proficiency testing, analysis of textbooks. Preparation and presentation of micro-lessons. Twenty hours of high school observation. Prerequisites: Three courses at the 200 and 300 levels.

461. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

462. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Ital 461, and approval of the department.

478. The Bible as Literature. 4 Hours. Same as Engl 478 and RelS 478. Literary analysis of the English Bible (including the Apocrypha) in its historical and religious contexts; study of the King James Version and successive revisions of it. Prerequisites: 6 hours of English from Engl 241, 242, 243, 300; or consent of the instructor.

494. Topics in Jewish Studies. 4 Hours. May be repeated for a maximum of 6 hours of credit if topic is different for each registration. Selected topics in Jewish studies. Prerequisite: JSt 101 or JSt 102 or consent of the instructor.

Kinesiology (Kine)

400. Sport Administration. 3 Hours. Overview of the total management responsibility of the sport administrator, including planning, organizing, staffing, directing, and controlling the sport enterprise.

403. Marketing and Facility Management in Exercise and Wellness. 3 Hours. Introduction to management and marketing principles as they apply to promoting organizations. Theory and practice of managing exercise and wellness facilities.

407. Facilities Design and Event Management. 3 Hours. Planning, design, and maintenance of new and remodeled sport facilities; management considerations in conducting various types of events. Prerequisite: Kine 400.

412. Psychology and Physical Activity. 3 Hours. Analysis and application of psychological concepts related to process and outcomes of sport and exercise programs.

413. Curriculum Design and Evaluation. 3 Hours. Factors contributing to decision-making for curriculum design for various age groups, congruence of design to outcomes, evaluation procedures. Prerequisite: Kine 384 or consent of the instructor.

415. Urban Youth Fieldwork. 3 Hours. May be repeated for a maximum of 6 hours of credit. Interview and placement required for each enrollment. Experience in planning, teaching in, and evaluating physical activity-based urban youth programs. Accompanying seminar to examine related literature and explore the interface between theory and practice. Field work required. Prerequisites: Consent of the instructor. Requires interview and placement.

416. Programs For Underserved Youth. 3 Hours. Survey and evaluation of physical activity-based models and programs designed to help underserved youth in school, extended day, and special programs. Includes development of new models. Prerequisite: Consent of the instructor.

417. Physical Activity Programs for the Elderly. 3 Hours. Effects of aging on motor physiological performance, diagnostic procedures, prescriptive fitness and recreational programs, and instructional processes. Prerequisite: Consent of the instructor.

418. Exercise Adherence. 3 Hours. Exercise behavior as it relates to habitual physical activity. Encompasses health outcomes, exercise adherence factors, intervention strategies, and exercise settings.

420. Adult Fitness Programming and Assessment. 3 Hours. Emphasis on physiological, psychological, and kinesiological aspects of the physical conditioning process. Diagnostic, prescriptive, and instructional procedures. Prerequisites: Kine 351 and 352; or consent of the instructor.

421. Advanced Exercise Physiology. 3 Hours. In-depth study of the mechanisms that underly the acute and chronic responses to physical activity. Extensive computer use required. Prerequisites: Kine 352 and Chem 114; or consent of the instructor.

422. Exercise Physiology II. 3 Hours. Cardiovascular, respiratory, environmental, and fluid-electrolyte aspects of exercise and training; relationship to pathogenesis of these systems and exercise.

423. Theory and Methods of Stress Testing. 3 Hours. Theory, procedures, and techniques utilized by the exercise technician to evaluate work capacity, body fat, strength, and cardiovascular endurance. Prerequisites: Kine 421 or 422, and consent of the instructor.

427. Biomechanical Analysis of Sport Techniques. 3 Hours. The scientific mechanical basis for analyzing the techniques of selected sports to minimize performance errors and maximize results. Prerequisite: Kine 351 or consent of the instructor.

428. Advanced Functional Anatomy. 3 Hours. Mechanics and muscular analysis of human motion through the scientific study and application of selected physical principles. Prerequisite: Kine 351.

429. Biomechanical Analysis of Sport Injuries. 3 Hours. The biomechanical principles related to sport injuries. Prerequisite: Kine 351.

452. Qualitative Methods and Evaluation in Physical Education. 3 Hours. Practical introduction of qualitative research techniques: participant observation, interviewing, and use of documentary and archival sources. Emphasis on naturalistic settings in physical education.

460. Survey of Adapted Physical Education. 4 Hours. Characteristics of selected populations of children with disabilities. Emphasis on the relationship of the handicapping condition to motor development, motor learning, physical activity and physical education.

472. Movement Neuroscience. 3 Hours. Overview of the human nervous system. Emphasis is placed on the basic functional anatomical and physiological concepts relevant to the organization and execution of movement. Prerequisites: Kine 251, 252, 352, 354; or consent of the instructor.

481. Workshop in Kinesiology. 1 to 3 Hours. May be repeated for credit if topic varies for each registration. Intensified study of selected activities, topics, processes, or areas in kinesiology. Topic will be announced.

490. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the school. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the school.

491. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the school. The second half of a two-segment sequence of practice teaching, including seminar, to meet
534. Nutrition and Human Performance. 2 Hours. Same as HN 535. Nutrition which impacts on human performance; impaired performance due to nutritional problems; aspects relevant to the professional athlete. Prerequisites: HN 410 and either PhyB 341 or Kine 352, or consent of the instructor.

540. Disability and Physical Activity. 3 Hours. Same as DHD 520. Examination of the foundations of physical activity for persons with disabilities. Emphasis on strategies for promoting physical activity among persons with disabilities in community settings.

541. Applied Physical Education Methods. 4 Hours. Intended for graduate students who have taken the Adapted PE survey course, it is designed to provide the student with knowledge and skills required to meet the professional and legal mandates pertaining to physical education for children with disabilities. Prerequisite: Kine 460.

562. Advanced Adapted Physical Education. 3 Hours. An investigation of research and program implications for adapting physical education and/or rehabilitation to mentally and physically impaired persons. Primary multi-handicapping conditions are also addressed. Prerequisites: Kine 460 and consent of the instructor.

563. Evaluating Performance in Adapted Physical Education. 4 Hours. A comprehensive treatment of assessment procedures and validated testing instruments, used in classifying, placing, and prescribing instruction in adapted physical education. Prerequisite: Kine 561.

564. Adapted Physical Education Field Experience. 1 to 3 Hours. Observation, planning, and program implementation in a variety of school-based and community motor programs for handicapped children. Prerequisites: Kine 563 and consent of the instructor.

570. Neural Mechanisms Underlying Motor Control. 4 Hours. Neurobiological mechanisms that underlie the control and regulation of movement. Prerequisite: Consent of the instructor.

571. Biomechanics of Normal and Abnormal Movement. 3 Hours. Same as PT 571. Previously listed as: PT 519. Principles of statics and dynamics exemplified by human movements. Examination of muscle mechanics, joint forces, stability. Redundancy and intersegmental interactions in multijoint movements. Prerequisite: Consent of the instructor.

572. Psychology of Motor Control and Learning. 3 Hours. Same as PT 572. Advanced principles of the control and acquisition of complex, voluntary skills. Prerequisite: Kine 354 or consent of the instructor.

573. Advanced Topics in Motor Control and Learning. 3 Hours. Contemporary theories and models in motor control and learning.

574. Instrumentation for Motor Control Research. 3 Hours. Same as PT 574. Previously listed as: PT 522. Introduction to oscilloscopes, amplifiers, filters, and transducers. Origin and processing of electromyograms. Motion capture and processing techniques. Prerequisite: Kine 571.

582. Issues and Problems in Kinesiology. 3 Hours. May be repeated once for credit. Intensive study of selected topics; particular attention to current issues and research literature in kinesiology. Prerequisites: 30 hours of kinesiology courses.

589. Seminar in Kinesiology. 1 Hour. Final experience for Option I student. Student must demonstrate ability to synthesize material obtained in program and relate it to their area of specialization. Prerequisites: 32 semester hours of graduate credit and consent of the major advisor.

590. Research Methods in Kinesiology. 3 Hours. Training in research methods as they pertain to the specific areas of research in kinesiology. A research paper is required. Prerequisites: 30 hours of kinesiology courses at the undergraduate level.

591. Laboratory Experiences in Kinesiology. 2 Hours. S/U grade only. Provides laboratory experiences for the PhD students in Kinesiology. Students rotate through the research laboratories in the School. Prerequisite: Acceptance into the PhD program in Kinesiology.

593. Internship in Kinesiology. 0 to 9 Hours. Credit is not given for Kine 593 if student has credit in Kine 597. Supervised
internship in a laboratory or field setting. A written report is required. Normally open only to candidates in the administration exercise science and adapted physical education areas of specialization. Prerequisites: Kine 595, completion of 24 semester hours of core work, completion of all coursework in specialization, successful completion of comprehensive examination and consent of the advisor and director of graduate studies.

594. Selected Topics in Kinesiology. 1 to 3 Hours. May be repeated for credit if topic varies. Topic to be announced. Analysis of selected problems and concerns in specified specializations. Topics vary from semester to semester, depending on the needs and interests of the graduate students. Prerequisite: Consent of the instructor.

595. Preparation for the Research Experience in Kinesiology. 3 Hours. Students in thesis, project, or internship options must complete background work by the end of the semester before they can proceed. Prerequisites: Kine 590 and consent of the instructor.

596. Independent Research in Kinesiology. 1 to 4 Hours. Topics vary. Students design, implement, and analyze a research problem in their individual area of specialization under the supervision of a faculty member. Prerequisite: Kine 590 or the equivalent.

597. Project in Kinesiology. 0 to 16 Hours. S/U grade only. Supervised practicum in laboratory or field setting in which recent research findings are applied, tested, and evaluated. May be repeated for credit. Prerequisites: Kine 590 and 595, completion of course work in the area of specialization, and consent of the advisor and director of graduate studies.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Thesis work under the supervision of a graduate advisor. Prerequisites: Kine 490 and consent of the graduate advisor.

599. PhD Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Independent research by the student under the supervision of the thesis adviser. Prerequisites: Kine 590 and consent of the thesis adviser.

Latin (Lat)

450. Latin for Reading Knowledge. 4 Hours. No credit toward major or minor, or foreign language requirement. May not be taken for credit by students who have completed Lat 103 or 104. No graduate credit. Intensive introduction to Latin grammar and vocabulary. Prerequisite: Knowledge of another foreign language strongly recommended.

499. Independent Reading. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Individual study under faculty direction. Prerequisite: 4 hours in Latin at the 200 level or the equivalent.

Latin American and Latino Studies (LALS)


481. Topics in Latin American History. 4 Hours. Same as Hist 461. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history, Latin American and Latin studies, or consent of the instructor.

471. Spanish Culture and Society. 4 Hours. Same as Anth 471 and Span 471. Introduction to themes in Spanish culture and society based primarily upon the literature in anthropology. Parallel sets of readings in Spanish and English.

475. Problems in South American Ethnology. 4 Hours. Same as Anth 475. Intensive reading and research in theoretical and ethnographic problems in South American Indian social structures and cultures. Special attention will be given to the influence of Levi-Strauss' ideas on the formulation of cultural theory in South America. Prerequisite: Anth 213 or consent of the instructor.

491. Interdisciplinary Seminar in Latin American Studies. 4 Hours. May be repeated for credit if topic is different for each registration. Specific topics as announced each semester. In-depth study of selected topics such as: process of state formation, education, populism, the family, democratization, industrialization and ideological currents. Prerequisite: Latin American and Latino Studies major or consent of the instructor.

493. Seminar in Latin American/Latino Cultural Studies. 4 Hours. Latin American/Latino cultural studies theory and method: everyday life and popular culture, related to socio-economic, political, transcultural/transnational processes. Postmodern, postcolonial and subaltern perspectives. Prerequisite: LALS 101 or 102 or consent of the instructor.

495. Topics in Latino Community Studies. 4 Hours. May be repeated for credit if topic is different for each registration. In-depth study of Latino communities and current issues from an interdisciplinary perspective, with emphasis on the learning and use of investigative methodologies. Prerequisite: Latin American and Latino Studies major or consent of the instructor.

499. Advanced Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Individual advanced reading or research project in Latin American or U.S. Latino studies, with instructor's consent and supervision. Prerequisite: Open, with consent of the instructor, to graduate students and Latin American and Latino Studies majors with at least a 3.00 grade point average. Students in other programs or with lower than a 3.00 grade point average are admitted at instructor's discretion only.

501. Latinos and Latin America in Transnational Context. 4 Hours. Analysis of transnational processes linking Latin America and Latinos in the U.S. The impact of globalization on migration, culture, identity, work, health, education, family, and politics.

561. Colloquium on Latin American History. 4 Hours. Same as Hist 561. May be repeated for credit. Students may register for more than one section per term. Topics on themes in Latin American history. Specific topics are announced each term.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Investigation of special problems under the direction of a faculty member. Prerequisite: Consent of the instructor.

Liberal Arts and Sciences (LAS)

494. Topics in Cultural Studies. 4 Hours. An interdisciplinary approach to a current cultural debate. Topics will vary. May be repeated for credit if topic is different for each registration. Taught at the Field Museum.

Linguistics (Ling)

402. Trial Interaction. 4 Hours. Same as Crj 402. Language use, culture, and law in the trial process. Analysis of qualitative methods applied to legal processes and change. Prerequisites: Crj 261 and Crj 350, or consent of the instructor.

405. Introduction to General Linguistics. 4 Hours. Introduction to the theories and methods of the phonological, morphological, and syntactic analysis of language. The historical development of languages. Language use.

415. Linguistic Structures I. 4 Hours. Introduction to key concepts in the field, including descriptive and prescriptive grammars, competence and performance, and human language as a system; articulatory phonetics, phonology, morphology.

425. Linguistic Structure II. 4 Hours. Fundamentals of semantics and syntax within the broad frameworks of generative and functional linguistics, including key concepts such as sense reference, utterance, sentence, form and function.

440. Semantics. 4 Hours. Introduction to the theories and methods of semantic analysis. Prerequisite: Ling 405 or consent of the instructor.

453. Dialectology. 4 Hours. Geographical and social variations in language. Prerequisite: Ling 410 or consent of the instructor.

456. Language and Gender. 4 Hours. Same as GWS 456. Examination of current sociolinguistic research and theories on the function of sex categories in linguistic systems and male-female differences in patterns of linguistic usage. Prerequisite: Ling 405 or consent of the instructor.

459. Topics in Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one
section per term. Topics vary. Prerequisite: Consent of the instructor.

474. Psychology of Language. 3 Hours. Same as Comm 454 and Psch 454. Introductory survey of methods, theory, and research; linguistic foundations, history, and present status of the field.

480. Sociolinguistics. 4 Hours. Same as Anth 480. Variations in language that correlate with variation in societies and smaller social groups; interactions of languages and societies. Prerequisite: Ling 405 or consent of the instructor.

483. Methodology of TESOL. 4 Hours. Same as CIE 483. Methods of teaching listening, speaking, reading, and writing to speakers of English as a second or foreign language. Prerequisite: Consent of the instructor.

490. Communication, Culture, and Society. 4 Hours. Same as Comm 490. Analysis of contrastive cultural paradigms (interethnic, gender, class) to develop student's awareness of own socialization and cultural orientation. Prerequisites: Comm 201 and 203, and at least two 300- or 400-level communication courses; or approval of the department.

496. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. S/U grade only. Students are assigned to this course at the discretion of the department. Independent study in an area of linguistics not normally covered by regular course offerings. Prerequisites: 9 hours of linguistics and approval of the head of the department.

506. Cross-Cultural Communication. 4 Hours. Same as Comm 506. Analysis of different theoretical approaches to cross-cultural communication (sociolinguistic, attributional); contrastive analysis of Western and non-Western cultural systems (interactional etiquette, discourse rules).

531. Grammar for TESOL. 4 Hours. Survey of major grammatical structures and patterns as they relate to TESOL instruction.

551. Research Practicum in Ethnography/Sociolinguistics. 4 Hours. Same as Engl 551. May be repeated for a maximum of 12 hours of credit. Conceptualization and implementation of exploratory ethnographic research project. Prerequisite: Engl 485 or previous coursework in ethnographic research.

556. Second Language Learning. 4 Hours. An introduction to research findings and methods in second language learning. Prerequisite: Consent of the instructor.

559. Seminar in Linguistics. 4 Hours. May be repeated for a maximum of 9 hours of credit. Students may register for more than one section per term. Advanced study in linguistics. Topics vary. Prerequisite: Consent of the instructor.

572. Developmental Psycholinguistics. 3 Hours. Same as Comm 524 and Psch 523. Theories, research methods and research findings in the area of language development. Biological, cognitive, and social influence; disorders of language development. Prerequisite: Consent of the instructor.

582. Qualitative Methods in Communication. 4 Hours. Same as Comm 580. Qualitative methods course analyzing language and culture patterns. Prerequisite: Comm 501 or consent of the instructor.

583. Materials and Curriculum Development in TESOL. 4 Hours. Evaluation, adaptation, and development of curricula, syllabi, and materials for TESOL. Prerequisite: Ling 483.

586. Classroom Testing for TESOL. 4 Hours. Theory and practice in the creation and evaluation of classroom tests for TESOL.

594. Internship in TESOL. 1 to 12 Hours. S/U grade only. May be repeated for a maximum of 13 hours of credit. Observation, tutoring, and supervised teaching for teachers of English as a second or foreign language. Prerequisites: Ling 583 and consent of the instructor.

596. Independent Study in Linguistics. 1 to 6 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Students are assigned to this course at the discretion of the department. Independent study and research on a topic other than that approved for a graduate thesis. Prerequisites: Consent of the instructor and approval of the head of the department.

597. Research in Linguistics. 0 to 16 Hours. May be repeated for credit with the approval of the department. A maximum of 4 hours of credit may be applied toward the M.A. in Linguistics degree. S/U grade only. Open only to degree candidates. Independent research in linguistics. Prerequisites: Consent of the instructor and the director of graduate studies.

598. Master's Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Open only to degree candidates. Students engaged in thesis research and writing are assigned to this course at the discretion of the department. Independent research on a topic approved for a graduate thesis. Prerequisites: Consent of the thesis supervisor and approval of the head of the department.

Lithuanian (Lith)

410. Structure of Lithuanian. 4 Hours. Synchronic analysis of the structure of Lithuanian; emphasis on discourse analysis of oral and written texts. Prerequisite: 18 hours of Lithuanian or the equivalent or Ling 405.

425. Translation of Lithuanian Texts. 4 Hours. Problems of translating Lithuanian texts; workshop in translating Lithuanian works into English. Prerequisite: Lith 302 or consent of the instructor.

499. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Graduate students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

510. History of Lithuanian Language. 4 Hours. Development of Lithuanian from its Indo-European origins to the formation of the standard language; the aspects of Lithuanian literary language and its lexical, syntactical and stylistic problems.

515. Lithuanian Linguistics and Poetics. 4 Hours. Linguistic and stylistic analysis of Lithuanian texts based on contemporary theories of style.

545. Lithuanian Renaissance and Baroque Literature. 4 Hours. Lithuanian prose, poetry, and historical works of the sixteenth, seventeenth, and eighteenth centuries.

550. Studies in Lithuanian Romanticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a genre, movement, or topic. Content varies.

560. Studies in Lithuanian Realism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, author, or movement. Content varies.

565. Studies in 20th Century Lithuanian Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, author or movement. Content varies.

570. Studies in Lithuanian Literary Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Function of literary criticism in all epochs of Lithuanian literature.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

Management (Mgmt)

430. Family Business Management. 3 Hours. Competitive strengths/weaknesses of a family business, dynamics of family interactions within the overlapping family, management and ownership systems. Prerequisites: Consent of the instructor. Prior experience in a family business is recommended.

444. Industrial Sociology. 4 Hours. Same as Soc 444. Analysis of industrial society and industrial institutions; the meaning of work and work relations; technology and economic change. Prerequisites: 6 hours of upper-division sociology or management consent of the instructor.

445. Organizational Analysis and Practice. 3 Hours. Emphasis on organizational theories and models to analyze and improve functioning and performance of organization. Structure, technology, environmental adaptation, and managerial control systems are considered. Prerequisite: Mgmt 340.

446. Social Organizations of National Economies. 4 Hours. Same as Soc 446. Economic institutions, organizations, activity, and development in different societies. Demographic, technological, political, international, cultural and social influences on markets, enterprises, labor, land, capital, consumption and distribution. Prerequisite: 6 hours of upper-division sociology, management, economics, or political science; or consent of the instructor.
447. Organizations. 4 Hours. Same as Soc 447. Characteristics of business, government, and not-for-profit organizations; approaches used to study organizations; theoretical and empirical analysis of organizational processes. Prerequisite: 6 hours of upper-division sociology, management, or political science; or consent of the instructor.

452. Organizational Behavior. 3 Hours. Emphasis on understanding and managing people at work. Analysis of individual, group and organization topics including leadership, motivation, attitudes, group dynamics, and organizational culture. Prerequisite: Mgmt 340.

453. Human Resource Management. 3 Hours. Examination of the activities involved in attracting, retaining, and motivating employees. Topics include planning, selection, compensation, performance appraisal, succession, and legal issues. Prerequisites: Mgmt 340 and 350.


455. Entrepreneurship: New Venture Formation. 3 Hours. Same as Mktg 454. Awareness and realistic understanding of the process of starting a new company. Role of the entrepreneur in the economy and society, entrepreneurial characteristics overview and self-evaluation. Prerequisites: Fin 300, Mgmt 340, and Mktg 360 or consent of the instructor.


463. Negotiation and Conflict Resolution. 3 Hours. Strategies and techniques for successful agreement negotiation and business conflict resolution. Includes applications to classic situations such as collective bargaining, interpersonal relations, and stakeholder concerns. Prerequisite: Mgmt 340.

465. Compensation and Reward Systems. 3 Hours. Examination of compensation and reward systems designed to enhance employee motivation and performance. Topics include pay structure design, incentive systems, and benefits. Prerequisites: Mgmt 453 and 454.

466. Managerial Effectiveness Through Diversity. 3 Hours. Management of diverse work forces. Discrimination, affirmative action, career development, socialization and social change policies; history for psychological, sociological, legal and managerial viewpoints. Prerequisite: Mgmt 340.

467. Impact of Technological Change. 3 Hours. Examines the impact of technological change upon the business environment and the managerial process. Emphasis on alternative futures and the planning necessary to attain desired ends. Prerequisites: Mgmt 340 and 350.

470. Career Planning and Development. 3 Hours. Individual and organizational perspectives in career planning. Self-direction, networking, support facilities, and corporate management systems are considered. Prerequisite: Mgmt 340 or the equivalent.

471. Management and Organizational Development. 3 Hours. Strategies for promoting the creativity, flexibility, and productivity of the organization and its management personnel. Readings and case studies from the public and private sectors. Prerequisites: Mgmt 340 and 452 or consent of the instructor.

479. Contemporary Management Philosophies and Practices. 3 Hours. Presentations by business and government executives. Emphasis on problems faced by contemporary senior management and their effects upon the organization. Students make group presentation and case analysis. Prerequisites: Mgmt 340 and 350 or consent of the instructor.

480. Transportation Systems Management. 3 Hours. Provides a fundamental knowledge of problems and practices encountered in the management of transportation systems. Includes impact of public policy, capital facilities, industry structure, costs, operations pricing, and environmental relationships. Prerequisites: Mgmt 340 and 350 or consent of the instructor.

481. Managerial Logistics. 3 Hours. Management of activities governing the flow of materials and products through stages of production and distribution. Includes design of logistical systems and use of mathematical techniques. Prerequisite: IDS 355 or consent of the instructor.

482. Urban Mass Transportation Systems Management. 3 Hours. The managerial, economic, and environmental aspects of urban transit. Includes development, federal role in financing, labor relations, pollution, social benefits, and marketing urban transit. Prerequisites: Mgmt 340 and 350 or consent of the instructor.

483. Transportation and Public Policy. 3 Hours. Relationship between government and transportation in the United States. Topics include the evolution of transport policy, problems in transport regulation, and current issues in public policy. Prerequisite: Mgmt 480 or consent of the instructor.

484. Quality Management in Business. 3 Hours. Managing quality in organizations. The economic quality; analytical tools for quality measurement and control; creating a quality culture; and motivation for quality. Prerequisites: Engl 161, Econ 218, and IDS 270.


494. Special Topics in Management. 3 Hours. Exploration of areas not covered in existing course offerings or study of selected topics in greater depth. Subject matter will vary from semester to semester. Prerequisites: 9 hours of 400-level management courses, or consent of the instructor.

495. Competitive Strategy. 4 Hours. Multidisciplinary analysis of organization strategy and policy, using case method and/or business simulation. Assignments involve extensive library research and oral and written reports. Prerequisite: Consent of the instructor.

499. Independent Study in Management. 1 to 3 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Independent study of an approved topic in management. Prerequisite: Consent of the department head.

502. Entrepreneurship. 4 Hours. No credit given if the student has credit in MBA 510. Same as Mktg 502. Launching new ventures and entrepreneurial companies; components of successful business plans and feasibility studies; perceptual processes of opportunity recognition; entrepreneurial creativity and innovation. Career opportunities. Prerequisites: Actg 500 and Mktg 500 or the equivalent courses.

519. Advanced Seminar in Management. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Advanced seminar devoted to special topics in management. Prerequisite: Consent of the instructor.

540. Organizational Analysis and Practice. 4 Hours. Organizational analysis and applications based on key organization theories; structure, technology, environmental adaptation, management functions and controls, formal and informal organization. Prerequisites: Admission to the MBA or MS in Accounting program.

541. Organizational Behavior. 4 Hours. No credit given if the student has credit in MBA 505. The organization as a social system. Topics include leadership, interpersonal effectiveness, group behavior, managing change, conflict management, motivation and behavior, and interpersonal communications. Prerequisites: Admission to MBA or MS in Accounting program.

552. Human Resource Management. 4 Hours. Human resource management programs and policies. Staffing, training and development; historical evolution of personnel policies, modern labor force and technological trends; supervision, wage and salary administration, human resource research and utilization. Prerequisite: Mgmt 541.

554. Collective Bargaining and Managerial Processes. 4 Hours. Structure and conduct of collective bargaining and the effects of collective representation on the managerial function in public, private, and nonprofit institutions. Prerequisite: Mgmt 541 or the equivalent.

555. Entrepreneurship: New Venture Formation. 4 Hours. Same as Mktg 555. Awareness and understanding of new venture creation and/or acquisition by developing a plan for a business; assessment of personal entrepreneurial potential. Prerequisite: Mgmt 502 or consent of the instructor.

556. Policy Issues in Labor Relations. 4 Hours. Policy issues involving unions in the private and public sector. Includes wage
control, strike substitute procedures, labor law, foreign trade, industry regulations, and worker participation. Prerequisite: Mgmt 554 or the equivalent.

557. International Management. 4 Hours. Management practices and problems in major nations. Legal and cultural factors affecting managerial policies and decisions; organization planning and manpower utilization; comparative management systems and ideologies. Prerequisite: Mgmt 541.

558. Entrepreneurial Electronic Commerce. 4 Hours. Same as Mktg 555. The role of electronic commerce in entrepreneurship; competitive practices, marketing strategies, financing options, creating an e-commerce business plan. Prerequisites: Actg 500 or MBA 501; and Mktg 500 or MBA 506.

563. Seminar: Topics in Collective Bargaining. 4 Hours. Recent developments in both the private and public sectors related to the collective bargaining process. Prerequisite: Mgmt 554.

565. Human Resource Planning and Development. 4 Hours. Analysis of career management and human resource planning and development. Topics include human resource planning programs, appraisal and assessment systems; development strategies, theories and approaches. Prerequisite: Mgmt 553.

566. Human Resource Information Systems. 4 Hours. Utilization in organization settings. Problems of design, user acceptance, implementation, usage, and evaluation of human resource management information systems. Prerequisite: Mgmt 553 or the equivalent.

567. Personnel Administration Law. 4 Hours. Government regulation of the terms and conditions of employment, including equal employment opportunity, unemployment compensation, disability compensation, health and safety, worker privacy and due process. Prerequisite: Mgmt 553.

568. Compensation Administration. 4 Hours. Compensation theory policies and practices, including job analysis and evaluation, compensation surveys, wage and salary structures, merit and incentive compensation employee benefits and pension plans. Prerequisite: Mgmt 553.

569. Seminar: Behavioral Science and Modern Resource Management. 4 Hours. Theories in the behavioral sciences, changes in American organizations and the structures, and approaches of personnel and resource management. Prerequisite: PhD student status or consent of the instructor.

570. Social and Legal Environment of the Firm. 4 Hours. Exploration of current ethical, social, political, technological, economic, and global issues as they relate to business and management in setting goals, making decisions, and creating policy. Prerequisite: Econ 520.

573. Research Methods in Organizational Behavior and Human Resource. 4 Hours. Methodological and industrial design appropriate for research in human resource and relations management, and organizational behavior. Students expected to complete a theoretically based research paper. Prerequisite: Mgmt 569, PhD student status or consent of the instructor.

575. Seminar: Topics in Personnel Practices and Relations. 4 Hours. Relationships among work environment, compensation, unions and workers' performance. Emphasis on legislation affecting employee selection, rewards, and the quality of work life. Prerequisite: Mgmt 569, PhD student status, or consent of the instructor.

576. Behavioral Science Applications in Human Resource Management. 4 Hours. Applies concepts, structures, theories and methods of organizational behavior to develop techniques useful for research and practice at the micro level of human resource management. Prerequisite: Mgmt 569, PhD student status, or consent of the instructor.

577. Employment, Selection, and Placement. 4 Hours. Selection and placement of personnel based on theory and practical approaches. Focus on planning models, current methods, legal considerations. Development of applied skills.

578. Organization and Management Development. 4 Hours. The theories, analytic approaches and skills development needed for introducing organizational change affecting units, task groups and individuals and for establishing good working relationships. Prerequisite: Mgmt 541.

579. Contemporary American and International Management. 4 Hours. Student teams evaluate case studies, present findings and recommendations for business strategies and research corporations of visiting executives, prepare presentations, and critique lectures.

580. Strategic Planning. 4 Hours. The process of strategic planning in complex organizations. Skill in development and evaluation of strategy is facilitated through use of business simulation and case analyses. Prerequisite: Mgmt 541.

581. Administrative Structure and Organizational Design. 4 Hours. An advanced exploration of theories of administrative structure and organizational design. Course topics include: conceptual models; macro, middle and micro level variables and principles and strategies of organizational change and development. Prerequisite: Mgmt 541.

582. Management of Innovation and Technological Change. 4 Hours. Analysis of the role of organization structure and management processes in fostering innovation. Emphasis on issues in research and development, flexible manufacturing, government policy, and technology transfer. Prerequisite: Mgmt 541.

587. Seminar: Topics in Organizational Behavior and Human Resources. 4 Hours. Topics of current research interest in human resource systems and organizational behavior. Emphasis on current issues in published literature and unpublished research. Prerequisite: Mgmt 569, PhD student status, or consent of the instructor.

588. Seminar: Topics in Strategic Management. 4 Hours. Selected topics and current problems in organizational strategy. Research and field work in strategic planning. Application of theory and concepts to problems in strategic management. Prerequisite: Mgmt 541.

589. Seminar: Topics in Human Resource Management. 4 Hours. Recent literature including parameters of the field, system designs and applications, information systems, and studies of work systems, quality of work life, productivity and career management. Prerequisite: Mgmt 569, PhD student status, or consent of the instructor.

590. Seminar in Policy. 4 Hours. Study of strategies and policies that influence the long-term survival, growth, and character of business firms; strategy formulation and implementation in domestic and international organizations. Prerequisite: Enrollment in the final year of the MBA program.

591. Research Apprenticeship. 2 to 4 Hours. May be repeated for credit. S/U grade only. Directed training in conducting research in specific areas of management, and in developing skills related to the research. Prerequisite: Consent of the instructor.

594. Special Topics in Management. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. An intensive study of a selected topic in management. Topics vary by section and by term. Prerequisite: Consent of the instructor.

596. Independent Study in Management. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Independent study under direction of a faculty member. Prerequisite: Consent of the head of the Department of Management.

599. PhD Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Students may register for more than one section per term. Independent research on topic approved for the doctoral dissertation. Prerequisite: Consent of the instructor.

Marketing (Mktg)

452. Principles of Retailing. 3 Hours. Theory and practice in the making of retailing decisions; merchandising policies, buying policies, and activities; pricing policies and practices, promotional policies, credit policies, and practices. Prerequisite: Mktg 360.

454. Entrepreneurship: New Venture Formation. 3 Hours. Same as Mgmt 455. Awareness and realistic understanding of the new venture formations process, role of the entrepreneur in the economy and society, entrepreneurial characteristics overview and self-evaluation. Prerequisites: Fin 300, Mgmt 340, and Mktg 360 or consent of the instructor.

461. Consumer Market Behavior. 3 Hours. Understanding consumer decision processes; steps in decision making, including need recognition, perception, cognition and attitude formation; effect of environmental social, psychological, and individual difference factors on consumer decision making. Prerequisite: Mktg 360 or consent of the instructor.

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
462. Marketing Research. 3 Hours. An investigation of the gathering, analyses and interpretation of information used in solving marketing problems. Prerequisites: Mktg 360.

463. Marketing Channels. 3 Hours. Principles of developing an integrated distribution system; relationship to firm’s marketing structure; evaluation of decisions on sources; evaluation of decisions on raw-material and components, plant and warehouse location, outlets; analysis of products through marketing channels. Prerequisites: Mktg 360. Business administration students must have declared a major, or have received consent of the instructor.

464. Small Business Consulting. 3 Hours. Student teams diagnose and recommend solutions to problems of Chicago-area small businesses with assistance of retired executives and U.S. Small Business Administration personnel. Prerequisites: Econ 218, Fin 300, Mgmt 340, Mgmt 350, Mktg 360, and IDS 355.

465. Marketing Management. 3 Hours. Seminar. Development of marketing plans and programs to achieve the firm’s marketing objectives. Emphasis on individual and group research and presentation of plans from the perspective of the marketing manager. Business case analysis. Prerequisite: 15 hours of marketing.

466. Comparative Marketing Systems. 3 Hours. Treats the topic of domestic marketing systems in other countries, their structures and processes, in a framework of comparative cultural, political, economic, and social systems. Prerequisites: Mktg 360 or consent of the instructor. Business administration students must have declared a major.

469. International Marketing. 3 Hours. How firms sell across international frontiers; problems of product modification, pricing, intercultural communication, preparation for shipment, documentation. Focuses on small firms and multinational corporations. Prerequisite: Mktg 360 or consent of the instructor.

473. The Personal Selling Effort in Marketing. 3 Hours. Analysis of selling strategies and tactics in different situations, problems of managing sales force. Emphasis will be placed on applications of the behavioral sciences. Prerequisite: Mktg 461 or consent of the instructor.

474. Advertising and Sales Promotion. 3 Hours. The management, planning, creation, evaluation, and use of advertising and sales promotion. Prerequisite: Mktg 461 or consent of the instructor.

475. Product Management. 3 Hours. Development and review of new and existing products during their life cycles, the evolution of products and services from a creative idea to their withdrawal from the market. Prerequisite: Mktg 462 or consent of the instructor.

476. Industrial Marketing. 3 Hours. Unique concepts and strategies applied when businesses market to other organizations and institutions. Derived demand, systems selling, bid pricing, national account programs, and using distributors. Prerequisite: Mktg 360 or consent of the instructor.

494. Special Topics in Marketing. 3 Hours. Intensive study of selected problems. Reading assignments from scholarly and professional journals, emphasis on covering relatively few areas in great depth. Prerequisite: Business administration students must have declared a major.

499. Independent Study in Marketing. 3 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Topic and research methodology is to be determined by consultation with the instructor. Prerequisites: Major in marketing. Consent of the head of the department and the instructor must be obtained prior to registration.

500. Introduction to Marketing. 4 Hours. No credit given if the student has credit in MBA 506. Client/consumer behavior and the way institutions respond to such behavior through the planning, pricing, promotion, and distribution of goods and services. Prerequisite: Consent of the instructor.

502. Entrepreneurship. 4 Hours. No credit given if the student has credit in MBA 510. Same as Mgmt 502. Launching new ventures and entrepreneurial companies; components of successful business plans and feasibility studies; perceptual processes of opportunity recognition; entrepreneurial creativity and innovation. Career opportunities. Prerequisites: Actg 500 and Mktg 500 or the equivalent courses.

510. Introduction to Health Care Marketing. 4 Hours. The relevance and workings of marketing in the health care system.
583. Seminar on Marketing Theory. 4 Hours. Emphasis on marketing literature evolution and development of marketing practices that reflect/influence the basic literature. Attention devoted to how other fields have contributed to marketing thought. Prerequisite: Admission to the PhD program in Business Administration.

584. Product Innovation and Development. 4 Hours. An in-depth investigation of the factors affecting the new product strategy of the firm and its management of product innovation. Prerequisite: Admission to the PhD program in Business Administration.

585. Seminar: Topics in Quantitative Models in Marketing. 4 Hours. Formulation of conceptual and quantitative models that relate marketing activities and behaviors to other behaviors or sales or profits. Examines methods that researchers have used to test hypothesized marketing models. Prerequisite: Admission to the PhD program in Business Administration.

586. Advanced International Marketing. 4 Hours. Concepts and problems pertaining to export marketing with emphasis on multinational businesses. Includes product modification, differential pricing, national social and commercial policies, promotion, logistical issues. Prerequisite: Admission to the PhD program in Business Administration.

587. Advanced Marketing Research. 4 Hours. Multi-dimensional scaling, conjoint analysis including hybrid analysis, choice models including multinomial logit and probit models, selectivity models. Prerequisite: Admission into the PhD program in Business Administration.

588. Marketing Communications. 4 Hours. The firm's use of the elements of the promotion mix; advertising, personal selling, sales promotion, publicity and public relations for effective communication with its markets. Prerequisites: Admission to PhD program in Business Administration and consent of the instructor.

589. Services Marketing. 4 Hours. Distinctive aspects of services marketing examined from both a conceptual and managerial perspective with focus on the research fronts and questions in services marketing. Prerequisite: Admission to the PhD program in Business Administration.

591. Pricing Theory and Practice. 4 Hours. Advanced study of pricing concepts and areas of application including price sensitivity, competitive issues and product lines, life cycle, psychological, and legal issues. Prerequisite: Admission to the PhD program in Business Administration.

594. Special Topics—MBA Program. 2 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Independent study under the direction of a faculty member. Prerequisite: Enrollment by petition to the director of the MBA Program.

**Maternal-Child Nursing (NuMC)**

507. Scientific Basis for Women's Health and Perinatal Nursing I. 2 Hours. Same as NuWH 507. Focuses on anatomy, physiology and endocrinology of reproduction, pregnancy, labor and birth as scientific basis for women's health and perinatal nursing. Prerequisite: Consent of the instructor.

508. Scientific Basis for Women's Health and Perinatal Nursing II. 2 Hours. The anatomy, physiology, and genetics of conception, embryonic development, and fetal and neonatal growth and development as scientific basis for women's health and perinatal nursing. Prerequisite: NuMC 507 or consent of the instructor.

510. Advanced Nursing Care of the Well Infant, Child, and Adolescent. 3 Hours. Emphasizes prevention, health promotion and maintenance for all childhood age groups through teaching, counseling, guidance and support of children and their families. Prerequisite: Credit or concurrent registration in NuSc 530 or consent of the instructor.

511. Primary Care Management of Acute/Chronic Conditions in Childhood. 3 Hours. Emphasizes clinical decision making and management of acute episodic illnesses and stable chronic illnesses commonly encountered in pediatric ambulatory health care settings. Prerequisite: Credit or concurrent registration in NuSc 530 and NuSc 531, or consent of the instructor.

512. Practicum in Advanced Pediatric Primary Care I. 1 to 6 Hours. May be repeated for credit. Emphasizes clinical experiences in prevention, health promotion and maintenance through teaching, counseling, guidance and support of children and their families. Prerequisites: Credit or concurrent registration in NuMC 510 and in NuSc 532, or consent of the instructor.

513. Practicum in Advanced Pediatric Primary Care II. 1 to 6 Hours. May be repeated for credit. Emphasizes clinical experiences and management of acute episodic and stable chronic illnesses commonly encountered in pediatric ambulatory health care settings. Prerequisite: Credit or concurrent registration in NuMC 512 or consent of the instructor.

514. Practicum in Advanced Pediatric Primary Care III. 1 to 6 Hours. May be repeated for credit. Emphasizes clinical experiences that integrate prevention, health promotion and maintenance, and clinical management of acute episodic and stable chronic illnesses commonly encountered in pediatric ambulatory health care settings. Prerequisite: Credit or concurrent registration in NuMC 513 or consent of the instructor.

515. Advanced Parent-Infant Nursing. 3 Hours. Examines the process of parenting in low-risk and at-risk populations, and health status and behavior of the neonate. Prerequisite: NuMC 508 or consent of the instructor.

516. Advanced Nursing Care of Perinatal and Pediatric Health Problems. 4 Hours. Integration of theory and research into the management/care of selected clinical problems in maternal-child populations. Prerequisite: NuMC 508 or NuSC 530 or the equivalent.

517. Health Care of Women I. 5 Hours. Same as NuWH 517. Health care of women from adolescence to senescence with emphasis on human sexuality, control of fertility, sexually transmitted diseases, and antepartum care. Prerequisite: Credit or concurrent registration in NuMC 508 or consent of the instructor.

518. Health Care of Women II. 5 Hours. Same as NuWH 518. Health care of women from adolescence to senescence with emphasis on intrapartum, postpartum, common gynecologic problems, and management of other common conditions. Prerequisite: NuMC 517 or consent of the instructor.


521. Practicum in Advanced Maternal-Child Nursing II. 3 Hours. Advanced nursing assessment and management of a selected
481. **Computational Geometry.** 4 Hours. Algorithmic problems on sets of points, rectangles, intervals, arcs, chords, polygons. Counting, reporting, location, intersection, pairing; static and dynamic data structures. Prerequisite: Grade of C or better in MCS 401 or consent of instructor.

492. **Special Topics in Computer Science.** 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Topics in mathematical computer science, such as symbolic computation, automated reasoning, cryptography or geometric algorithms. Prerequisite: Approval of the department.

496. **Independent Study.** 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading course supervised by a faculty member. Prerequisites: Approval of the instructor and the department.


503. **Mathematical Methods for Algorithm Analysis.** 4 Hours. Discrete mathematical techniques useful in algorithm analysis: summation methods, floor/ceiling expressions, modular arithmetic techniques, harder binomial identities, special numbers, generating functions, asymptotics. Prerequisites: Grade of C or better in MCS 401 and MCS 421.

504. **Mathematics and Information Science for Industry Workshop.** 4 Hours. May be repeated for credit. Students may register for more than one section per term. A project-based course on one or more advanced-topics in applied mathematics, statistics, or computer science, motivated by industrial problems. The topics vary from year to year. Prerequisites: a grade of B or better in MCS 401, 471 and 507.

507. **Mathematical, Statistical, and Scientific Software.** 4 Hours. The design, analysis, and use of mathematical, statistical, and scientific software. Prerequisite: A grade of B or better in MCS 360 or an equivalent course; or consent of the instructor.

521. **Combinatorial Optimization.** 4 Hours. Combinatorial optimization: network flows, bipartite matching, Edmonds algorithm for non-bipartite matching, the matching polytope, matroids, greedy algorithms, matroid union and intersection algorithms, matroid polyhedra, polymatroids. Prerequisites: MCS 423 and Stat 471.

531. **Error-Correcting Codes.** 4 Hours. Finite fields, cyclic codes, quadratic residue codes, BCH codes, decoding schemes. Reed-Muller codes, weight distributions, codes and designs. Prerequisites: Grade of C or better in MCS 261, and in Math 310 or Math 330.

541. **Computational Complexity.** 4 Hours. Time and space complexity of computations, classification of math problems according to their computational complexity, P vs. NP problem. Prerequisite: Consent of the instructor.

542. **Theory of Computation II.** 4 Hours. Undecidability and computational complexity. Complexity measures for Turing machines, sorting, searching, graph computations, pattern matching, NP-complete problems. Prerequisites: Grade of C or better in Stat 301 and ECS 360; or CS 306.

411. **Compiler Design.** 4 Hours. Same as CS 473. Language translation: lexical analysis, parsing schemes, symbol table management, syntax and semantic error detection, and code generation. Development of fully-functional compiler. Prerequisites: Grade of C or better in either CS 361 or MCS 441, and in either CS 360 or MCS 360 and CS 365.

415. **Programming Language Design.** 4 Hours. Same as CS 473. Language translation: lexical analysis, parsing schemes, symbol table management, syntax and semantic error detection, and code generation. Development of fully-functional compiler. Prerequisites: Grade of C or better in either CS 361 or MCS 441, and in either CS 360 or MCS 360 and CS 365.

421. **Combinatorics.** 4 Hours. The pigeonhole principle, permutations and combinations, generating permutations and combinations, binomial coefficients, inclusion-exclusion principle, recurrence relations and generating functions, special counting sequences, Polya theory of counting. Prerequisites: Grade of C or better in MCS 261 or EECS 360; and in Math 310 or 320 or 330.

423. **Graph Theory.** 4 Hours. Basic concepts of graph theory including Eulerian and hamiltonian cycles, trees, coloring, connectivity, shortest paths, minimum spanning trees, network flows, bipartite matching, planar graphs. Prerequisites: Grade of C or better in MCS 261 or EECS 360; and in Math 310 or 320 or 330.

425. **Codes and Cryptography.** 4 Hours. Mathematics of communications theory, basic information theory necessary to understand both coding theory and cryptography; basic ideas and highlights for both coding theory and cryptography, including public-key cryptosystems. Prerequisites: Grade of C or better in MCS 261 or EECS 360; and in Math 310 or 320 or 330.

441. **Theory of Computation I.** 4 Hours. Introduction to formal languages; relations between grammars and automata; elements of the theory of computable functions. Prerequisite: Grade of C or better in MCS 261 or EECS 360.

451. **Object-Oriented Programming in C++.** 4 Hours. No credit given if the student has credit in CS 474. C++ as an object-oriented language, classes and member functions, access control, class scope, constructors, destructors, overloading, conversions, streams, derived classes, polymorphism through virtual functions, templates, class libraries. Extensive computer use required. Prerequisite: Grade of C or better in MCS 360 or the equivalent; or consent of the instructor.

471. **Numerical Analysis.** 4 Hours. Introduction to numerical analysis; floating point arithmetic, computational linear algebra, iterative solution to nonlinear equations, interpolation, numerical integration, numerical solution of ODEs, computer subroutine packages. Prerequisite: Grade of C or better in MCS 275 or in EECS 170 or in EECS 171; or consent of the instructor.
563. Analytic Symbolic Computation. 4 Hours. Analytic computation, including integration algorithms, differential equations, perturbation theory, mixed symbolic-numeric algorithms and other related topics. Prerequisites: Grade of C or better in MCS 460 or the equivalent, and Math 480 or consent of the instructor.

565. Mathematical Theory of Databases. 4 Hours. Abstract systems for databases, syntax and semantics of operational languages, dependencies and normal forms, axiomizations, queries and query optimization, null values, algebraic interpretations. Prerequisite: Consent of the instructor.


572. Introduction to Supercomputing. 4 Hours. Introduction to supercomputing on vector and parallel processors; architectural comparisons, parallel algorithms, vectorization techniques, parallelization techniques, actual implementation on real machines. Prerequisites: MCS 471 or 571, or consent of the instructor.

575. Computer Performance Evaluation. 4 Hours. Modeling of computer systems, basic queues, central server models, Little's Law, operational analysis, Markovian networks, Jackson and BCMP networks, product form solutions, computational algorithms, mean value analysis, approximation methods. Prerequisites: Stat 401 and MCS 412, or consent of instructor.

590. Advanced Topics in Computer Science. 4 Hours. Students may register for more than one section per term. Topics in areas such as: mathematical aspects of artificial intelligence, symbolic methods in mathematics, mathematical cryptography, automated reasoning. Topics may vary from term to term. Prerequisite: Approval of the department.

591. Advanced Topics in Combinatorial Theory. 4 Hours. May be repeated for credit. Some of the following topics: combinatorial enumeration, designs, graph theory, matroid theory, combinatorial matrix theory, Ramsey theory. Contents vary from year to year. Prerequisites: MCS 423.

592. Advanced Topics in Error-Correcting Codes. 4 Hours. Topics of current interest in coding theory including codes which are of practical value and which shed light on various mathematical areas. Prerequisites: MCS 531, or consent of instructor.

593. Graduate Student Seminar. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. For graduate students who wish to receive credit for participating in learning seminar whose weekly time commitment is not sufficient for a reading course. This seminar must be sponsored by a faculty member. Prerequisite: Approval of the department.

595. Graduate Seminar. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Current developments in research with presentations by faculty, students, and visitors. Prerequisite: Approval of the department.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading course sponsored by a faculty member. Prerequisites: Approval of the instructor and the department.

597. MISI Master's Project. 2 to 4 Hours. May be repeated for a maximum of 4 hours of credit. S/U grade only. Specialized project under close faculty supervision to satisfy the project requirement for the MS degree in Mathematics and Information Science for Industry. Prerequisites: MCS 504 and approval of the department.

598. Master's Thesis. 0 to 16 Hours. S/U grade only. Research work under the supervision of a faculty member leading to the completion of a master's thesis. Prerequisites: Approval of the department.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Prerequisite: Approval of the department.

Mathematics (Math)

410. Advanced Calculus I. 4 Hours. Functions of several variables, differentials, theorems of partial differentiation. Calculus of vector fields, line and surface integrals, conservative fields, Stokes' and divergence theorems. Cartesian tensors. Prerequisite: Grade of C or better in Math 210.

411. Advanced Calculus II. 4 Hours. Implicit and inverse function theorems, transformations, Jacobians. Point-set theory. Sequences, infinite series, convergence tests, uniform convergence. Improper integrals, gamma and beta functions, Laplace transform. Prerequisite: Grade of C or better in Math 410.

413. Analysis I. 4 Hours. The real number system, continuous functions, differentiability, the Riemann integral. Prerequisite: Grade of C or better in Math 215 or consent of the instructor.

414. Analysis II. 4 Hours. Sequences and series of functions. Uniform convergence. Taylor's theorem. Real valued functions of several variables, curves and vector fields, line and surface integrals. Prerequisite: Grade of C or better in Math 413.

417. Complex Analysis with Applications. 4 Hours. Complex numbers, analytic functions, complex integration, Taylor and Laurent series, residue calculus, branch cuts, conformal mapping, argument principle, Rouche's theorem, Poisson integral formula, analytic continuation. Prerequisite: Grade of C or better in Math 210.

419. Models in Applied Mathematics. 4 Hours. Introduction to mathematical modeling; scaling, graphical methods, optimization, computer simulation, stability, differential equation models, elementary numerical methods, applications in biology, chemistry, engineering and physics. Prerequisites: Grade of C or better in Math 220 and in MCS 260.


425. Linear Algebra II. 4 Hours. Canonical forms of a linear transformation, inner product spaces, spectral theorem, principal axis theorem, quadratic forms, special topics such as linear programming. Prerequisite: Grade of C or better in Math 320.

427. Analysis in Several Variables. 4 Hours. Properties of Cartesian n-space the derivative, inverse and implicit function theorems, extrema, line integrals, vector calculus theorems, change of variables, differential forms, generalized Stokes' theorem. Prerequisites: Grade of C or better in Math 320, and one course from Math 410, 411, 413, 414.

430. Formal Logic I. 4 Hours. Credit is not given for both Mathematics 430 and Philosophy 416. First order logic, syntax and semantics, completeness-incompleteness. Prerequisite: Grade of C or better in MCS 261 or Math 320 or ECECS 360.

435. Foundations of Number Theory. 4 Hours. Primes, divisibility, congruences, Chinese remainder theorem, primitive roots, quadratic residues, quadratic reciprocity, and Jacobi symbols. The Euclidean algorithm and strategies of computer programming. Prerequisite: Grade of C or better in Math 210.


440. Introduction to Higher Geometry. 4 Hours. Projective geometry, as an extension of Euclidean geometry, treated synthetically and/or algebraically. Desargues' and Pappus' theorems, subgeometries, conics, and the underlying skew field. Prerequisites: Grade of C or better in Math 425 and 330.

442. Differential Geometry of Curves and Surfaces. 4 Hours. Frenet formulas, isoperimetric inequality, local theory of surfaces, Gaussian and mean curvature, geodesics, parallelism, and the Gauss-Bonnet theorem. Prerequisites: Grade of C or better in either Math 410 or 427; and Math 320.

445. Introduction to Topology I. 4 Hours. Elements of topology chosen from the following: advanced point set topology, piecewise linear topology, fundamental group and knots, differential topology, applications to physics and biology. Prerequisite: Grade of C or better in Math 410 or 413.

446. Introduction to Topology II. 4 Hours. Topics in topology chosen from the following: advanced point set topology, piecewise linear topology, fundamental group and knots, differential topology, applications to physics and biology. Prerequisite: Grade of C or better in Math 445.

480. Applied Differential Equations. 4 Hours. Linear first-order systems. Numerical methods. Nonlinear differential equations and
517. Second Course in Abstract Algebra II. 4 Hours.
Rings and algebras, polynomials in several variables, power series rings, tensor products, field extensions, Galois theory, Wedderburn theorems. Prerequisite: Math 516.

518. Representation Theory. 4 Hours.
Major areas of representation theory, including structure of group algebras, Wedderburn theorems, characters and orthogonality relations, idempotents and blocks. Prerequisites: Math 517.

519. Algebraic Groups. 4 Hours.
Classical groups as examples; necessary results in algebraic geometry: structure and classification of semisimple algebraic groups. Prerequisite: Math 517.

520. Homological Algebra. 4 Hours.
Modules, categories and functors, derived functors, the Kunneth formula, cohomology of groups, cohomology of algebras, spectral sequences and their applications, selected topics. Prerequisites: Math 516.

530. Advanced Topics In Number Theory. 4 Hours.
May be repeated for credit. Students may register for more than one section per term. Subject may vary from semester to semester. Topics may include Elliptic functions, L-functions, modular forms. Prerequisite: Approval of the department.

531. Advanced Topics In Algebra. 4 Hours.
Students may register for more than one section per term. Research-level topics such as groups and geometries, equivalences of module categories, representations of Lie-type groups. Prerequisite: Approval of the department.

532. Advanced Topics In Finite Groups. 4 Hours.
Students may register for more than one section per term. Major areas of finite group theory, including permutation and linear representations, classical and sporadic groups, local methods and classification results. Prerequisite: Math 517.

533. Real Analysis I. 4 Hours.
Introduction to real analysis. Lebesgue measure and integration, differentiation, L-p classes, abstract integration. Prerequisite: Math 411 or 414 or the equivalent.

534. Real Analysis II. 4 Hours.
A continuation of Math 533. Prerequisite: Math 417.

535. Complex Analysis I. 4 Hours.

536. Complex Analysis II. 4 Hours.
Normal families, Riemann mapping theorem. Analytic continuation, harmonic and subharmonic functions, Picard theorem, selected topics. Prerequisite: Math 535.

537. Introduction to Harmonic Analysis I. 4 Hours.
Fourier transform on L(p) spaces, Wiener's Tauberian theorem, Hilbert transform, Paley Wiener theory. Prerequisites: Math 533 and either Math 535 or Math 417.

538. Introduction to Harmonic Analysis II. 4 Hours.
An introduction to the theory of singular integrals, and H(p) spaces. Prerequisite: Math 537 or consent of the instructor.

539. Functional Analysis I. 4 Hours.
Topological vector spaces, Hilbert spaces, Hahn-Banach theorem, open mapping, uniform boundedness principle, linear operators in a Banach space, compact operators. Prerequisite: Math 533.

540. Functional Analysis II. 4 Hours.

541. Partial Differential Equations I. 4 Hours.
Theory of distributions; fundamental solutions of the heat equation, wave equation, and Laplace equation. Harmonic functions. Cauchy problem for the wave equation. Prerequisite: Math 417.

542. Partial Differential Equations II. 4 Hours.

544. Advanced Topics In Analysis. 4 Hours.
Students may register for more than one section per term. Subject may vary from semester to semester. Topics include partial differential equations, several complex variables, harmonic analysis and ergodic theory. Prerequisite: Approval of the department.

547. Algebraic Topology I. 4 Hours.
The fundamental group and its applications, covering spaces, classification of compact surfaces, introduction to homology, development of singular homology theory, applications of homology. Prerequisites: Math 330 and 445.
548. Algebraic Topology II. 4 Hours. Cohomology theory, universal coefficient theorems, cohomology products and their applications, orientation and duality for manifolds, homotopy groups and fibrations, the Hurewicz theorem, selected topics. Prerequisite: Math 547.

549. Differentiable Manifolds I. 4 Hours. Smooth manifolds and maps, tangent and normal bundles, Sard's theorem and transversality, embedding, differential forms, Stokes' theorem, degree theory, vector bundles. Prerequisite: Math 545.

550. Differentiable Manifolds II. 4 Hours. Vector bundles and classifying spaces, Lie groups and Lie algebras, tensors, Hodge theory, Poincare duality. Topics from elliptic operators, Morse theory, cobordism theory, deRham theory, characteristic classes. Prerequisite: Math 549.

551. Riemannian Geometry. 4 Hours. Riemannian metrics and Levi-Civita connections, geodesics and completeness, curvature, first and second variation of arc length, comparison theorems. Prerequisites: Math 442 and 549.

552. Algebraic Geometry I. 4 Hours. Basic commutative algebra, affine and projective varieties, regular and rational maps, function fields, dimension and smoothness, projective curves, schemes, sheaves, and cohomology, positive characteristic.

553. Algebraic Geometry II. 4 Hours. Divisors and Linear systems, differentials, Riemann-Roch theorem for curves, elliptic curves, geometry of curves and surfaces. Prerequisite: Math 552.

554. Complex Manifolds I. 4 Hours. Holomorphic functions in several variables, Riemann surfaces, Sheaf theory, vector bundles, Stein manifolds, Cartan theorem A and B, Grauert direct image theorem. Prerequisites: Math 517 and 535.

555. Complex Manifolds II. 4 Hours. Dolbeault Cohomology, Serre duality, Hodge theory, Kadaira vanishing and embedding theorem, Lefschitz theorem, Complex Tori, Kahler manifolds. Prerequisites: Math 517 and 535.

556. Topics In Algebraic Topology. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Homotopy groups and fibrations. The Serre spectral sequence and its applications. Classifying spaces of classical groups. Characteristic classes of vector bundles. Prerequisite: Math 548 or consent of the instructor.

559. Advanced Topics In Geometric and Differential Topology. 4 Hours. Topics from areas such as index theory, Lefschetz theory, cyclic theory, KK theory, non-commutative geometry, 3-manifold topology, hyperbolic manifolds, geometric group theory, and knot theory. Prerequisite: Approval of the department.

570. Advanced Topics In Differential Geometry. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Subject may vary from semester to semester. Topics may include eigenvalues in Riemannian geometry, curvature and homology, partial differential relations, harmonic mappings between Riemannian manifolds, hyperbolic geometry, arrangement of hyperplanes. Prerequisite: Approval of the department.

571. Advanced Topics In Algebraic Geometry. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Various topics such as algebraic curves, surfaces, higher dimensional geometry, singularities theory, moduli problems, vector bundles, intersection theory, arithmetical algebraic geometry, and topologies of algebraic varieties. Prerequisite: Approval of the department.

572. Advanced Topics In Geometric Analysis. 4 Hours. Topics drawn from areas such as potential theory, Schauder estimates, maximum principles, Dirichlet problem, quasilinear elliptic equations. Prerequisite: Approval of the department.

573. Methods of Applied Mathematics. 4 Hours. Applications of applied mathematics, integral equations, eigenfunction expansions, calculus of variations, fluid flow and conformal mapping, special functions, Laplace, Mellin, and Hankel transforms, approximations. Prerequisite: Math 417 and 481, or consent of the instructor.

574. Applied Optimal Control. 4 Hours. Introduction to optimal control theory; calculus of variations, maximum principle, dynamic programming, feedback control, linear systems with quadratic criteria, singular control, optimal filtering, stochastic control. Prerequisite: Math 411 or 427, or consent of the instructor.

575. Integral Equations and Applications. 4 Hours. Fredholm and Volterra equations, Fredholm determinants, separable and symmetric kernels, Neumann series, transform methods, Wiener-Hopf method, Cauchy kernels, nonlinear equations, perturbation methods. Prerequisite: Math 411 and 417 and 481, or consent of the instructor.

576. Boundary Value Problems. 4 Hours. Distributions, Green's functions, alternative theorem, regular and singular Sturm-Liouville problems, spectral theory, potential method, method of images, complex variable methods, equations of evolution. Prerequisites: Math 320 and 417 and 481, or consent of the instructor.

577. Advanced Applied Partial Differential Equations. 4 Hours. Quasilinear and nonlinear first order PDE's, shock solutions, second order equations, cylinder and sphere problems, Wave, Laplace and diffusion equations, maximum principles, nonlinear wave motion. Prerequisites: Math 410 and 417 and 481.

578. Asymptotic Methods. 4 Hours. Asymptotic series, Laplace's method, stationary phase, steepest descent method, Stokes phenomena, uniform expansions, multi-dimensional Laplace integrals, Euler-Maclaurin formula, irregular singular points, WKBJ method. Prerequisites: Math 417 and 481, or consent of the instructor.

579. Singular Perturbations. 4 Hours. Algebraic and transcendental equations, regular perturbation expansions of differential equations, matched asymptotic expansions, boundary layer theory. Poincare-Lindstedt, multiple scales, bifurcation theory, homogenization. Prerequisite: Math 481 or consent of the instructor.

580. Mathematics of Fluid Mechanics. 4 Hours. Development of concepts and techniques used in mathematical models of fluid motions. Euler and Navier Stokes equations. Vorticity and vortex motion. Waves and instabilities. Viscous fluids and boundary layers. Asymptotic methods. Prerequisites: Grade of C or better in Math 410 and Grade of C or better in Math 417 and Grade of C or better in Math 481.

581. Physical Principles of Applied Mathematics II. 4 Hours. Development of concepts and techniques basic to key mathematical models of physical phenomena; dynamic problems in elasticity, fluids, nonlinear wave propagation, group speed and velocity. Prerequisite: Math 580.

582. Wave Propagation and Scattering I. 4 Hours. Solutions of wave equations in multiple dimensions, vector, and dyadic waves; separable and nonseparable problems. Representations: Green's function integrals, complex integrals, spectral representations. Approximate solutions. Prerequisites: Math 417 and 481; or consent of the instructor.

583. Wave Propagation and Scattering II. 4 Hours. Solutions of reduced wave equations for scattering of scalar, vector, and dyadic waves; separable and nonseparable problems. Representations: Green's function integrals, complex integrals. Various approximations. Prerequisite: Math 582.

584. Applied Stochastic Models. 4 Hours. Applications of stochastic models in mathematical models, biology, queuing, filtering, and stochastic control, diffusion approximations, Brownian motion, stochastic calculus, stochastically perturbed dynamical systems, first passage times. Prerequisite: Stat 401 and Math 417 and 481, or consent of the instructor.

585. Applied Deterministic Models. 4 Hours. Applications of deterministic models in biology, chemistry, economics, mechanics and physics. Topics include population dynamics, chemical kinetics, resource optimization, mechanical vibrations and traffic flow. Prerequisite: Math 481 or consent of the instructor.

586. Computational Finance. 4 Hours. Introduction to the mathematics of financial derivatives; options, asset price random walks, Black-Scholes model; partial differential equations for option valuation, binomial models, numerical methods; exotic options, interest-rate derivatives. Prerequisites: Grade of C or better in Math 220 and Grade of C or better in Stat 381; or consent of the instructor.

589. Teaching and Presentation of Mathematics. 2 Hours. No graduation credit awarded for students enrolled in the Master of Science in the Teaching of Mathematics degree program. Required for teaching assistants in MSCS. Strategies and techniques for effective teaching in college and for mathematical consulting. Observation and evaluation, classroom management, presenting mathematics in multidisciplinary research teams.

590. Advanced Topics in Applied Mathematics. 4 Hours. Topics from areas such as: elastic scattering, nonlinear...
problems in chemistry and physics, mathematical biology, stochastic optimal control, geophysical fluid dynamics, stability theory, queueing theory. Prerequisite: Approval of the department.

591. Seminar on Mathematics Curricula. 4 Hours. Examination of research and reports on mathematics curricula. Analysis of research in teaching and learning mathematics. Development of using technology in mathematics teaching. Prerequisite: Enrollment in Doctor of Arts program in mathematics or consent of the instructor.

592. Seminar on Mathematics: Philosophy and Methodology. 4 Hours. Problems related to teaching and learning mathematics. Analysis of work of Piaget, Gagné, Bruner, Ausabel, Freudenthal, and others and their relation to mathematics teaching. Prerequisite: Enrollment in Doctor of Arts program in mathematics, or consent of the instructor.

593. Graduate Student Seminar. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. For graduate students who wish to receive credit for participating in a learning seminar whose weekly time commitment is not sufficient for a reading course. This seminar must be sponsored by a faculty member. Prerequisite: Approval of the department.

594. Internship in Mathematics. 0 to 8 Hours. May be repeated for credit. Students may register for a maximum of 8 hours of credit. S/U grade only. Only 4 credit hours count toward the 32 credit hours required for the MS in MthT degree. Does not count toward the 12 credit hours of 500-level courses required. Under the direction of a faculty advisor, students work in government or industry on problems related to their major field of interest. At the end of internship, the student must present a seminar on the internship experiences. Prerequisites: Completion of the core courses in the degree program in which the student is enrolled and approval of the internship program by the graduate adviser and the Graduate Studies Committee.

595. Research Seminar. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Current developments in research with presentations by faculty, students, and visitors. Prerequisite: Approval of the department.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading course supervised by a faculty member. Prerequisites: Approval of the instructor and the department.

598. Master's Thesis. 0 to 16 Hours. S/U grade only. Research work under the supervision of a faculty member leading to the completion of a master's thesis. Prerequisite: Approval of the department.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Prerequisite: Approval of the department.

Mathematics Teaching (MthT)

400. Methods of Teaching Secondary Mathematics I. 4 Hours. To be taken in the year prior to student teaching. Philosophies, issues, techniques, and styles of teaching high school mathematics. Implications of psychological models. Mathematics in the evolving curriculum. Preparation of lessons. Prerequisite: Grade of C or better in MthT 410, good academic standing in the MS in the Teaching of Mathematics program in Secondary Mathematics Education; and a 2.50 grade point average in mathematics courses at the level of calculus or above.

401. Methods of Teaching Secondary Mathematics II. 4 Hours. To be taken in the year prior to student teaching. Philosophies, issues, techniques and styles of teaching high school mathematics. Preparation of diverse lessons. Supervised teaching experience. Prerequisite: Grade of C or better in Math 210, and enrollment in the MS in the Teaching of Mathematics program in Secondary Mathematics Education; and a 2.50 grade point average in mathematics courses at the level of calculus or above.

410. Advanced Euclidean Geometry I. 4 Hours. A transformational approach to the geometry of the Euclidean plane is developed through the use of specific activities. Prerequisite: Grade of C or better in Math 210.

411. Advanced Euclidean Geometry II. 4 Hours. Axioms for Euclidean geometry are developed based upon reflections. Further concepts in Euclidean geometry which arise from these axioms are explored. Prerequisite: Grade of C or better MthT 410.

420. Methods of Structured Programming I. 4 Hours. Structured programming teaching aids such as Karel the Robot and ELANO, data types, control structures, procedures, functions, efficiency of algorithms, arrays and recursion. Prerequisite: Grade of C or better in Math 210.

430. Mathematical Analysis for Teachers I. 4 Hours. Basic properties of numbers, functions, graphs, limits, continuity, completeness of the system of real numbers. Prerequisites: Grade of C or better in Math 210, or consent of the instructor.

435. Abstract Algebra. 4 Hours. For students in the Master of Science in the Teaching of Mathematics program only. Other students enroll in Math 330. Sets, properties of integers, groups, rings, fields. Prerequisites: A grade of C or better in Math 210, and enrollment in the MS in the Teaching of Mathematics.

438. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: 2.50 grade point average in mathematics courses at the level of calculus or above, successful completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

439. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Credit or concurrent registration in MthT 438, and approval of the department, and a 2.50 grade point average in mathematics courses at the level of calculus or above, and successful completion of 100 clock hours of pre-student-teaching field experiences.

450. Concepts in Elementary School Mathematics I. 4 Hours. For elementary school teachers. Advanced analysis of concept development and teaching methods. Sorting, classifying, counting, number tracks, addition, subtraction, group, place value, length, area, and alternative teaching strategies. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the instructor.

453. Geometric Measurement and Numerical Methods. 4 Hours. Do not purchase a calculator for the course until after the first day of class. Classical problems of length, area, and volume, including numerical trigonometry, are explored using a scientific calculator. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the instructor.

455. Teaching Algebra for Understanding. 4 Hours. Manipulative and other representations of mathematical concepts used for teaching algebra to middle grade students. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the instructor.

456. Introduction to Calculus and the Graphing Calculator. 4 Hours. Problem solving using derivatives, differentials, and their applications followed by integrals and their applications. Maximum-minimum problems solved directly by graphing, then by derivatives. Prerequisite: Admission to the Mathematics Education Concentrators Program or consent of the instructor.

457. Introduction to Number Theory with Application. 4 Hours. Classical topics of elementary number theory and how they pertain to teaching the upper grades. Primes, GCF, LCM, divisibility, floor and ceiling functions, Gaussian Residue, lattices. Prerequisite: Admission to the Mathematics Education Concentrators Program or consent of the instructor.

468. Geometry with Applications for Middle Grade Teachers. 4 Hours. Plane and solid figures and their properties. Polygons and polyhedra. Euler's formula. Volume versus surface area. Spacial visualization; two-dimensional representations of three-dimensional figures. Prerequisite: Admission to the Mathematics Education Concentrators Program or consent of the instructor.

470. Teaching Mathematics with Science: An Activity Approach I. 4 Hours. For elementary school teachers. Introduction to basic variables (length, area, volume, mass, time) and the Scientific Method (picture, table, graph, questions). Extensive use of TIMS project curriculum. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the instructor.

480. Microcomputers in Elementary School Mathematics I. 4 Hours. For elementary school teachers.
Introduction to microcomputers and their use in elementary school mathematics. Basic microcomputer functions, educational software programs, pedagogical and curricular implications, and implementation questions. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the instructor.

490. Topics in Teaching Secondary Mathematics. 1 to 5 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which it is given. Prerequisites: May vary according to topic.

491. Topics in Teaching Elementary/Junior High School Mathematics. 1 to 5 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which it is given. Prerequisites: May vary according to topic.

496. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading course supervised by a faculty member. Prerequisite: Approval of the instructor and the department.

510. Introduction to Higher Geometry. 4 Hours. For graduate students in mathematics teacher education programs. Other students enroll in Math 440. Projective geometry, as an extension of Euclidean geometry, treated synthetically and/or algebraically. Desargues’ and Pappus’ theorems, subgeometries, conics and the underlying skew field. Prerequisites: Grade of C or better in Math 425 and 330.

530. Mathematical Analysis for Teachers II. 4 Hours. Derivatives, inverse functions, Riemann integral, trigonometric functions, logarithmic and exponential functions. Prerequisite: A grade of C or better in MTH 430, or consent of the instructor.

550. Concepts in Elementary School Mathematics II. 4 Hours. Directed numbers, addends, changing units, and accuracy, units of measurement, decimal and common fractions, and mixed numbers. Prerequisite: MTH 450 or consent of the instructor.

560. Introduction to Analytic Geometry and Calculus. 4 Hours. For elementary school teachers. Do not purchase a calculator until after the first day of class. Programmable calculators used to investigate ideas and applications of analytic geometry, differential and integral calculus. Examples and ideas relevant to elementary mathematics and science curricula. Prerequisite: MTH 460 or consent of the instructor.

565. Teaching Geometry: An Activity Approach. 4 Hours. Informal geometry using manipulatives, elementary topological concepts, polygons, polyhedra, metric geometry, motion geometry, geometric constructions, spherical geometry, introduction to research on the learning of geometry. For elementary school teachers. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the instructor.

570. Teaching Mathematics with Science: An Activity Approach II. 4 Hours. Continues MTH 470. Cartesian coordinates, nonlinear functions, more complex analytic techniques, work, laws of motion, energy, electricity, use of microcomputers in data manipulation and analysis. Extensive use of TIMS project curriculum. Prerequisite: MTH 470 or consent of the instructor.

575. Principles of Probability and Statistics. 4 Hours. For elementary school teachers. Probability, descriptive and inferential statistics, implications for teaching. Emphasis on collection and analysis of data, classroom activities and software. Prerequisite: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers), or consent of the department.

580. Microcomputers in Elementary School Mathematics. 4 Hours. Continues MTH 480. For elementary school teachers. Microcomputer functions, graphics and problem-solving, evaluation of software, additional uses of computers as an instructional tool. Prerequisite: MTH 480.

589. Practicum in Teaching Elementary School Mathematics. 4 Hours. Culminating experience for students in the MS in the Teaching of Mathematics program (option for elementary school teachers). Major project is required. Supervised weekly seminars. Prerequisites: Admission to the MS in the Teaching of Mathematics program (option for elementary school teachers) and consent of the instructor.

590. Topics in Teaching Secondary Mathematics. 1 to 5 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which it is given. Prerequisites: May vary according to topic.

591. Topics in Teaching Elementary/Junior High School Mathematics. 1 to 5 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which it is given. Prerequisites: May vary according to topic.

592. Topics in Advanced Mathematics for Teachers. 1 to 5 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which it is given. Prerequisites: May vary according to topic.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Reading course supervised by a faculty member. Prerequisite: Approval of the instructor and the department.

Mechanical Engineering (ME)

401. Applied Stress Analysis I. 4 Hours. Complex bending and torsion, curved flexural members, energy methods in design, theories of failure. Prerequisite: CEMM 203.

403. Introduction to Composite Material Design. 4 Hours. Micromechanics and macromechanics of composites, strength theory; analysis, design, and manufacturing techniques. Engineering applications. Prerequisite: ME 401.

408. Intermediate Vibration Theory. 4 Hours. Free and forced vibrations of multi-degree of freedom linear systems. Lagrangian dynamics, matrix, approximate and numerical methods. Prerequisite: ME 308.


412. Dynamic Systems Analysis I. 4 Hours. Same as IE 412. Classical control theory, concept of feedback, Laplace transform, transfer functions, control system characteristics, root locus, frequency response, compensator design. Prerequisite: ME 308.


415. Propulsion Theory. 4 Hours. Thermodynamics and fluid mechanics of air-breathing engines, performance of rockets; chemical and nuclear rockets. Prerequisite: ME 419 or the equivalent.


418. Elements of Turbulent Flow and Mixing. 4 Hours. Turbulent transport equations; statistical nature of turbulent transports; recent developments in turbulent mixing, free shear flows, wall shear flows, transition, numerical modeling of turbulent flows. Prerequisite: ME 318.

419. Compressible Flow Theory. 4 Hours. Conservation laws, one-dimensional flows. Normal and oblique shock waves, Prandt-
421. Intermediate Heat Transfer. 4 Hours. Topics in conduction, convection and radiation with emphasis on exact solutions: extended surfaces, internal and external flows, surface radiation, combined modes of heat transfer and selected topics. Prerequisite: ME 321 or consent of the instructor.

422. Heating, Ventilation, and Air-Conditioning. 4 Hours. Refrigeration systems and heat-pump, mass transfer in humidification, solar heat transfer in buildings, heating and cooling loads, air-conditioning computer project. Prerequisite: ME 321.

423. Heat Exchangers. 4 Hours. Classification; heat transfer and pressure drop analysis, flow distribution, transient performance, surface selection and geometrical properties, codes and standards. Prerequisites: ME 321 and 211.


426. Applied Combustion. 4 Hours. Topics in combustion, providing both a theoretical and applied understanding of combustion processes as they relate to furnaces. Internal and external combustion engines; pollutant formation. Prerequisite: ME 325.

427. Solar Engineering. 4 Hours. Applications; solar geometry and intensities; applied heat transfer topics; flat plate and concentrating collectors; energy storage; analysis of heating and cooling systems. Prerequisite: ME 321 or consent of the instructor.

428. Numerical Methods in Mechanical Engineering. 4 Hours. Introduction to numerical solution methods for problems in mechanical engineering. Example problems include heat transfer, fluid mechanics, thermodynamics, mechanical vibrations, dynamics, stress analysis, and other related problems. Prerequisites: EECS 170.


450. Air Pollution Engineering. 4 Hours. Same as ChE 450. Environmental aspects of combustion processes, pollutant formation. Control of pollutants and particulates. Air quality control. Fundamentals of combustion. Prerequisite: ME 321 or consent of the instructor.

464. Virtual Automation. 4 Hours. Same as IE 464. Fundamentals of manufacturing and automation modeling using CAD/CAM and computer-integrated manufacturing methods; concepts of virtual manufacturing; industrial robots and automated factory models within virtual environments. Prerequisites: IE 201; and EECS 170 or EECS 171 or CS 107.

468. Virtual Manufacturing. 4 Hours. Same as IE 468. Virtual reality applications in manufacturing systems design, manufacturing applications of networked virtual reality, virtual reality modeling of occupational safety engineering. Prerequisite: EECS 171 or consent of the instructor.

494. Special Topics in Mechanical Engineering. 4 Hours. May be repeated for credit. Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. Prerequisite: Consent of the instructor.
528. Numerical Heat Transfer. 4 Hours. Numerical methods for solving selective problems in heat transfer. Iterative methods with shooting; local nonsimilarity methods; perturbation methods; finite difference methods; grid generation. Applications include conduction, convection, and radiation problems. Prerequisite: ME 421 or consent of the instructor.


535. Theory of Vibrations II. 4 Hours. Same as CEMM 535. Harmonic vibrations; vibrations of a string; vibrations of a beam; vibrations of a membrane; periodic systems; Floquet waves; nonlinear vibrations. Prerequisite: CEMM 435 or ME 408 or the equivalent.


548. Advanced Computer-Aided Manufacturing. 4 Hours. Analysis and design of computer-integrated systems for process planning, production planning and control of discrete part manufacturing activities. Prerequisite: ME 447.

569. Advanced Virtual Manufacturing. 4 Hours. Same as IE 569. Manufacturing systems design optimization using virtual environments, optimization of manufacturing decision support using virtual reality interfaces, analysis and evaluation of virtual environments. Prerequisite: Consent of the instructor.

594. Current Topics in Mechanical Engineering. 4 Hours. May be repeated for credit. Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. Prerequisite: Consent of the instructor.

595. Seminar on Mechanical Engineering Research. 1 Hour. S/U grade only. Advances in mechanical engineering research will be discussed in a seminar setting. Students will be expected to make presentations in various areas, as well as invited faculty members. Prerequisite: Graduate standing in mechanical engineering.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 4 hours of credit. Students may register for more than one section per term. Individual study under close supervision of a faculty member. Prerequisite: Consent of the instructor.

598. MS Thesis Research. 0 to 16 Hours. S/U grade only. May be repeated for credit. Individual research in specialized problems under close faculty supervision. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual research on specialized problems under close faculty supervision. Prerequisite: Consent of the instructor.

Medical-Surgical Nursing (NuMS)

530. Nursing Management of Acutely Ill Patients I. 3 Hours. Advanced practice in medical-surgical nursing. Emphasizes pathophysiology, etiologies, clinical evaluation and management of adults with common health problems in acute care. Prerequisites: Credit or concurrent registration in NuSC 530, NuSC 531, and NuS5C532.

532. Nursing Management of Acutely Ill Patients II. 3 Hours. Concentration on advanced medical-surgical nursing covering pathophysiology, etiologies, clinical evaluation and management of acutely ill adults. Prerequisites: NuMS 530 and concurrent registration in NuS 533.

533. Medical-Surgical Clinical Nurse Specialist Practicum I. 4 to 8 Hours. May be repeated for credit. Practicum emphasizing the clinical evaluation, symptom management, education and case management of adults with common health problems in acute care. Prerequisite: NuMS 530.

534. Acute Care Nurse Practitioner Practicum I. 6 to 8 Hours. May be repeated for credit. Practicum emphasizing the clinical evaluation, symptom management, education and case management of acutely ill adults. Prerequisite: Consent of the instructor.

535. Medical-Surgical Clinical Nurse Specialist Practicum II. 4 to 8 Hours. May be repeated for credit. Practicum emphasizing the comprehensive clinical evaluation and management of adults with complex health problems in acute care. Prerequisite: NuMS 533.

536. Acute Care Nurse Practitioner Practicum II. 6 to 8 Hours. May be repeated for credit. Practicum emphasizing the clinical evaluation, symptom management, education and case management of acutely ill adults. Prerequisite: Consent of the instructor.

537. Acute Care Nurse Practitioner Practicum III. 6 to 8 Hours. May be repeated for credit. Practicum emphasizing the comprehensive clinical evaluation and management of adults with complex health problems in acute care. Prerequisite: NuMS 536.

542. Analysis of Medical-Surgical Nursing Research. 2 Hours. Analysis of selected historical and contemporary examples of research in Medical-Surgical Nursing. Future directions for research and practice are examined. Prerequisite: Consent of the instructor.

545. Biometrics and Applied Statistics. 4 Hours. Application of recent procedures in statistical analysis. Emphasis is on design of experiments and regression analysis; use of BMDP software on Mainframe/VAX computers. Prerequisite: NuSc 545 or the equivalent or consent of the instructor.

546. Multivariate Analysis for Health Sciences. 3 Hours. Practical applications of multivariate techniques in health sciences. Minimal involvement in mathematics provided one has basic understanding of multivariate analysis. Prerequisite: NuSc 545.

549. Laboratory Techniques for Nursing Research. 3 Hours. Animals used in instruction. Techniques in laboratory research for nursing science. Basic physiological and biochemical methods and equipment, animal models, human subjects, safe laboratory practice, development from conceptualization through execution. Prerequisite: NuSc 530.

550. Common Geriatric Health Problems. 3 Hours. Advanced practice in geriatric nursing. Emphasizes pathophysiology etiologies, clinical evaluation and management of common and uncomplicated problems for older adults. Prerequisites: NuSc 530, 531, and 532.

552. Management of Complex Geriatric Health Problems. 3 Hours. Advanced practice in geriatric nursing. Emphasizes pathophysiology, etiologies, clinical evaluation and management of complex health problems in older adults. Prerequisite: Credit or concurrent registration in NuMS 553 or 554.

553. Geriatric Clinical Nurse Specialist Practicum I. 7 Hours. Practicum emphasizing clinical practice, education, research and consultation related to care of older adults with common health problems. Prerequisite: NuMS 550.

554. GNP Practicum I: Management of Common Health Problems. 6 Hours. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis, symptom management, education and case management of older adults with common uncomplicated health problems. Prerequisite: NuMS 550.
555. Geriatric Clinical Nurse Specialist Practicum II. 8 Hours. Practicum emphasizing clinical practice, education, research and consultation related to the care of older adults with acute and chronic conditions. Prerequisites: NuMS 552 and 553.

556. GNP Practicum II: Older Adults with Complex Health Problems. 6 Hours. Practicum emphasizing clinical evaluation, differential diagnosis, symptom management, education and case management of older adults with complex health problems. Prerequisite: NuMS 554.

558. GNP Practicum III: Integrative Practice. 6 Hours. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis and comprehensive case management of older adults with common and complicated health problems. Prerequisite: NuMS 556.

562. Quality of Life Issues in Research and Clinical Practice. 3 Hours. Quality of life: construct definition, ethical issues in clinical practice of nurses and other health professionals, measurement and research regarding various illness and age groups. Prerequisite: Consent of the instructor.

564. Pain: Etiology, Assessment, Management. 2 Hours. The causes of pain and the variety of instruments used to assess and measure pain management in relation to chronic and acute pain. Prerequisite: Consent of the instructor.

Medical Education (MHPE)

421. Instructional Methods for Health Professionals. 3 Hours. Improves skill in methods such as lecture, discussion, laboratory, supervision and use of media through practice, being videotaped, role playing and reading.

431. Research Design & Grant Writing for Educational Research Projects. 2 Hours. Introduction to the skills necessary to plan a research project and write a research grant proposal in an area of health professions education using a systematic approach. Prerequisite: Consent of the instructor.

433. Principles of Evidence-Based Health Care. 2 Hours. Same as BHIS 433: Qualitative and quantitative assessment of human subject clinical research: locating, evaluating, comparing scientific papers as bases for health care education and practice. Prerequisite: Graduate or professional standing; and approval of the Department.

439. Writing for Scientific Publication. 2 Hours. Instruction and workshop explores the process of fully preparing and submitting a manuscript to a health professions journal. Students must bring analyzed data set. Prerequisite: Consent of the instructor.

441. Clinical Decision Making. 2 Hours. Introduction to descriptive and normative theories of decision making: interpretation of diagnostic tests; measuring patient preferences; decision analysis and cost-effectiveness analysis; psychology of judgment and choice. Prerequisite: Consent of the instructor.

494. Special Topics in Health Professions Education. 1 to 4 Hours. May be repeated for credit with the approval of the department. Students may register for more than one section per term. Presents special topics in selected aspects of medical humanities for health professionals. Prerequisites: Prerequisites may vary by section, depending upon topic.

500. Philosophical Issues in Research. 2 Hours. Same as PMAd 500. An in-depth examination of foundational issues underlying research questions of ethics, design, conduct and evaluation pertaining to pharmaceutical preparations.

Medical Laboratory Sciences (MLS)

413. Independent Study. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. Study of topics of limited scope using scientific problem-solving methods and appropriate resources. Prerequisite: Consent of the instructor.

417. Clinical Experience I. 3 to 10 Hours. May be repeated for credit with the approval of the Division. Supervised clinical laboratory experience at an affiliated institution in 1-3 clinical disciplines to develop psychomotor skills, clinical reasoning, and professional behaviors for entry level practice. Prerequisites: Completion of required MLS discipline courses and consent of the coordinator.

418. Clinical Experience II. 3 to 10 Hours. May be repeated for credit with the approval of the Division. Continuation of MLS 417. Supervised clinical laboratory experience at an affiliated institution in 1-3 clinical disciplines to develop psychomotor skills, clinical reasoning, and professional behaviors for entry level practice. Prerequisites: Completion of sequence of required MLS discipline courses and consent of the coordinator.

442. Clinical Immunology. 2 Hours. Histocompatibility, cell mediated immunity, antibody diversity; interactions and assessment of cellular immunity. Hypersensitivity mechanisms, allergy, immunodeficiency diseases, autoimmunity and transplantation. Prerequisite: MLS 361 or consent of the instructor.

446. Current Issues in Clinical Laboratory Science. 2 Hours. Laboratory personnel certification/licensure; government regulations; physician office testing/consulting; information systems; education/management issues; ethics; patient interactions; role of allied health professionals; career opportunities; future trends.

447. Clinical Correlations for Clinical Laboratory Scientists. 3 Hours. Case studies will assist entry-level clinical laboratory professionals to integrate discipline-specific knowledge from clinical chemistry, hematology, immunohematology, Immunology, and clinical microbiology into a comprehensive concept of the patient. Prerequisite: Concurrent registration in MLS 417 or MLS 418 or the equivalent; or consent of the instructor.

520. General Clinical Chemistry. 3 Hours. Same as Path 520. Clinically significant lipids, enzymes, hormones, trace metals and
527. Clinical Laboratory Method Evaluation. 3 Hours. Same as Path 527. Development and comparison of clinical laboratory methods; also, statistical methods of evaluating sensitivity, specificity, precision, accuracy, predictive value, and cost effectiveness. Prerequisite: Consent of the instructor.

530. Hematology I. 3 Hours. Structure and function of bone marrow; erythropoiesis, leukopoiesis, and thrombopoiesis; platelets; blood groups; genetics and disease. Prerequisites: Bioche 210, OrgP 513 or 514, and consent of the instructor.

532. Hemostasis. 2 Hours. Platelet physiology, kinetics, and disorders; procoagulant physiology, fibrinolytic factors, and the coagulation process; hemorrhagic disorders associated with factor deficiencies and vascular insufficiency; hypercoagulable syndromes, clinical management of clotting disorders. Prerequisites: Basic knowledge of hemostasis, certification, and consent of the instructor.

560. Blood Groups: Systems and Serology. 3 Hours. Red cell immunology, genetics, membrane biochemistry; genetics and characteristics of human blood group systems; parentage testing; related clinical serology; forensics; recent biotechnology. Prerequisites: General knowledge of immunohematology and consent of the instructor.

561. Clinical Immunohematology and Transfusion. 3 Hours. Blood cell metabolism, blood collection and storage, transfusion practices, adverse effects of transfusion, HDN, parentage testing, regulations, standards, and compliance, computer applications, quality assurance. Prerequisites: MLS 560 and consent of the instructor.

562. Principles and Methods in Immunohematology I. 3 to 4 Hours. Clinical/blood center sessions for resolution of complex allo/auto antibody transfusion problems; paternity testing; HL-A/platelet antibody testing; apheresis techniques; bone marrow/stem cell processing. Prerequisite: MLS 562 and credit or concurrent registration in MLS 561 and consent of the instructor.

564. Current Trends in Immunohematology. 1 Hour. S/U grade only. May be repeated for a maximum of 2 hours of credit. Advanced studies of current trends; assigned topics in current literature read, evaluated and discussed. Prerequisites: General knowledge of immunohematology and consent of the instructor.

580. Practicum in Medical Laboratory Sciences. 1 to 4 Hours. May be repeated for a maximum of 6 hours of credit. Field experience under supervision of a professional expert in a medical laboratory sciences setting that is consistent with the student's focus of study and career goals. Prerequisite: Consent of the instructor.

581. Forensic Analysis of Biological Evidence. 4 Hours. Same as BpS 581 and CjJ 581. Forensic blood identification and typing; body fluid identification and typing; blood group, isoenzyme, serum protein typing; electrophoresis; isoelectric focusing; DNA typing; reporting results; expert testimony. Prerequisite: Consent of the director of graduate studies.

584. Forensic Drug Analysis and Toxicology. 4 Hours. Same as CjJ 584 and BpS 584. Analysis of commonly abused drugs in their solid-dosage form and in biological media. Emphasis on modern instrumental methods and interpretation of results. Prerequisite: Consent of the director of graduate studies.

594. Special Topics in Medical Laboratory Sciences. 1 to 3 Hours. Students may register for more than one section per term. Current theories and methods in medical laboratory sciences. Seminar, literature search, directed study, and discussion format. Topic areas include clinical chemistry, clinical microbiology, clinical immunology, immunohematology, and hematology. Prerequisites: Consent of the instructor.

595. Seminar in Medical Laboratory Sciences. 1 Hour. S/U grade only. Topics of current interest in medical laboratory sciences. Includes discussions of current journal articles and important new developments in the clinical laboratory disciplines. Prerequisite: Consent of the instructor.
594. Special Topics in Medicinal Chemistry. 2 to 4 Hours. May be repeated for a maximum of 4 hours of credit. An advanced course covering selected topics which may include new spectroscopic, theoretical, chemometric, and synthetic approaches to biomolecular structure and function. Prerequisites: MCh 561 and 562 and one year of physical chemistry and one semester of biochemistry or consent of the instructor.

595. Seminar in Medicinal Chemistry. 1 Hour. S/U grade only. Presentation on a current research topic.

596. Master's Research in Medicinal Chemistry. 0 to 16 Hours. S/U grade only. Thesis research to fulfill master's degree requirements.

599. Doctoral Research in Medicinal Chemistry. 0 to 16 Hours. S/U grade only. Research for doctoral students.

Medicinal Chemistry and Pharmacognosy (PmMP)

412. Pharmaceutical Applications of Genomics and Bioinformatics. 2 Hours. Same as MCh 412. Introduction to genomics and bioinformatics for advanced pharmacy students. Principles of gene expression, DNA sequencing in bacterial and human genomes, with emphasis on diagnostic and therapeutic applications. Prerequisite: Phar 332 or consent of the instructor.

Medicine (Med)

500. Fundamentals of Sleep Medicine. 1 Hour. Fundamentals of sleep anatomy, cell biology, physiology, and pharmacology applied to clinical disorders of sleep which represent significant public health risks. Prerequisite: Consent of the instructor.

Microbiology and Immunology (MIm)

425. Fundamentals of Immunology and Microbiology. 3 Hours. Mechanisms of host defense; antigens, immunoglobulins and their reactions; antibody synthesis, regulation and the cellular immune response; bacterial and viral structure and function; mechanisms of pathogenesis. Prerequisite: Consent of the instructor.

426. Microorganisms as Agents of Human Disease. 3 Hours. Fundamental aspects of bacterial, fungal and viral pathogenesis, therapy, control and prevention of infectious diseases. Prerequisite: Consent of the instructor.

455. Microbiology Laboratory Rotation. 3 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. S/U grade only. Course in basic and applied methods essential for the study of nucleic acids, immunoglobulins, gene transfer, cell fusion, virological and immunological methods.

501. Immunochemistry. 3 Hours. Same as Bche 501. Immunoglobulin genetics and structure; regulation of immunoglobulin gene expression and generation of antibody diversity; molecular and genetic aspects of lymphocyte receptors and activation. Prerequisite: MIm 451 and Bche 460 and/or consent of the instructor.

502. Immunobiology. 3 Hours. Biology of immunocompetent cells and the immune response; mechanisms of cell-mediated injury and hypersensitivity; major histocompatibility complex, MHC antigens; tumor immunity. Prerequisites: MIm 455 and Bche 460 or consent of the instructor.

503. Advanced Virology. 3 Hours. Animal DNA, RNA and retroviruses; morphology; genome structure; replication; gene expression and its regulation; cellular transformation by viral oncotgenses; viral vectors and their applications. Prerequisites: MIm 553 and 455, or consent of the instructor.

504. Medical Mycology. 3 Hours. Lectures, conferences and laboratory work covering the saprophytic, opportunistic and pathogenic fungi causing disease in man. Prerequisite: Graduate standing or professional degree with consent of the instructor.

513. Structure of Biopolymers. 3 Hours. Same as Bche 513 and PmPg 513. Explores the relationship between structural stability, kinetic properties and function of biopolymers, with particular emphasis on proteins and nucleic acids. Prerequisites: Bche 460 and a year of physical chemistry; or consent of the instructor.

531. Advanced Molecular Genetics. 2 Hours. Eukaryotic cells in culture, cell hybridization and differentiation, gene mapping, regulation; recombination models; mutation and fate of inserted DNA; gene rescue; ontogenes. Prerequisites: MIm 455 and 554.

534. Mechanism of Microbial Pathogenesis. 2 Hours. Advanced course covering the variety of mechanisms by which microbes produce disease in a healthy or a compromised host. Bacterial, mycoplasmal, Rickettsial, viral, fungal, and protozoal diseases are included. Prerequisites: MIm 451, 552, and 553.

551. Immunology. 5 Hours. Concepts in immunology, immunogenetics, molecular immunology, cellular immunology and immunopathology at the intermediate level. Prerequisites: An undergraduate course in molecular biology or genetics, consent of the instructor and concurrent registration in Bche 460 or the equivalent.

552. Molecular Microbiology. 3 Hours. Structure, growth, metabolism, bacterial phylogeny and the diversity of microorganisms, microbial genetics, molecular biology, genetic regulation. Plasmids, transposons, bacteriophages, mechanism of pathogenesis. Prerequisite: Credit or concurrent registration in Bche 460 or consent of the instructor.

553. Molecular Biology of Cells and Viruses. 3 Hours. Animal viruses including basic structure and viral nucleic acids; emphasizes molecular organization of viral genomes; cellular and molecular events during virus replication and viral transformation. Prerequisite: MIm 552 or consent of the instructor.

554. Molecular Aspects of Microbiology. 3 Hours. Basic concepts of prokaryotic and eukaryotic genetics; gene structure and function; gene expression; molecular aspects of mutation and recombination; chromosome structure and function. Prerequisite: Bche 460.

560. Molecular Microbiology. 5 Hours. Credit is not given for MIm 560 if the student has credit in MIm 552. Genes, molecular biology and physiology of bacteria, viruses, and Eukaryotic cells. Special emphasis on genetic regulation. Prerequisite: Concurrent registration in Bche 460.

561. Eukaryotic Molecular Biology and Immunology. 5 Hours. Credit is not given for MIm 561 if the student has credit in MIm 451 and/or 553. Genetics, molecular biology and physiology of eukaryotic cells. Concentrated focus on molecular and cellular immunology, lymphocyte biology and immunochemistry. Prerequisite: Bche 460.

585. Cell Biology. 4 Hours. Same as Anat 585 and Phyb 585. Functional and structural organization of the cell with emphasis on the cellular basis of physiological activity.

594. Special Topics in Microbiology, Immunology, and Virology. 1 to 2 Hours. Advanced topics are covered in depth. Topics vary yearly. Prerequisite: MIm 451, 552, 553, and 455; Bche 460, and consent of the instructor.

595. Seminar in Microbiology and Immunology. 1 Hour. S/U grade only. Topics of current research interest are presented by guest lecturers from outside institutions in areas of molecular biology, bacteriology, virology and immunology.

598. Research in Molecular Biology and Immunology. 0 to 16 Hours. S/U grade only. MS thesis research on problems in microbiology, immunology, virology and molecular biology. Prerequisite: Graduate standing in Microbiology and Immunology.

599. Research in Molecular Biology and Immunology. 0 to 16 Hours. S/U grade only. PhD thesis research on problems in microbiology, immunology, virology and molecular biology. Prerequisite: Graduate standing in Microbiology and Immunology.

Molecular Genetics (Gene)

501. Faculty Research Seminars. 1 Hour. S/U grade only. Should be taken in the first year in the PhD in Molecular Genetics program. Faculty presentation of research areas within molecular genetics. Prerequisite: Graduate standing in the PhD in Molecular Genetics program or consent of the instructor.

502. Somatic Cell and Human Genetics. 4 Hours. The genetics of somatic cells and advanced human genetics. Gene transfer, mutagenesis, drosophila genetics, genetic linkage and human disease, cancer genetics, and gene therapy. Prerequisite: Bche 460 or consent of the instructor.

503. Research Methods in Genetics. 5 Hours. May be repeated for a maximum of 10 hours of credit. Open only to students in the Molecular Genetics program. Laboratory course in experimental methods in molecular genetics. Prerequisite: Consent of the instructor.
512. Experimental Design and Analysis in Molecular Genetics. 4 Hours. Methods and logic in the analysis of gene function, gene cloning, analysis of genetic changes, studies of gene expression, design of experimental controls. Prerequisite: Bche 460 or consent of the instructor.

513. Molecular Basis of Cell Growth and Differentiation. 4 Hours. Oncogenes, tumor suppressor proteins and growth factors, and their roles in tumorigenesis, cell growth, differentiation and development. Prerequisite: Bche 460 or consent of the instructor.

514. Structure and Function of Nucleic Acids. 4 Hours. Describes the structure and function of nucleic acids. Unravels the basic molecular mechanisms underlying heredity, including replication, transcription and recombination. Prerequisite: Bche 460 or consent of the instructor.

515. Journal Club. 1 Hour. May be repeated for credit. Student presentation and critical analysis of recent journal articles and current topics in molecular genetics. Prerequisite: Consent of the instructor.

526. Molecular and Genetic Analysis of Development. 3 Hours. Same as BioS 526. Examines developmental mechanisms used in animal and plant model systems. Lecture. Prerequisite: Graduate standing or consent of the instructor.

594. Special Topics in Molecular Genetics. 1 to 4 Hours. May be repeated for credit if topic varies for each registration. Advanced course on selected topics in molecular genetics. Topics will vary from year to year. Prerequisite: Consent of the instructor.

595. Student Research Seminars. 1 Hour. May be repeated for credit. S/U grade only. Research presentations by graduate students in the Molecular Genetics program. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Independent dissertation research by the student, under the guidance of the adviser. Prerequisite: Advanced standing in the PhD in Molecular Genetics program.

Native American Studies (NAS$)

471. Studies in Native American Literatures. 4 Hours. Same as EnGl 471. May be repeated for a maximum of 8 hours of credit. The history and development of literature by and about American Indians. Content varies.

Neuroscience (Neus)

580. Themes in Neuroscience. 2 Hours. Same as BioS 580. May be repeated for credit. Survey of two or three topics in neuroscience with an emphasis on recent research advances. Research that spans the areas under consideration will be emphasized.

582. Methods in Modern Neuroscience. 2 Hours. Animals used in instruction. Same as BioS 582. Underlying principles and applications of techniques used to analyze nervous system organization and function. Behavioral, electrophysiological, anatomical, and biochemical approaches are considered.

583. Practicum in Neuroscience Methods. 3 Hours. Same as BioS 583. Technologically intense laboratory experience in the methods used by neuroscientists to solve research problems. Demonstrations and discussions complement laboratory exercises. Prerequisite: Neus 582.

Nursing Sciences (NuSc)

402. Ethics in Nursing. 2 Hours. Examines selected ethical concepts in nursing practice and administration. Critical analysis of ethical theories, principles, and rules. Ethical reasoning applied to nursing situations. Prerequisite: Consent of the instructor.

440. Wholistic Health: Use of Self. 2 Hours. Spiritual assessment of self, individuals and families. Self as a therapeutic agent/health provider for wholistic health care. Prerequisites: Consent of the instructor.

441. Wholistic Health: Community Focus. 2 Hours. Community and congregational assessment. Faith community as a place of healing self and providing wholistic health care as a member of a multidisciplinary team. Prerequisite: Consent of the instructor.

442. Wholistic Health Care Systems. 2 Hours. Integration of health and faith to influence and change for wholistic health care systems using negotiation, community development, coalitions, and advocacy at local, regional, national, and international levels. Prerequisite: Consent of the instructor.

450. Women and Mental Health Nursing. 3 Hours. Same as GWS 450 and NuPs 450 and NuWH 450. Theories of female psychology; women's daily lives and mental health; gender differences in mental illness; strategies for improving women's mental health. Prerequisite: Consent of the instructor.

455. Women's Health: A Primary Health Care Approach. 3 Hours. Same as CHSc 456 and NuPH 455 and NuWH 455. Health promotion and disease prevention in women's health. Includes community experience with community women. Primary health care approaches examined. Prerequisite: Consent of the instructor.

465. International Nursing. 2 Hours. Previously listed as NuPH 465. Forum for exchange of ideas, experiences, and readings on effect of political structures, socio-cultural and economic forces on health care systems and nursing education. Prerequisite: Consent of the instructor.

494. Special Topics. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. Discusses selected topics of current interest. Offered according to sufficient student demand and instructor availability. Prerequisite: Consent of the instructor.

505. Philosophy of Science for Health Research. 3 Hours. Traces the development of scientific reasoning and explanation from Aristotle to the present, focusing on the nature of knowledge and role of truth for health research. Prerequisites: NuSc 527 or the equivalent and consent of the instructor.

506. Theory and Theory Development for Nursing Research. 3 Hours. Methods of theory development and critical analysis of selected biological, behavioral, health service, and grand nursing theories which form the basis of nursing science are examined. Prerequisite: NuSc 505.

511. Advanced Research Design. 4 Hours. In-depth analysis of research design, including such areas as design appropriateness and validity, sampling, research ethics, and interpretation. Application of the content to nursing and related fields. Prerequisites: NuSc 527 or the equivalent and consent of the instructor.

515. Measurement in Health Research. 4 Hours. Qualitative and quantitative measurement theories; assessment of reliability, validity, and data quality. Critical analysis of measurement issues across the continuum of measures in health research. Prerequisite: NuSc 511 or the equivalent or consent of the instructor.

517. Advanced Research Practicum. 1 to 4 Hours. Must be repeated for a minimum of 3 hours credit; may be repeated for a maximum of 6 hours of credit. S/U grade only. An intensive guided research practicum in design, data collection, psychometric analysis or specific analytic technique relevant to the student's research specialization. Prerequisites: NuSc 515 and two advanced statistics courses.

525. Intermediate Statistics. 3 Hours. Application and interpretation of statistical techniques appropriate for health sciences. Prepares students to think quantitatively, use the computer to perform statistical analysis, and assess data critically. Prerequisite: An undergraduate statistics course.

526. Nursing Inquiry I. 2 Hours. The first of a two-course sequence on the process and application of nursing inquiry; emphasizes approaches to inquiry, theory analysis, constructs, measurement and theory generation. Prerequisite: Credit or concurrent registration in NuSc 525 or the equivalent.

527. Nursing Inquiry II. 2 Hours. A continuation of NuSc 526, emphasizing the methods of theory development and theory testing in selected areas of nursing sciences. Ethical issues in research. Prerequisite: NuSc 526.

528. Health, Environment, and Systems. 2 Hours. Examination of international, national and local environments for health, health systems, health policy and their outcomes. Influence of social, cultural, and ethical factors.

529. Issues of Advanced Practice in Nursing. 1 Hour. May be repeated for credit for students enrolled in specific nursing concentrations. Students may register for more than one section per term. Examines advanced practice in nursing from historical, contemporary, and future dimensions. Prerequisite: NuSc 528.
530. Physiologic Basis of Nursing Practice Across the Lifespan. 4 Hours. Advanced contemporary physiologic principles and their relevance to clinical practice. Content topics will include developmental (lifespan) physiologic changes. Prerequisite: An undergraduate physiology course or consent of the instructor.

531. Pharmaceutical Intervention in Advance Practice in Nursing. 3 Hours. Advanced principles of pharmaceutical intervention. Includes legal issues, client adherence and medication selection factors. Prerequisite: Credit or concurrent registration in NuSc 530 or the equivalent or consent of the instructor.

532. Comprehensive Health Assessment for Advanced Practice. 2 to 3 Hours. Students registering for three credit hours must register for two extra laboratory-discussion hours per week. Includes physical, psychosocial, developmental, occupational, sexual, cultural assessments across the lifespan, emphasizing differences between normal and abnormal. Students synthesize results in client’s health status. Prerequisite: NuSc 210 or the equivalent or consent of the instructor.

540. Instructional Strategies for the Nurse Educator. 3 Hours. Introduction to educational theory, methods, and strategies for nursing instruction and evaluation in classroom, clinical, and online teaching. Prerequisite: Consent of the instructor.

541. Teaching Practicum for the Nurse Educator. 3 Hours. Application of educational theory, methods, and strategies for nursing education, curriculum development, program evaluation or education administration in classroom, school, clinical or other selected settings. Prerequisites: Credit or concurrent registration in NuSc 540 or credit or concurrent registration in NuSc 542; and consent of the instructor.

542. Curriculum Processes in Nursing Education. 3 Hours. Builds on basic instructional strategies to prepare the nurse educator for faculty role in various levels of programs, including curriculum design and evaluation. Prerequisite: Consent of the instructor.

543. Issues for Nurse Educators and Administrators. 3 Hours. Focuses on issues in nursing education administration in the context of society, health care, and nursing, especially strategic planning, resources, political influences, conflict, change and leadership. Prerequisites: NuSc 541 and NuSc 542; and consent of the instructor.

544. Qualitative Research in Nursing. 4 Hours. Major approaches to qualitative research including design, conduct, reporting, and firsthand experience in data collection and analysis. Prerequisite: Consent of the instructor.

545. Concept Development in Nursing. 3 Hours. The contribution of concept analysis to the development of nursing theory is emphasized and specific approaches to concept analysis are examined. Prerequisite: Consent of the instructor.

546. Issues in Nursing Education Administration II. 3 Hours. Focuses on executive development in nursing education programs, policy formulation, executive and college relationships to external societal influences. Prerequisite: Consent of the instructor. Credit in NuSc 543 is highly recommended.

550. Issues for Research and Practice in Women’s Health. 3 Hours. Same as NuAS 550 and NuWH 550. Analysis of gender-related definitions of health and illness in theory issues and research evaluation criteria for women’s health care practice are developed as a basis for research. Prerequisite: Consent of the instructor.

554. Comparative International Health Systems and Nurses’ Management. 2 Hours. Management of health services in the context of national health systems in developed, developing, and least developed countries. Prerequisite: NuSc 528 and consent of the instructor.

555. Theories and Methods in Women’s Health Nursing Research. 3 Hours. Same as NuWH 555. Critical analysis of theoretical and methodological approaches in women’s health nursing research. Emphasis on evaluation scheme useful to researchers. Prerequisites: NuAS 550 and consent of the instructor.

560. Theoretical Basis for Primary Health Care. 3 Hours. Students analyze the conceptual basis of primary health care applicable to diverse communities and develop a primary health care model specific to a community of interest.

561. Ethical Issues in Primary Health Care. 3 Hours. Examination of the ethical components of primary health care as a philosophy, strategy, and level of care; and explication of personal framework for analysis of a specific health issue. Prerequisite: NuSc 560 or consent of the instructor.

562. Primary Health Care Research Methods. 3 Hours. Conceptual issues, advanced methodologies and dissemination strategies for scientifically sound and policy relevant global primary health care research. Building community relationships for primary health care research. Prerequisites: NuSc 560 and NuSc 511 or the equivalent or consent of the instructor.

565. Advanced Research in Women’s Health. 1 to 2 Hours. Same as NuPH 565 and NuWH 565. Advanced seminar for doctoral students in graduate nursing concentration in women’s health. Faculty and students present and critique on-going and developing research. Prerequisite: Consent of the instructor.

570. International Dimensions in Women’s Health. 3 Hours. Same as NuPH 570 and NuWH 570. Critical examination of the health of women from a global perspective. Emphasizes resources and strategies nurse researchers use to monitor women’s health across cultures and countries. Prerequisite: Consent of the instructor.

575. Minority Women’s Health Nursing. 3 Hours. Same as NuWH 575. Theoretic and descriptive overview of the health concerns and health conditions of women from ethnic/racial minority backgrounds with implications for nursing research and practice. Prerequisite: Consent of the instructor.

585. Advanced Research Seminar. 1 to 2 Hours. May be repeated for credit: a minimum of 2 hours credit is required; a maximum of 4 hours of credit may be applied toward the PhD degree. Students may register for more than one section per term. S/U grade only. Integrates theory and methods for health research. Topics vary according to student interests and instructor availability. Prerequisites: Consent of the instructor. Open only to PhD degree students.

590. Leadership in Scientific Careers. 1 Hour. S/U grade only. For doctoral students only. Analyzes components of leadership in science at the national and global levels. Analyzes factors and issues of the discipline affecting a research career. Analyzes the interdependency of the science to policy cycles of influence. Prerequisite: NuSc 517.

594. Special Topics: Advanced. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. Discusses selected topics of current interest. Offered according to sufficient student demand and instructor availability. Prerequisite: Consent of the instructor.

595. Seminar in Nursing. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Identifies and analyzes a broad range of issues related to modern nursing and nursing research. Topics vary according to student interests and instructor availability. Prerequisite: Consent of the instructor.

596. Independent Study: Graduate. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Selected problems in nursing are investigated under the direction of a graduate faculty member. Modes of investigation are determined by the nature of the nursing problem selected. Prerequisite: Consent of the instructor.

597. Project Research: Master’s. 0 to 16 Hours. S/U grade only. Master’s student project research. Prerequisite: Consent of the instructor.

598. Thesis Research: Master’s. 0 to 16 Hours. S/U grade only. Master’s student thesis research. Prerequisite: Consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. S/U grade only. Doctoral student thesis research. Prerequisite: Consent of the instructor.

Occupational Therapy (OT)

401. Occupational Performance in Adults and Adolescents. 4 Hours. Reviews the primary developmental aspects and roles of adolescence and adulthood. Personal and environmental factors that influence occupational performance and prevention and wellness models to facilitate occupational functioning. Prerequisite: Admission to the MS in Occupational Therapy program.
406. Development of a Therapeutic Self. 3 Hours. Emphasizes understanding and developing foundational skills in therapeutic use of self and forms of therapeutic reasoning. Group theory and process is introduced and group leadership skills developed. Prerequisite: Admission to the MS in Occupational Therapy Program.

407. Introduction to Occupational Therapy Practice. 2 Hours. Overview of the role of the therapist and aspects of occupational therapy practice in multiple settings. The basics of assessment, treatment planning, intervention, and documentation, as well as service delivery systems and current issues. Prerequisite: Admission to the MS in Occupational Therapy program.

411. Occupational Performance in Children. 4 Hours. Developmental theories concerning factors influencing the development of occupational performance in infancy, childhood, and early adolescence. Developmental assessment methods and tools. Prerequisites: Grades of C or better in OT 401 and 407 and consent of the instructor.

412. Human Structure and Function. 5 Hours. Anatomical and physiological basis for occupational performance. Features structure and function of musculoskeletal, cardiovascular and nervous systems and application of biomechanical principles. Prerequisite: Admission to the MS in Occupational Therapy program.

416. Occupational Therapy Practice: Psychosocial Aspects of Occupational Performance. 3 Hours. Occupational therapy practices relevant to psychosocial intervention, related bodies of knowledge influencing practice, psychological process affecting occupational functioning and assessment and treatment related to psychosocial problems. Prerequisites: Grade of C or better in OT 401 and Grade of C or better in OT 407; and consent of the instructor.

420. Community Practicum. 1 Hour. May be repeated for credit. S/U grade only. Field experience in a community agency serving an urban population. Emphasis is on service learning in context and the development of professional behaviors. Field work required. Prerequisite: Admission to the MS in Occupational Therapy program.

422. Medical Conditions. 1 Hour. S/U grade only. This self-paced course reviews etiology, clinical manifestation, clinical course, and general medical and rehabilitative management of common medical conditions; emphasis placed on musculoskeletal, neurologic, cardiopulmonary, and psychiatric disorders. Prerequisite: Admission to the MS in Occupational Therapy program.

424. Contexts of Occupational Therapy Practice. 2 Hours. Trends in health care, reimbursement, legislation, and disability policy and how they affect occupational therapy. The policy process and development of an advocacy role. Exposure to community based practice and consultation roles. Prerequisite: Grade of C or better in OT 407.

428. Fieldwork Level I. 3 Hours. Application of occupational therapy theory and therapeutic reasoning in a 40-hour fieldwork experience with the opportunity to develop beginning therapeutic skills and professional behavior. Prerequisites: Grades of C or better in OT 411, 412, and 416 and satisfactory completion of OT 422, and consent of the instructor.

436. Occupational Therapy Practice: Functional Movement and Mobility. 5 Hours. Application of occupational therapy evaluation and intervention skills to children and adults with occupational performance deficits resulting from mobility and movement dysfunction. Prerequisites: Grades of C or better in OT 411, 412, and 416, and satisfactory completion of OT 422.

437. Occupational Therapy Practice: Cognition and Perception in Action. 4 Hours. The impact of impaired cognitive and perceptual processes on occupational performance of children and adults with neurological conditions, cognitive and intellectual disabilities and psychiatric disabilities. Prerequisites: Grades of C or better in OT 411, 412, and 416, and satisfactory completion of OT 422.

447. Ethnographic Research in Health and Human Services I. 4 Hours. Same as Dis 447. Course for practitioners and researchers who are not well-versed in ethnography, details strategies for conducting ethnographic research in health and human service contexts. Prerequisite: Consent of the instructor.

448. Fieldwork Level IIA. 8 Hours. S/U grade only. First of two supervised, full-time 12-week practica with emphasis on application of occupational therapy theory, development of psychomotor skills, reasoning client related problems, and professional socialization as an entry-level occupational therapist. Prerequisites: Grades of C or better in OT 428, 436, and 437 and consent of the instructor.

449. Fieldwork Level IIB. 8 Hours. S/U grade only. Second of two supervised, full-time 12-week practica with emphasis on application of occupational therapy theory, development of psychomotor skills, reasoning client related problems, and professional socialization as an entry-level occupational therapist. Prerequisites: Grades of C or better in OT 428, 436, and 437 and consent of the instructor.

461. Advanced Fieldwork Practicum. 3 to 12 Hours. S/U grade only. Supervised fieldwork practicum to advance clinical skills in a specialty area of practice. Prerequisite: OT 351 or consent of the instructor.

500. Theories of Occupational Therapy. 4 Hours. Develops an understanding of the theoretical basis of occupational therapy and the impact of theory on clinical practice. Covers the history of knowledge and practice development in the field. Focuses on specific practice models developed as guides to clinical reasoning. Prerequisite: Consent of the instructor.

510. Research in Occupational Therapy. 3 Hours. Introduction to basic elements of research design relevant to occupational therapy practice. Prepares student to become critical consumer of research in occupational therapy and related fields. Quantitative and qualitative approaches to research. Prerequisite: Admission to the MS in Occupational Therapy program, or consent of the instructor.

515. Synthesis I. 1 Hour. S/U grade only. Integrating theory, practice and research knowledge and skills across courses using case studies, and small group learning activities. Prerequisites: Grades of C or better in OT 401, 406, 407, 500, and AHS 510.

526. Assistive Technology and the Environment. 3 Hours. Assessing the need for, delivering, and evaluating the outcomes of occupationally-based technology and environmental interventions with people with disabilities within the home, school, workplace and community. Prerequisites: Grades of C or better in OT 411, 412, 416, and AHS 510.

530. Advanced Field Experience: Clinical Specialization in Occupational Therapy. 1 to 4 Hours. S/U grade only. Provides opportunity for the student interested in advanced occupational therapy practice to observe a master clinician and participate in treatment and/or clinical research. Prerequisite: Consent of the instructor.

531. Advanced Field Experience in Occupational Therapy Management. 1 to 4 Hours. S/U grade only. Practicum experience working with an experienced professional to develop projects or programs in student’s interest area, e.g., administration, middle management, consultation, program evaluation, and grantsmanship. Prerequisite: Consent of the instructor.

532. Advanced Field Experience: Occupational Therapy Education. 1 to 4 Hours. S/U grade only. Provides opportunity to observe, prepare, and present lectures/labs to occupational therapy students in technical or professional curricula or to develop skills as a clinical educator. Prerequisite: Consent of the instructor.

534. Socio-Cultural Aspects of Occupational Therapy. 3 Hours. Addresses social and cultural contexts in which chronic illness and disability are experienced; contexts which impact that experience, and broad contexts in which recovery/accommodation and occupational therapy treatment occur. Prerequisites: Grades of C or better in OT 424, 428, and 526.

535. Synthesis II. 2 Hours. S/U grade only. Integrating advanced theory, practice and research knowledge and skills across courses using complex individual and programmatic case studies and small and large group intervention planning activities. Prerequisites: Grade of C or better in OT 424, 428 and 526; and satisfactory completion of OT 422.

540. Advanced Topics in Occupational Therapy Research and Evaluation. 4 Hours. Students may register for more than one section per term. In-depth presentation of selected research/measurement strategies. Specific topics vary and include single system design, survey research, ethnography, evaluation of clinical effectiveness. Prerequisite: Consent of the instructor.

541. Advanced Human Occupation Theory and Application. 4 Hours. Provides an advanced understanding of evaluation, intervention, program development and research based on the model of human occupation. Focuses on use of the model to address
psychosocial problems in a range of disabled persons. Prerequisite: OT 400 or consent of the instructor.

543. Clinical Reasoning in Occupational Therapy. 4 Hours. Comparison of current approaches to study of clinical reasoning in health professions. Emphasis on phenomenological approaches. Prerequisite: Consent of the instructor.

545. Advanced Concepts in Work Rehabilitation. 4 Hours. Same as CHSe 565. Presents current theory, research, and clinical practice in work-related rehabilitation of physically-injured, psychiatric, and neurologically-impaired clients. Prerequisite: Consent of the instructor.

546. Family-Oriented Interventions. 4 Hours. Promotes responsive intervention programs including characteristics of parenting, and the meanings of illness and disability on the family. Prerequisite: Consent of the instructor.

547. Ethnographic Research in Health and Human Services II. 4 Hours. Same as Dis 547. Provides facility supervision and peer criticism for students at various stages of proposing and conducting ethnographic research in health and human service contexts. Prerequisite: OT 447.

550. Disability in the Urban Environment. 4 Hours. Same as Dis 550. Features of urban contexts that influence experiences of persons with disabilities are examined as they exacerbate problems or enhance resources in low income communities.

551. Computers, Communication, and Controls in Rehabilitation Technology. 3 Hours. Same as DHD 551. Assistive technology course exploring different methods for evaluating controls used to operate computers, communication devices, and powered wheelchairs. Instruction also addresses device features and integration factors.

555. Synthesis Ill. 2 Hours. S/U grade only. Integrating advanced theory, practice and research knowledge and skills from advanced fieldwork and coursework using complex case studies and small group assessment and intervention planning activities from students’ fieldwork experiences. Prerequisite: OT 448.

560. Dilemmas in Disability Services. 4 Hours. Same as Dis 560. The complexities inherent in the delivery of therapeutic and related services to persons with disabilities including personal attributes, interpersonal, and contextual components.


564. Administration and Management in Occupational Therapy. 2 Hours. Overview of issues related to administration and management in varied settings in which occupational therapists practice. Topics include management functions, service planning, quality improvement, financial management and accreditation. Prerequisite: OT 555.

565. Research Approaches in Rehabilitation Technology Use and Delivery. 3 Hours. Same as DHD 565 and Dis 565. Advanced course in the design and critical analysis of research on the delivery and long term use of rehabilitation technology and universal access modifications by people with disabilities within the home, school, work site and community.

566. Narrative and the Phenomenology of Disability. 4 Hours. Same as Dis 566. Open to master’s and PhD students in social sciences, medicine, nursing, social work, education and related health professions. Recent interdisciplinary studies of narrative as they pertain to chronic illness and disability.

594. Special Topics in Occupational Therapy. 1 to 4 Hours. New course under development and selected seminar topics of current interests to faculty and students. Prerequisite: Consent of the instructor.

595. Seminar in Occupational Therapy. 1 Hour. S/U grade only. Pre-thesis seminar. Students participate in faculty-student discussion and activities related to individual areas of research/thesis. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. This course is for graduate students who wish to pursue independent study not related to their project/thesis research. Prerequisite: Consent of the instructor.

597. Project Research. 4 to 8 Hours. May be repeated for a maximum of 8 hours of credit. S/U grade only. Independent scholarship focusing on problems of application in field. Students undertake an action project, create a method for dissemination, and orally present the project. Prerequisites: Graduate standing in the MS in Occupational Therapy program and consent of the instructor.

598. Research in Occupational Therapy. 0 to 16 Hours. S/U grade only. Students may register for more than one section per term. MS students are required to take a minimum of 7 credit hours. Independent research in occupational therapy, directed by a faculty member. Prerequisite: Foundation courses in research methods (such as AHS 510) and statistics or consent of the instructor.

Oral and Maxillofacial Surgery (OSur)

501. Applied Anatomy of the Head and Neck I. 3 Hours. Dissection of the head and neck with emphasis on surgical approaches and techniques. Prerequisite: Anat 312 or the equivalent.

510. Conscious Sedation and General Anesthesia. 3 Hours. S/U grade only. May be repeated for credit. Didactic lectures in all phases of pain and anxiety control supplemented with clinical experience in administration of general anesthetic and inhalation and intravenous sedatives.

511. Oral Surgery Seminar. 2 Hours. S/U grade only. Lecture, seminars, conferences and journal clubs dealing with current topics of clinical and research interest in oral surgery. Prerequisite: Consent of the instructor.

512. Craniofacial Deformity Seminar. 1 Hour. S/U grade only. May be repeated for credit. Discusses the investigation, evaluation, treatment planning and follow-up monitoring of patients with dentofacial deformities. Prerequisite: Admission to the oral and maxillofacial surgery residency or orthodontics graduate program.


532. Diagnosis and Treatment Planning in Orthognathic Surgery. 2 Hours. Non-orthognathic surgical topics of practical interest to orthodontists and their professional interrelationships with oral and maxillofacial surgeons.

533. Oral and Maxillofacial Surgery Literature Review. 2 Hours. S/U grade only. Course will cover the methodology for critical review of medical literature and discuss key articles appearing in appropriate medical journals.

561. Physical Diagnosis. 4 Hours. In-depth methods of obtaining a history and performing physical diagnosis of the entire body through theoretical and practical lesions.

Oral Medicine and Diagnostic Sciences (OMDS)


501. Advanced Oral Pathology I. 2 Hours. Detailed consideration of oral cysts, odontogenic tumors, and diseases of facial bones, blood and lymphoreticular systems, and salivary glands. Journal literature used. Prerequisite: OMDS 424 or the equivalent.

502. Advanced Oral Pathology II. 2 Hours. Detailed consideration of oral cancer and other lesions of oral mucosa, dental caries, inflammatory periodontal disease, skin lesions and microscopic diagnosis techniques. Journal literature used. Prerequisite: OMDS 424 or the equivalent.

519. Electron Microscopy Seminar. 1 Hour. A student speaker makes a seminar type presentation about a topic and follows this with a discussion involving electron microscopy. Prerequisite: Consent of the instructor.

527. Oral Biology Seminar. 1 Hour. Same as Hstl 514. S/U grade only. Invited speakers present the progress of current research work in their field of interest related to oral tissues. Prerequisite: Consent of the instructor.

529. Electron Microscopy in Dentistry. 1 Hour. Same as Hstl 515. Principles, theory, and practice of transmission and scanning electron microscopy, and energy dispersive x-ray microanalysis. Processing, sectioning, staining and examination of tissues. Prerequisite: Consent of the instructor.
595. Seminar in Oral Pathology. 2 Hours. S/U grade only. Reviews, reports, and discussion topics are drawn from the literature and material of surgical oral pathology. Prerequisite: Consent of the instructor.

598. Research in Oral Pathology. 0 to 16 Hours. S/U grade only. Independent thesis research on basic biomedical phenomena or specific oral disease(s). Prerequisite: Consent of the advisor.

**Oral Sciences (OSci)**

451. Research Methodology. 1 Hour. Primarily intended for students enrolled in the Master of Science in Oral Sciences degree program. Designed to help the student understand, utilize and appreciate the process of scientific inquiry. Prerequisite: Matriculation into the Master of Science in Oral Sciences program, or courses in basic biological sciences or the equivalent background and consent of the instructor.

452. Biological Basis of Oral Diseases. 2 Hours. Focuses on the biological basis of oral disease and modern concepts in the biomedical sciences. Prerequisites: Matriculation into the Master of Science in Oral Sciences program, or BCHe 411 and Hstl 451 or the equivalent courses, or consent of the instructor.

580. Seminar in Oral Sciences I. 1 Hour. S/U grade only. Faculty led. Presentation and discussion of original research followed by a question/answer/discussion session between faculty members presenting, supporting faculty and students. Prerequisite: Graduate standing in the Master of Science in Oral Sciences program or consent of the instructor.

581. Seminar in Oral Sciences II. 1 Hour. S/U grade only. Student led. Seminars include presentations and discussion of selected key papers by the student in his or her field of research. Prerequisite: Graduate standing in the Master of Science in Oral Sciences program or consent of the instructor, and OSci 580.

590. Hominid Evolution, Dental Anthropology, and Human Variation. 1 Hour. Evolution; hominid origins; organization and development of human dentition, agenesis, metric and non-metric variation in tooth form, human growth and maturation, variation and adaptation. Prerequisite: Consent of the instructor.

593. Independent Research in Oral Sciences. 1 to 8 Hours. S/U grade only. Faculty supervised research projects. Research may not duplicate that being done in OSci 598. Prerequisite: Consent of the instructor.

594. Special Topics in Oral Sciences. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Content varies. Selected topics of current interest in oral sciences. Prerequisites: Graduate or postgraduate standing and consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Faculty-supervised independent study not included in regular course offerings. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Thesis research to fulfill master's degree requirements. Prerequisites: Matriculation into the Master of Science in Oral Sciences program and consent of the Director of Graduate Studies.

**Orthodontics (Ortd)**

513. Craniofacial Growth and Development. 4 Hours. Physiology of the stomatognathic system, behavioral development, implications of craniofacial growth and development, reactions of periodontal tissues to applied force and prevalence; causes of malocclusion. Prerequisite: Matriculation into Certificate Program in Orthodontics or MS in Oral Sciences program.

521. Methodologies in Craniofacial Research. 1 Hour. Demonstration and discussion of the techniques and methods employed in the study of the structure, growth and function of the craniofacial region.

522. Craniofacial Anomalies I. 2 Hours. Introduction to a variety of orofacial clefts, etiology, clinical presentation, growth and development and habilitation via an interdisciplinary team approach. Longitudinal analysis of cases with cleft lip and palate.

525. Craniofacial Anomalies II. 1 Hour. Introduction to treatment aspects of patients with orofacial clefts and to a variety of craniofacial anomalies, their etiology, clinical presentation, growth and development and habilitation through a team approach. Clinical rotations through the Center for Craniofacial Anomalies. Prerequisite: Ortd 524.

537. Biostatistics Applied to Craniofacial Research. 2 Hours. Multivariate statistical techniques applied to craniofacial growth research. Prerequisites: Ortd 523 and a basic univariate statistics course.

545. Seminar in Orthodontics. 1–2 Hours. May be repeated for a maximum of 13 hours of credit. S/U grade only. Presentations by selected guest lecturers on research or clinical material relating to matters of interest to the Department of Orthodontics. Prerequisite: Enrollment in the orthodontics post-graduate or oral sciences graduate program.

**Pathology (Path)**

421. General Pathology—Dental. 3 Hours. Basic principles of pathological processes. Prerequisites: Anat 440, Path 407, and PhyB 401, or consent of the instructor.

422. Systemic Pathology—Dentistry. 3 Hours. Disease process affecting specific organs. Prerequisite: Path 421.

425. General Pathology. 3 Hours. Basic principles of pathological processes, including tissue injury and repair, inflammation, circulatory disturbances, retrograde processes and tissue responses to specific infectious agents and neoplasms. Prerequisites: Anat 440 or 425 or the equivalent and PhyB 401 or the equivalent, or consent of the instructor.

426. Organ Pathology. 5 Hours. The disease processes affecting specific organs and anatomic systems. Prerequisite: Path 425 or consent of the instructor.

427. Clinical Pathology. 4 Hours. Practical application of the clinical aspects of laboratory medicine. Emphasizes problem solving at the laboratory level and clinico-pathological correlation. Prerequisite: Path 425 and consent of the instructor.

500. Concepts of Scientific Inquiry. 1 Hour. Analyzes the design, execution and reporting of scientific investigations to help develop insight into the research process.

501. Experimental Pathology. 3 Hours. Survey of experimental pathology: general principles and techniques. Prerequisites: Path 425 and 426 or the equivalents, or consent of the instructor.

503. Molecular Pathology. 2 Hours. Molecular pathology principles and techniques; application to unfold molecular basis of disease. Molecular diagnostic testing to determine disease by examining RNA, DNA or protein. Prerequisite: Path 501.

505. Quantitative Morphology. 2 Hours. Same as Anat 505. Principles and practice of morphometry and stereology, which are methods for quantitating structure. Specific application to the histological and ultrastructural levels of anatomy and pathology. Prerequisites: Path 425 and 504, or Anat 442, or consent of the instructor.

506. Medical Immunology. 2 Hours. Role of immune process in health and disease. Prerequisites: Path 425, and MIm 451 or the equivalent or consent of the instructor.

507. Physiological Basis of Pathology. 2 Hours. Same as Hstl 507. Subject matter allied to general pathology but going deeper into physical chemistry and physiological principles, as set forth in N.R. Joseph’s Comparative Physical Biology. Prerequisite: Hstl 401 or Path 421 and 422.

508. Clinical Pathophysiology I. 3 Hours. Pathophysiological alterations that occur as the result of disease. Emphasizes the following disease processes: neoplastic, infectious, immunological, hematologic, cardiovascular, respiratory, and renal. Prerequisites: Path 425 and Path 426.

509. Clinical Pathophysiology II. 3 Hours. Continuation of Clinical Pathophysiology I. Pathophysiological disease processes in the following systems: gastrointestinal, hepatobiliary, nervous, female and male genitalia, skin, musculoskeletal and endocrine. Prerequisite: Path 508.

520. General Clinical Chemistry. 3 Hours. Same as MLS 520. Clinically significant lipids, enzymes, hormones, trace metals and vitamins; acid-base and electrolyte balance; medical relevance; methods of analysis/automation; therapeutic drug monitoring and toxicology. Prerequisite: Consent of the instructor.
522. Clinical Biochemistry. 5 Hours. Clinical chemistry principles and techniques and its role in diagnosis and treatment; chemistry of major body constituents in health and disease; effective use of the laboratory. Prerequisite: Bche 460 or the equivalent.

527. Clinical Laboratory Method Evaluation. 3 Hours. Same as MLS 527. Includes development and comparison of clinical laboratory methods; also, statistical methods of evaluating sensitivity, specificity, precision, accuracy, predictive value, and cost effectiveness. Prerequisite: Consent of the instructor.

530. Medical Bacteriology. 3 Hours. Principles, theory and practice of diagnostic bacteriology and infectious diseases. Prerequisite: Mfm 452 or the equivalent.

534. Medical Mycology, Parasitology, and Virology. 3 Hours. An advanced microbiology course on the latest theoretical and practical concepts of human pathogenic fungi, protozoa, helminths and viruses and their relation to disease and diagnosis. Prerequisite: Mfm 452 or consent of the instructor.

595. Pathology Seminar and Journal Club. 2 Hours. S/U grade only. Weekly seminar and journal club covering selected fields of interest and research in pathology.

598. Master's Thesis Research. 0 to 16 Hours. Students may register for more than one section per term. S/U grade only. Research in experimental pathology towards MS degree.

599. PhD Thesis Research. 0 to 16 Hours. Students may register for more than one section per term. S/U grade only. Research in experimental pathology towards a PhD degree.

Pediatric Dentistry (PedD)

410. Principles and Methods in Dental Research I. 2 Hours. Introduces students to several of the more commonly used statistical, procedures for testing hypotheses; provides students with a beginners set of tools for using statistics. Prerequisites: Enrollment in post-graduate or graduate program in pediatric dentistry.

411. Principles and Methods in Dental Research II. 2 Hours. Designed to provide the student with an understanding of the scientific method. Prerequisite: PedD 410.

501. Dental Pediatrics I. 2 Hours. The pathophysiology and biologic basis of the neurologically, mentally and medically compromised developing child and the implications to dental management and research.

502. Dental Pediatrics II. 2 Hours. The pathophysiology and biologic basis of the neurologically, mentally and medically compromised developing child and the implications to dental management and research. Prerequisite: PedD 501.

595. Pediatric Dentistry Seminar. 2 Hours. S/U grade only. Presentation and discussion of current literature and research in pediatric dentistry, medical and dental aspects of pulp therapy, traumatology, fluorides and cariology. Provides behavior guidance and application of material from other areas.

Pharmaceutics (PmPc)

See Biopharmaceutical Sciences (BpS)

Pharmacodynamics (PmPd)

See Biopharmaceutical Sciences (BpS)

Pharmacognosy (PmPg)

480. Biological Evaluation of Natural Products. 3 Hours. Short-term procedures useful for the discovery and characterization of natural product drugs, with related laboratory experiments, and principles of more advanced drug development. Prerequisite: Consent of the instructor.

510. Research Techniques in Pharmacognosy. 3 Hours. Introduction to the techniques used in pharmacognosy.

511. Advanced Pharmacognosy. 4 Hours. A theoretical and applied course designed to acquaint the student with the occurrence, isolation, characterization, identification, biosynthesis and activity profile of biologically active natural products. Prerequisite: PmPg 510 or the equivalent or consent of the instructor.

512. Microscopy of Natural Drug Products. 3 Hours. Use of microscopic methods in the identification of natural drugs and herbal products, with emphasis on the use of light and scanning electron microscopes. Prerequisite: PmPg 517 or consent of the instructor.

513. Structure of Biopolymers. 3 Hours. Same as Bche 513 and Mfm 513. Explores the relationship between structural stability, kinetic properties and function of biopolymers, with particular emphasis on proteins and nucleic acids. Prerequisites: Bche 460 and a year of physical chemistry; or consent of the instructor.

515. Structure Elucidation of Natural Products I. 2 Hours. A review of modern spectroscopic and chemical techniques as applied to the determination of structure of natural products. Prerequisites: PmPg 511 and MdcCh 562.

516. Structure Elucidation of Natural Products II. 2 Hours. A review of modern spectroscopic and chemical techniques as applied to the determination of structure of alkaloidal natural products. Prerequisites: PmPg 511 and MdcCh 562.

517. Problem-Solving in Plant Taxonomy. 4 Hours. Principles and concepts in plant taxonomy, which include identification, classification, nomenclature, discussion of major recent/modern systems, family characterization and field work methods. Prerequisite: Consent of the instructor.

518. Correlative Phytochemistry. 2 Hours. Distributional correlation of well-defined groups of secondary phytoconstituents with existing plant classification systems as an aid in the search for biologically active natural products. Prerequisite: PmPg 517.

519. Fermentation and Biotransformation. 2 Hours. The fermentation and biotransformation of natural products will be examined. Prerequisite: PmPg 511.

520. Ethnopharmacology Field Work. 4 Hours. Studies of plants used by primitive peoples as medicinal agents, in defined geographic areas, primarily through interviews with medicine men and the populace. Plant material will be collected for subsequent study. Prerequisites: PmPg 517 or consent of the instructor. Contingent on the availability of funds for travel support.

521. Recent Advances in Pharmacognosy. 2 Hours. A review of recent progress in the chemistry, biosynthesis and biological properties of natural products. Prerequisite: PmPg 511.

522. Laboratory Techniques in Pharmaceutical Biotechnology I. 3 Hours. Students will perform laboratory research rotations as assigned by the Biotechnology track faculty in the three laboratories of the Center for Pharmaceutical Biotechnology in the College of Pharmacy. Prerequisite: Credit or concurrent registration in Bche 460; or consent of the instructor.

569. Predictive Strategies in Pharmacognosy. 2 Hours. Consideration of the methods employed for the selection of plants that are most likely to yield biologically active compounds. Prerequisites: Demonstration of competency in organic chemistry, botany and pharmacology.

595. Seminar in Pharmacognosy. 1 Hour. May be repeated for a maximum of 2 hours of credit. S/U grade only. Presentation on a current research topic.

598. Master's Research in Pharmacognosy. 0 to 16 Hours. S/U grade only. Research for completion of master's degree.

599. Doctoral Research in Pharmacognosy. 0 to 16 Hours. May be repeated for credit. S/U grade only. Research for students in the pharmacognosy doctoral program.

Pharmacology (Pcoil)

425. Medical Pharmacology. 6 Hours. Animals used in instruction. This is a College of Medicine course and does not follow the regular academic calendar. A lecture, conference and laboratory course on human pharmacology. Drug mechanisms, toxicities and kinetics are presented as a foundation to therapeutic application. Prerequisites: Bche 460 and general human physiology.

430. Principles of Toxicology. 2 Hours. Same as EOHS 457. Examines the toxic effects of drugs and chemicals on organ systems. Lectures emphasize basic principles, effects on specific organ systems, major classes of toxic chemicals and specialized topics such as forensic and industrial toxicology. Prerequisite: Pcoil 425 or consent of the instructor.

505. Advanced Topics in Receptor Pharmacology and Physiology. 2 Hours. Same as Phyb 505. Lecture/discussions of theoretical and experimental aspects of neurotransmitter, hormone and
drug interactions with tissue receptors. Topics include drug receptor theory and signal transduction mechanisms. Prerequisite: Bche 460.

**508. Drug Metabolism and Disposition. 2 Hours.**
Animals used in instruction. Basic principles underlying the metabolism and disposition of drugs. Biochemical mechanisms influencing the therapeutic and/or toxic effects of drugs and other foreign compounds. Prerequisite: Consent of the instructor.

**510. Molecular Pharmacology of the Cardiovascular System and Platelets. 2 Hours.**
Novel therapeutic approaches to: failing or dysrhythmic heart, prevention/dissolution of thrombi, vascular tone regulation, platelet dysfunction and platelets as model cells for excitation mechanisms. Prerequisites: Bche 460 and Phyb 401.

**520. Neuropharmacology of Membranes, Channels, Receptors, and Transmitters. 2 Hours.**
The mechanisms of pharmacological agents acting on membrane channels, synaptic transmission and neurons will be covered. An emphasis will be placed on drugs as tools in the investigation of central nervous system function. Prerequisite: Pcel 425 or consent of the instructor.

**530. Pharmacology and Biology of the Vessel Wall. 2 Hours.**
Regulation of physiological and pathological processes in the cardiovascular system; e.g. endothelial barrier, cell adhesion, smooth muscle proliferation, angiogenesis, endothelial gene expression. Pharmacological treatment of cardiovascular diseases. Prerequisites: Bche 460 and Phyb 401; or consent of the instructor.

**594. Special Topics. 1 Hour.**
May be repeated for credit. Organized presentation and discussion of rapidly developing research areas in molecular, cellular and systems pharmacology. Prerequisite: Consent of the instructor.

**595. Pharmacology Seminar. 1 Hour.**
May be repeated for credit. S/U grade only. Presentation of research and/or current literature by invited lecturers and students.

**596. MS Thesis Research. 0 to 16 Hours.** S/U grade only. Thesis work under supervision of a graduate advisor.

**599. PhD Thesis Research. 0 to 16 Hours.** S/U grade only. Thesis work under supervision of a graduate advisor.

### Pharmacy (Phar)

**400. Pharmacokinetics. 3 Hours.** Concepts and principles in pharmacokinetics including theories and basis for drug receptor actions, drug absorption, distribution, excretion and biotransformation. Prerequisites: Credit or concurrent registration in Phar 322 and 332 and Phyb 302.

**401. Principles of Drug Action and Therapeutics I. 3 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics and toxicology in the drug actions related to the disease states associated with the endocrine, renal, optical and auditory systems. Prerequisites: Phyb 302 and Phar 400.

**402. Principles of Drug Action and Therapeutics II. 4 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics and toxicology in the areas of the autonomic nervous system, cardiology, lipid disorders and hypertension. Prerequisites: Phyb 302; and Phar 342 and 400.

**403. Principles of Drug Action and Therapeutics III. 3 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of pain management and psychiatric disorders. Prerequisites: Consent of the instructor; and Phar 352 and 401 and 402.

**404. Principles of Drug Action and Therapeutics IV. 3 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics and toxicology in the areas of women’s and men’s health, respiratory disorders, diabetes and pediatrics. Prerequisites: Consent of the instructor; and Phar 352 and 401 and 402.

**405. Principles of Drug Action and Therapeutics V. 3 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of drug abuse, cerebrovascular diseases, parkinson’s and epilepsy. Prerequisites: Consent of the instructor; and Phar 353 and 401 and 402.

**406. Principles of Drug Action and Therapeutics VI. 3 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the area of infectious disease. Prerequisites: Consent of the instructor; and Phar 353 and 401 and 402.

### Pharmacy Administration (PmA)

**413. Images of Pharmacy in the Arts. 2 Hours.**
Same as MImm 413. Diverse art forms present human dimensions of pharmacy and implications in pharmacy practice, raising issues about professional ethics and personal values of patients and practitioners.

**421. Pharmaceutical Marketing. 3 Hours.**
Introduction to the field of marketing with special emphasis on pharmaceuticals and the marketing of pharmacy services.

**433. Clinical Drug Trials. 2 Hours.**
Methods for collecting and evaluating clinical drug trial data to support claims of product safety and efficacy in the approval process. Prerequisites: PmA 303 and consent of the instructor.

**440. Social Factors in Health & Illness Related to Pharmaceuticals. 2 Hours.**
The human behaviors related to illness/health, with emphasis on the function of pharmacy. Selected topics include professionalism, sociology of drugs and medication use. Prerequisite: Enrollment in the PharmD program or consent of the instructor.

**460. Introduction to Health Informatics. 1 Hour.**
Introduce the student to health informatics in the context of the changing environment in pharmacy. The student will develop an understanding of the role of informatics in practice and how pharmacy information systems interact with society and other systems. Prerequisites: Same as MImm 413.

**481. History of Pharmacy. 2 Hours.**
The development of pharmacy throughout history with emphasis on American practice. Prerequisite: PmA 300.

**482. Professional Practice Management. 3 Hours.**
Managerial functions of the pharmacist in all practice environments. Prerequisite: Admission into the MS or PhD program.

**500. Philosophical Issues in Research. 2 Hours.**
Same as MHum 500. An in-depth examination of foundational issues underlying research questions of ethics, design, conduct and evaluation pertaining to pharmaceutical preparations.

**502. Research Methods in Pharmacy Administration. 3 Hours.**
Focuses on “how-to-do” a research project and “why-to-use” a particular technique including meta-analysis, path analysis, conceptualization, measurements and data processing. Prerequisites: Soc 500 and consent of the instructor.

**507. Pharmacy and Its Environment. 2 Hours.**
Factors directly influencing the practice of pharmacy. Roles of the pharmacist as affected by contemporary organizational, legislative, societal and fiscal environments. Prerequisite: Admission into the MS or PhD in Pharmacy program.

**407. Principles of Drug Action and Therapeutics VII. 4 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of transplants, gastrointestinal disorders, body fluids, nutrition, and the impact of drug therapies on a geriatric person. Prerequisites: Consent of the instructor; and Phar 353 and 401 and 402.

**408. Principles of Drug Action and Therapeutics VIII. 3 Hours.**
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of bones and joints, hematological disorders, oncology. Prerequisites: Consent of the instructor; and Phar 353 and 401 and 402.

**410. Molecular Pharmacology of the Cardiovascular System and Platelets. 2 Hours.**
Novel therapeutic approaches to: failing or dysrhythmic heart, prevention/dissolution of thrombi, vascular tone regulation, platelet dysfunction and platelets as model cells for excitation mechanisms. Prerequisites: Bche 460 and Phyb 401.

**413. Images of Pharmacy in the Arts. 2 Hours.**
Same as MImm 413. Diverse art forms present human dimensions of pharmacy and implications in pharmacy practice, raising issues about professional ethics and personal values of patients and practitioners.

**421. Pharmaceutical Marketing. 3 Hours.**
Introduction to the field of marketing with special emphasis on pharmaceuticals and the marketing of pharmacy services.

**433. Clinical Drug Trials. 2 Hours.**
Methods for collecting and evaluating clinical drug trial data to support claims of product safety and efficacy in the approval process. Prerequisites: PmA 303 and consent of the instructor.

**440. Social Factors in Health & Illness Related to Pharmaceuticals. 2 Hours.**
The human behaviors related to illness/health, with emphasis on the function of pharmacy. Selected topics include professionalism, sociology of drugs and medication use. Prerequisite: Enrollment in the PharmD program or consent of the instructor.

**460. Introduction to Health Informatics. 1 Hour.**
Introduce the student to health informatics in the context of the changing environment in pharmacy. The student will develop an understanding of the role of informatics in practice and how pharmacy information systems interact with society and other systems. Prerequisites: Same as MImm 413.

**481. History of Pharmacy. 2 Hours.**
The development of pharmacy throughout history with emphasis on American practice. Prerequisite: PmA 300.

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**500. Philosophical Issues in Research. 2 Hours.**
Same as MHum 500. An in-depth examination of foundational issues underlying research questions of ethics, design, conduct and evaluation pertaining to pharmaceutical preparations.

**502. Research Methods in Pharmacy Administration. 3 Hours.**
Focuses on “how-to-do” a research project and “why-to-use” a particular technique including meta-analysis, path analysis, conceptualization, measurements and data processing. Prerequisites: Soc 500 and consent of the instructor.

**507. Pharmacy and Its Environment. 2 Hours.**
Factors directly influencing the practice of pharmacy. Roles of the pharmacist as affected by contemporary organizational, legislative, societal and fiscal environments. Prerequisite: Admission into the MS or PhD in Pharmacy program.

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.

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510. Problems in Pharmacy Management. 3 Hours. Selective managerial problems relative to pharmacy practice. Field work involves data collection based on individual and group models of the managerial decision process. Prerequisite: PmA 482 or the equivalent.

511. Advanced Pharmaceutical Marketing. 3 Hours. Marketing issues facing the U.S. major players in the pharmaceutical process including the development and access to pharmaceuticals as well as the regulatory and economic environment. Prerequisite: PmA 482 or the equivalent or consent of the instructor.

516. Drug Insurance. 3 Hours. Theoretical constructs and practical problems in designing, operating and evaluating large drug insurance programs including quality assurance techniques to facilitate rational prescribing and dispensing. Prerequisites: PmA 507 and consent of the instructor.

520. Problems in Computer Applications in Pharmacy Administration. 2 Hours. Illustrations and applications in pharmacy research pertaining to operating systems, communications protocols, architecture, compilers, programming languages, interpreters, databases, expert systems, and artificial intelligence. Prerequisites: Working ability with the ADN and working knowledge of: one operating system (CMS, DOS, UNIX), one editor, and one statistical analysis package (either mainframe or microcomputer-based).

525. Medication, Identity, and Illness. 3 Hours. Concepts and principles of human behavior related to pharmacy practice including understanding of patient behavior and methods to facilitate patient and inter-professional communication. Prerequisites: PmA 321 or consent of the instructor.

535. Health Policy and Pharmaceutical Care. 3 Hours. Regulatory controls and reform proposals covering drug approval, manufacture, marketing and use, including problems of drug diversion, lag, orphan products, and patent restoration. Prerequisite: PPA 500.

571. Principles of Pharmacoeconomics. 3 Hours. Evaluation of pharmaceutical services and its role in pharmaceutical firms, in shaping public policy and evaluating the outcome of patient care after drug therapy intervention. Prerequisites: Econ 511; and HPA 522 and PmA 511 or the equivalents.

594. Special Topics in Pharmacy Administration. 1 to 3 Hours. May be repeated for a maximum of 6 hours of credit. Topics vary. Intensive analysis of contemporary issue(s) associated with delivery and financing of pharmaceutical products and professional services.

595. Departmental Seminar. 1 Hour. S/U grade only. May be repeated for credit. Presentation by students, faculty and visiting experts. Topics to be arranged. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Individual research under direction of a member of the faculty. Prerequisites: PmA 502 or consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Open only to degree candidates. Independent research on topic approved by student's graduate committee. Prerequisite: Consent of the committee.

699. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only: Open only to degree candidates. Independent research on topic approved by student's graduate committee. Prerequisite: Consent of the committee.

Pharmacy Practice (PmPr)

430. Critical Care I. 2 Hours. Advanced pharmacotherapeutics course that will concentrate on the medical management and the pharmacotherapist's role in the management of the critically ill patient. Prerequisites: Phar 402, 403, 404, 405, 406 and concurrent registration in Phar 407 and 408 and completion of second year of the program.

Philosophy (Phil)

400. Philosophical Writing. 1 Hour. Fulfills writing in the discipline requirement. Philosophical issues covered will vary from semester to semester. Must be taken in conjunction with designated 400-level courses. See the undergraduate advisor for details. Prerequisites: Major in philosophy and concurrent registration in a 400-level philosophy course as designated in the Timetable.

401. Theory of Knowledge. 4 Hours. Survey and analysis of key topics in epistemology, such as skepticism, the nature of propositional knowledge, justification, perception, memory, induction, other minds, naturalistic epistemology. Prerequisite: Phil 201 or consent of the instructor.

403. Metaphysics. 4 Hours. Intensive treatment of one or more topics, such as free will, personal identity, causation, existence, substance and attribute, the nature of the mind. Prerequisite: Phil 203 or 226 or 426 or consent of the instructor.

404. Philosophy of Science. 4 Hours. Selected works on the aims and methods of science; the status of scientific theories, natural laws, and theoretical entities; the nature of scientific explanation. Prerequisites: Phil 102 or 210 and one 200-level course in philosophy, or consent of the instructor.

410. Introduction to Formal Logic. 4 Hours. Review of predicate logic and of introductory set theory. The concept of a formal system. Notions of completeness and soundness. Introduction to Godel’s first incompleteness theorem. Prerequisite: Phil 210 or consent of the instructor.

416. Metalogic I. 4 Hours. Students who have taken Math 430 may not register for this course. Should be taken in sequence with Phil 417. Metatheory for sentence and predicate logic. Completeness and compactness theorems and their applications. Prerequisite: Phil 210 or consent of the instructor.

417. Metalogic II. 4 Hours. Effective computability and recursive functions. Peano arithmetic. Arithmetization of syntax. Incompleteness and undecidability: Godel’s and Church’s theorems. Prerequisite: Phil 416 or consent of the instructor.

420. Plato. 4 Hours. May be repeated once for credit with the consent of the department. Careful reading of selected works. Prerequisite: Phil 220 or 221 or 3 courses in philosophy or consent of the instructor.

421. Aristotle. 4 Hours. May be repeated once for credit with the consent of the department. Careful reading of selected works. Prerequisite: Phil 220 or 221 or 3 courses in philosophy or consent of the instructor.

422. Medieval Philosophy. 4 Hours. Study of selected philosophers such as Augustine, Boethius, Averroes, Maimonides, Aquinas, William of Ockham, Buridan, Suarez. Prerequisite: Phil 220, 221, 420, or 421 or consent of the instructor.

423. Studies in Early Modern Philosophy. 4 Hours. May be repeated once for credit with the consent of the department. Careful reading of selected works of one or more philosophers, 1600 to 1750, such as Descartes, Hobbes, Spinoza, Leibniz, Locke, Berkeley, Hume, Reid, and Rousseau. Prerequisite: Phil 223 or 224 or 3 courses in philosophy or consent of the instructor.

424. Kant. 4 Hours. Intensive study of Kant’s metaphysics and theory of knowledge with main reading drawn from the Critique of Pure Reason. Prerequisite: Phil 223 or 224 or 3 courses in philosophy or consent of the instructor.

425. Studies in Nineteenth-Century Philosophy. 4 Hours. Careful reading of one or more post-Kantian philosophers such as Hegel, Schelling, Fichte, Schopenhauer, Marx, J.S. Mill, Kierkegaard, Nietzsche. Prerequisite: One 200-level course in philosophy or consent of the instructor.

426. Analysis and Logical Empiricism. 4 Hours. Developments in twentieth century philosophy with roots in the study of logic and language, such as logical atomism, logical empiricism, and contemporary analytic philosophy. Topics vary. Prerequisite: Phil 210 or 226 or consent of the instructor.

427. Continental Philosophy II: European Thought Since 1960. 4 Hours. European thought since 1960: Existential Marxism; critical theory, structuralism; post-structuralism and deconstruction. Prerequisite: Phil 227 or consent of the instructor.

429. Special Studies in the History of Philosophy. 4 Hours. May be repeated once for credit with the consent of the department. Advanced study of a historical school, period, or the development of a historical theme. Prerequisite: One 200-level course in the history of philosophy or consent of the instructor.

430. Ethics. 4 Hours. May be repeated once for credit with the approval of the department. Selected topics in moral philosophy, such
as normative ethics, value theory or meta-ethics. Prerequisite: One 200-level course in philosophy or consent of the instructor. Credit in a course in moral, social, or political philosophy is recommended.

431. Social/Political Philosophy. 4 Hours. May be repeated once for credit with consent of the department. Selected topics in social and political philosophy. Prerequisite: One 200-level course in philosophy or consent of the instructor. Credit in a course in moral, social, or political philosophy is recommended.

432. Topics in Ethics. 4 Hours. May be repeated once for credit with the approval of the department. Selected topics in ethics. Prerequisite: One 200-level course in philosophy or consent of the instructor. Credit in a course in moral, social or political philosophy is recommended.

433. Topics in Social/Political Philosophy. 4 Hours. May be repeated once for credit with the approval of the department. Selected topics in social and political philosophy. Prerequisite: One 200-level course in philosophy or consent of the instructor. Credit in a course in moral, social or political philosophy is recommended.

441. Topics in Philosophy of Religion. 4 Hours. May be repeated once for credit with the approval of the Department. Intensive study of one or more selected topics concerning the philosophical aspects of basic religious beliefs and concepts. Prerequisite: One 200-level course in philosophy (Phil 241 is recommended) or consent of the instructor.

500. Writing in Philosophy. 4 Hours. Required of all first-year PhD students. Practice in philosophical writing including finding a thesis. Judicious choice of reading on the topic, outlining, and composing drafts as well as style, paragraphing, and making sentences. Prerequisite: Graduate standing in philosophy.

501. Seminar: Topics in Ancient Philosophy. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

503. Medieval Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Two sections may be taken concurrently when topics vary. Intensive study of special topics in medieval philosophy.

504. Theoretical Approaches to Policy and Governance. 4 Hours. Same as PolS 504. Different theoretical approaches to the relationship between policy and governance and the philosophical foundations on which those approaches are based.

505. Seminar in Modern Philosophy. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive analysis of the work of one important philosopher or philosophical movement between 1600 and 1900.

508. Nineteenth-Century Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Students may register for more than one section per term. Topics in nineteenth-century philosophy.

509. History of Analytic Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Students may register for more than one section per term when topics vary. Topics in late nineteenth- and early twentieth-century Anglo-American philosophy.

510. History of Ethics and Social/Political Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Two sections may be taken concurrently when topics vary. Topics in the history of ethics or social-political philosophy.

513. Topics in History of Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Two sections may be taken concurrently when topics vary. Philosophers, philosophical schools, or intellectual trends other than those of the ancient and modern periods.

520. Topics in Contemporary Philosophy. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive analysis of the work of one important philosopher or philosophical movement of the twentieth century.

522. Feminist Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Students may register for more than one section per term. Topics in feminist philosophy.

524. Continental Philosophy. 4 Hours. May be repeated for credit with the approval of the department. Students may register for more than one section per term. Topics in continental philosophy.

526. Ethics. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

528. Social/Political Philosophy. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

530. Aesthetics. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics in aesthetics.

532. Metaphysics. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

534. Philosophy of Mind. 4 Hours. May be repeated for credit with the approval of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

536. Epistemology. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics in the contemporary theory of knowledge.

538. Philosophy of Language. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

540. Philosophy of Science. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary. Intensive study of selected topics.

542. Philosophy of Special Sciences. 4 Hours. May be repeated for credit with the approval of the department. Two sections may be taken concurrently when topics vary. Intensive study of special topics in philosophy of physics, philosophy of biology, or other sciences.

544. Philosophy of Logic. 4 Hours. May be repeated for credit with the consent of the department. Two sections may be taken concurrently when topics vary.

546. Philosophy of Mathematics. 4 Hours. May be repeated for credit with the approval of the department. Philosophical foundations of mathematics.

560. Recursion Theory I. 4 Hours. Same as Math 500. Primitive recursion, recursive and recursively enumerable sets, the arithmetic hierarchy, post’s problem and the finite injury priority method. Prerequisite: MCS 441.

562. Metamathematics I. 4 Hours. Same as Math 502. First order logic, completeness theorem and model theory. Prerequisite: Math 430 or consent of the instructor.

563. Metamathematics II. 4 Hours. Same as Math 503. Incompleteness theorems, elementary recursion theory and proof theory, first and second order arithmetic. Prerequisite: Phil 562.

565. Set Theory I. 4 Hours. Same as Math 504. Naive and axiomatic set theory. Independence of the continuum hypothesis and the axiom of choice. Prerequisite: Math 430 or Phil 562.


569. Advanced Topics in Logic. 4 Hours. Same as Math 512. Students may register for more than one section per term. Advanced topics in modern logic: e.g., descriptive set theory, model theory of fields, theory of hierarchies, stable groups. Prerequisite: Approval of the department.

590. Research Seminar. 4 Hours. May be repeated for credit. S/U grade only. A work-in-progress seminar for graduate students at the topical, prospectus, or dissertation level. Prerequisite: Completion of 10 of the 14 required courses for the PhD in Philosophy.

593. Independent Research. 2 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Topics and plan of study must be approved by the candidate’s advisor and by the staff member who directs the work.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Topics
and plan of study must be approved by the candidate's advisor and by
the staff member who directs the work.

599. Thesis Research. 0 to 16 Hours. May be repeated for
credit. Students may register for more than one section per term. S/U
grade only.

Physical Therapy (PT)

501. Science of Physical Therapy Practice. 3 Hours.
Concepts of evidenced-based physical therapy practice including
practice theory, measurement, outcomes assessment and critical
evaluation of bodies of literature in context of the health care system and
health policy. Prerequisite: Consent of the instructor.

502. Measuring Motor Development and Function. 3
Hours. Psychometric characteristics of standardized tests of motor
development and function. Survey of tests, test evaluation, interpretation
of test scores, and application to clinical practice. Prerequisites: Consent
of the instructor and a graduate-level course in statistics.

503. Analysis of Motor Development. 3 Hours.
Sensorimotor development in children, relating changes to maturation,
skill acquisition, motor learning, environmental influences and
individual differences. Includes critical review of current literature.
Prerequisite: Consent of the instructor. Recommended background: Prior experience in or knowledge of child development.

504. Assessment of Development Processes in
Infancy. 2 Hours. Motor and behavioral competencies of the
newborn, both term and preterm. Assessment of behavior and motor
dysfunction in infants; analysis of the literature on intervention.
Prerequisites: Consent of the instructor and credit or concurrent
registration in a graduate-level course in statistics.

510. Control of Posture and Locomotion. 2 Hours.
Review and analysis of normal and developmental aspects, assessment,
disorders, and rehabilitation of balance and gait disorders. Prerequisites:
PT 562 and consent of the instructor.

511. Therapeutic Intervention. 3 Hours. Provides clinicians
with an approach to integrate research into practice. The goal is to
acquire skills to evaluate therapeutic interventions in the literature and
in practice. Prerequisite: Consent of the instructor.

520. Mechanics of Joint Dysfunction. 3 Hours. Principles of
mechanics applied to pathology of joint components; mechanical and
neurological implications of extremity and spinal joint dysfunction;
critical review of pertinent literature. Prerequisite: PT 519.

521. Biomechanics of Locomotor Dysfunction. 3
Hours. Principles of mechanics applied to the study of walking
pattern. Kinematic and kinetic analysis of normal and pathological
deviations, and issues related to development from birth to adult
and neuromuscular control. Prerequisite: Consent of the instructor.

562. Neural Plasticity and Pathophysiology. 3 Hours.
Previously listed as: PT 462. Neurologic concepts underlying PNS/CNS
injury process and neural plasticity (nervous system remodeling and
reorganization). Neuropathology of conditions producing movement
dysfunction. Prerequisite: Consent of the instructor.

563. Measurement in Physical Therapy. 3 Hours.
Previously listed as: PT 463. Measurement theory and statistics
underlying the development of standardized tests. Critique of physical
therapy tests of strength, ROM, coordination, endurance, and activities
of daily living. Prerequisites: Consent of the instructor and any graduate-
level statistics course.

570. Planning and Evaluating Intervention Programs in
Various Settings. 3 Hours. Planning, implementation, and
evaluation of services for children with special needs. Emphasis on
conceptual frameworks in human development and family systems.
Program planning and evaluation. Prerequisite: Consent of the instructor.
Recommended background: Prior experience or knowledge of child
development.

571. Biomechanics of Normal and Abnormal
Movement. 3 Hours. Same as Kine 571. Previously listed as: PT
519. Principles of statics and dynamics exemplified by human
movements. Examination of muscle mechanics, joint forces, stability,
redundancy and intersegmental interactions in multijoint movements.
Prerequisites: Consent of the instructor.

572. Psychology of Motor Control and Learning. 3
Hours. Same as Kine 572. Advanced principles of the control and
acquisition of complex, voluntary skills. Prerequisites: Kine 354 or
consent of the instructor.

574. Instrumentation for Motor Control Research. 3
Hours. Same as Kine 574. Previously listed as: PT 522. Introduction to
oscilloscopes, amplifiers, filters, and transducers. Origin and
processing of electromyograms. Motion capture and processing
techniques. Prerequisite: PT 571.

575. Special Topics in Physical Therapy. 1 to 4 Hours.
May be repeated for a maximum of 8 hours of credit if topic is different
for each registration. Students may register for more than one section
per term. Selected topics of interest within physical therapy specialty
areas. Particular attention is given to topics of crosscutting importance
to these professions, especially applications in teaching, consultation,
and administration. Prerequisite: Consent of the instructor.

579. Seminar in Physical Therapy. 1 Hour. S/U grade only.
Topics of current interest in physical therapy. Includes discussions of
current research and important new developments in the specific
disciplines. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for
a maximum of 8 hours of credit. Students may register for more than
one section per term. For graduate students who wish to pursue
independent study not related to their project/thesis research.
Prerequisite: Consent of the instructor.

598. Research in Physical Therapy. 0 to 16 Hours. S/U
grade only. Independent research in one area of physical therapy directed
by a faculty member. Prerequisites: Foundation courses in research
methods and graduate-level statistics and consent of the instructor.

Physics (Phys)

401. Electromagnetism I. 4 Hours. Vector calculus;
 electrostatic fields in vacuum; solution of electrostatic boundary-value
problems; electrostatic fields in material media; electrostatic energy;
 electric currents. Prerequisites: Phys 142 and 215.

402. Electromagnetism II. 4 Hours. Magnetic fields of steady
currents and magnetic materials; electromagnetic induction; magnetic
energy; slowly-varying currents; a-c circuits; Maxwell's equations;
electromagnetic waves; bounded regions; special relativity. Prerequisite:
Phys 401.

411. Quantum Mechanics I. 4 Hours. Wave particle duality;
 wave functions; Schroedinger equation; mathematical structure of
 quantum mechanics; operators and observables; matrix representation
 of operators; three-dimensional Schroedinger equation. Prerequisite:
 Phys 441.

412. Quantum Mechanics II. 4 Hours. Orbital angular
momentum. Spin and vector addition of angular momenta; degenerate
 and nondegenerate perturbation theory; identical particles; time
 dependent perturbation theory; scattering theory. Prerequisite: Phys 411.

421. Modern Physics: Atoms and Molecules. 4 Hours.
Hydrogenic atoms, electron spin, external fields, multi-electron atoms,
diatomic molecules, line widths, photons, radiation from atoms and
other electromagnetic processes, positrons, positronium, elastic electron
scattering. Prerequisite: Credit or concurrent registration in Phys 411.

425. Modern Optics. 5 Hours. Review of electromagnetic wave
theory; advanced geometrical optics; Fourier transforms and optics;
 interference and diffraction; laser cavities and gain media; introduction
to nonlinear and fiber optics. Prerequisite: Phys 244.

429. Plasma. 4 Hours. Same as ECE 429. Single particle motion,
 plasma as fluids, waves in plasma, diffusion, resistivity, equilibrium,
 stability, introduction to kinetic theory. Prerequisite: ECE 322.

431. Modern Physics: Condensed Matter. 4 Hours.
Crystal structures; interatomic binding; lattice vibrations; thermal
and magnetic properties; quantum statistical mechanics; free electron theory
of metals; electronic band theory; semiconductors and insulators;
superconductivity. Prerequisites: Phys 411 and 461; or consent of the
instructor.

441. Theoretical Mechanics. 4 Hours. Variable motion, non-
 inertial frames, oscillations, rigid body motion, three-dimensional
motion, angular momentum, torque, orbits, Lagrange's equations.
Prerequisites: Phys 412 and 425.

450. Molecular Biophysics of the Cell. 4 Hours.
Introduction to molecular length, time, force, energy scales; statistical
thermodynamics of solutions; DNA, RNA and protein structure and
function; experimental methods; cell membranes; protein motors; energy
and information flow; prokaryote cell; eukaryote cell. Prerequisite: Phys
245 or the equivalent.
451. Modern Physics: Nuclei and Elementary Particles. 4 Hours. Accelerators, detectors, symmetries, conservation laws, leptons, weak interactions, electroweak theory, strong interactions, hadrons, nuclear forces, systematics and reactions, nuclear models, nuclear astrophysics, quarks, quantum chromodynamics. Prerequisite: Phys 411.

461. Thermal and Statistical Physics. 4 Hours. Thermal equilibrium (Zeroth Law); thermodynamic states (First Law); irreversibility; entropy (Second Law); thermodynamic potentials and properties; phase transitions; kinetic theory of gases; classical statistical mechanics. Prerequisite: Phys 245.

470. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, approval of the department.

471. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Phys 470, and approval of the department.

481. Modern Experimental Physics I. 4 Hours. Theory and experimental use of linear circuits, semiconductor devices, amplifiers, oscillators. Techniques and experiments in atomic, molecular and solid-state physics. Prerequisite: Phys 244.


494. Special Topics in Physics Teaching. 2 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Seminar on various topics related to the teaching of physics. Supervised practice. Subjects are announced.

499. Summary of Physics Problems. 1 Hour. May be repeated once for credit. No graduation credit for graduate students. Problem-solving techniques applied to the variety of undergraduate physics topics. Prerequisites: Credit or concurrent registration in Phys 401, 411, 441, 461, and 481.


513. Quantum Field Theory I. 3 Hours. Lagrangian formulation of relativistic wave equations. Quantum electrodynamics: Feynman rules, trace theorems, lowest-order calculations for several processes, self-energy, renormalization, higher-order diagrams. Prerequisite: Phys 512.

514. Quantum Field Theory II. 3 Hours. Path integrals, gauge theories, Weinberg-Salam model, electroweak processes, quantum chromodynamics, non-perturbative methods, topological objects in field theories, instantons. Prerequisite: Phys 513.


521. Molecular Physics. 3 Hours. Rotational and vibrational energies of molecules, potential curves, electronic transitions, transition moments, intensity rules, thermodynamic properties. Applications. Prerequisites: Phys 411 and 421 or consent of the department.

522. Laser Physics/Quantum Electronics. 3 Hours. Laser physics; population inversion; quantum theoretical calculation; modern laser systems; coherence phenomena; applications of lasers. Prerequisite: Phys 521 or approval of the department.

524. Group Theory in Physics. 3 Hours. Applications of group theory and symmetry principles to problems in elementary particle, solid-state, atomic and molecular physics. Prerequisite: Phys 512 or consent of the department.


533. Theory of Solids: Magnetism and Superconductivity. 3 Hours. The main body problem; many-particle states; functional integrals; Green's functions; Feynman diagrams; perturbation expansions; tree diagrams. Prerequisites: Phys 512 and 532.

534. Theory of Solids: Semiconductor Physics. 3 Hours. Spin systems; magnetism; equilibrium Green's functions; Landau theory of fermi liquids; Hubbard model; Luttinger model; non-equilibrium Green's functions; Keldysh; Kadonoff-Baym approach. Prerequisites: Phys 512 and 532.

540. Physics of Semiconductor Devices. 4 Hours. Same as ECE 540. Electrons in periodic lattice; equilibrium carrier distribution; energy band diagrams in junctions, in homogeneous semiconductors; recombination and generation; non-equilibrium processes, radiation and electric fields; diodes. Prerequisite: ECE 346 or the equivalent.

541. Theoretical Mechanics. 3 Hours. Variational principles; Lagrange and Hamilton equations; Hamilton-Jacobi theory; Poisson brackets, small oscillations; continuous systems and fields; dissipative systems; integrability. Prerequisite: Phys 442 or consent of the department.

545. Introduction to General Relativity. 3 Hours. Principle of equivalence, the metric field and geodesics, tensor analysis and differential geometry, Einstein's equations and the action principle, gravitational fields and waves, black holes. Prerequisites: Phys 502 and 541, or consent of the department.

551. Elementary Particle Physics I. 3 Hours. Phenomenology and theories of modern day particle physics. Classification of particles and their interactions. Survey of experimental techniques, accelerators and detectors. Prerequisite: Phys 512 or consent of the department.


561. Statistical Mechanics. 3 Hours. Density matrix. Information theory; Boltzmann-Gibbs distributions; the n-vector model; renormalization group theory; cellular automata. Prerequisite: Phys 461 or consent of the department.

581. Advanced Experimental Physics. 2 Hours. Experimental techniques in atomic, molecular and solid-ular and solid-state physics. Prerequisite: Phys 431 or consent of the instructor.

594. Special Topics in Modern Physics. 1 to 4 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Lectures on topics of current interest. Subjects are announced in the previous semester. Prerequisite: Phys 512.

595. Graduate Seminar. 2 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. S/U grade only. Seminars in areas of research activity within the department, covering recent contributions to the literature and
research in progress. Presentations by students, faculty and scientists from other institutions.

596. Individual Study. 2 to 4 Hours. S/U grade only. Students may register for more than one section per term. Special topics. Outside reading and a term paper are assigned by a special arrangement with the department and faculty. Prerequisite: Consent of the department.

598. Master’s Thesis Research. 0 to 16 Hours. S/U grade only. Student may elect to do thesis research to fulfill partial requirement for master’s degree. Prerequisite: Consent of the department.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Prerequisite: Consent of the department.

Physiology and Biophysics (PhyB)

401. Human Physiology I. 5 Hours. Lectures and conferences in human physiology. Emphasis is on cellular, nerve-muscle, cardiovascular, respiratory, and renal physiology. Prerequisites: Mathematics, undergraduate physics, and organic chemistry, and concurrent registration in graduate biochemistry, or consent of the instructor.

402. Human Physiology II. 5 Hours. Continuation of PhyB 401. Emphasizes gastrointestinal and physiology of the central nervous system, endocrine and reproductive systems. Prerequisite: A grade of C or better in PhyB 401 or consent of the instructor.


501. Endocrinology. 3 Hours. Review of the field of endocrinology will be followed by a systematic consideration of new concepts in endocrine gland and mechanism of hormone action. Attention will be paid to the most important areas of research being pursued at present. Prerequisite: PhyB 402 or consent of the instructor.

502. Physiology of Reproduction. 2 Hours. The purpose of this course is to enable students to acquire a detailed and up-to-date understanding of the biology of reproduction at both the physiological and molecular levels.

505. Advanced Topics in Receptor Pharmacology and Physiology. 2 Hours. Same as Pcol 505. Lecture/discussions of theoretical and experimental aspects of neurotransmitter, hormone and drug interactions with tissue receptors. Topics include drug receptor theory and signal transduction mechanisms. Prerequisite: Beche 460.

512. Gastrointestinal Physiology. 2 Hours. Advanced study of the physiology of the gastrointestinal tract. Special emphasis will be placed on recent developments in cellular and molecular aspects and on how they relate to established concepts in the literature. Prerequisite: PhyB 402 or consent of the instructor.

516. Physiology and Biochemistry of Muscle Contraction. 2 Hours. Same as Beche 516. Structure and function of myosin, actin, tropomyosin, troponin, and the sarcoplasmic reticulum; control, energetics, and mechanism of muscle contraction; gene expression.

518. Molecular, Cellular, and Integrative Cardiovascular Physiology. 3 Hours. Advanced study of the cardiovascular system from molecule to organism. Emphasis on recent developments at the molecular/cellular level and their relationship to overall function. Prerequisite: PhyB 401 or consent of the instructor.

523. Exercise Biology in Health and Disease. 3 Hours. Same as Kine 523. Interrelationships between exercise and various pathological conditions. Current research focusing on molecular and cellular mechanisms in healthy and diseased states. Prerequisite: Consent of the instructor.

524. Exercise Physiology: Training Adaptations and Mechanisms. 3 Hours. Same as Kine 524. Metabolic, endocrine, circulatory, respiratory, and molecular biology alterations that occur in response to exercise. Prerequisite: Consent of the instructor.

525. Exercise Physiology: Hormonal Implications. 2 Hours. Same as Kine 525. Relationship of endocrine system to anatomical, physiological, and biochemical alterations that occur in response to exercise; a mechanistic approach. Prerequisite: Consent of the instructor.

531. Molecular Biophysics. 2 Hours. Structural and dynamical studies of biomolecules by means of biophysical techniques. Prerequisites: One year each of college chemistry, physics, and quantum mechanics, or consent of the instructor.

532. Nuclear Magnetic Resonance. 2 Hours. An introduction to the principles of analysis of structure and dynamic properties of biomolecules by means of nuclear magnetic resonance (NMR) spectroscopy. Fundamentals of NMR theory. Prerequisites: One year each of college chemistry, physics, mathematics, and quantum mechanics or consent of the instructor.

533. Nuclear Magnetic Resonance in Biophysics. 2 Hours. Continuation of PhyB 532. Analysis of structure and dynamics of biomolecules in vitro and in vivo by means of nuclear magnetic resonance spectroscopy. Prerequisite: PhyB 532 or consent of the instructor.

544. Renal Physiology. 2 Hours. Renal physiology, regulation of body fluid balance, acid-base balance, renal tubular transport. Prerequisite: PhyB 402 or consent of the instructor.

569. Methods in Experimental Physiology. 3 Hours. Primarily for students in physiology. Registration limited to eight. A laboratory course designed to acquaint students with advanced techniques and methodology in physiologic investigations. Prerequisites: Enrollment in the MS or PhD in Physiology and Biophysics program, and credit or concurrent registration in PhyB 401 or the equivalent, or consent of the instructor.

585. Cell Biology. 4 Hours. Same as Anat 585 and MIm 585. Functional and structural organization of the cell with emphasis on the cellular basis of physiological activity.

586. Cell Physiology I. 4 Hours. Advanced functional and structural organization of the cell with emphasis on the cellular basis of physiological activity. Prerequisite: PhyB 402 and 585 and Beche 460, or consent of the instructor.

588. Membrane Biochemistry and Biophysics I. 2 Hours. Discussion of the physical and chemical properties of biological membranes and how they relate to their function as barriers capable of transporting water, electrolytes, solutes and macromolecules. Prerequisites: PhyB 402 and Beche 460.

589. Membrane Biochemistry and Biophysics II. 2 Hours. Continuation of PhyB 588. Relation of the properties of biological membranes to their function in specialized systems. Prerequisite: PhyB 588.

591. Departmental Seminar. 1 Hour. May be repeated for credit. S/U grade only. Required of all physiology and biophysics students each fall and spring semester while enrolled in the graduate program. Weekly seminar by staff and invited speakers. Prerequisite: Graduate or professional standing.

592. Tactics and Strategy of Research in Physiology. 2 Hours. Course presents an analysis concerning various approaches in solving current physiology problems. Emphasizes critical reading of the literature. Prerequisite: PhyB 401.

594. Special Topics in Physiology and Biophysics. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Topics may include bioengineering, endocrinology, membrane biology, ion transport and its regulation, muscle physiology, neurophysiology, molecular neurobiology and others of current significance in physiology and biophysics. Prerequisite: Consent of the instructor.

595. Journal Club and Seminar in Physiology. 1 Hour. S/U grade only. Student presentation and discussion of assigned topics of current importance in physiology and biophysics as well as related fields. Prerequisites: Consent of the instructor. Limited to degree candidates in physiology and biophysics.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Individual study guided by a faculty member. The format of the course, examination and grading to be established by the faculty member. Prerequisite: Consent of the instructor.

598. MS Thesis Research. 0 to 16 Hours. S/U grade only. Thesis work under the supervision of a graduate advisor. Prerequisite: Graduate standing in Physiology and Biophysics.

599. Thesis Research. 0 to 16 Hours. S/U grade only. Thesis work under the supervision of a graduate advisor.

Policy Studies (PS)

406. Politics of Urban Education. 4 Hours. Same as PoIS 440. Relations between school governance and urban politics. The role of educational interest groups, school boards, professional educators, and citizens in formulation and execution of educational policy.

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
453. Topics in Education Policy. 4 Hours. May be repeated for a maximum of 12 hours of credit. Workshop; emphasis on issues related to school organization, control and community relations. Topics are announced at the time the class is scheduled.


510. Seminar in Urban Education. 4 Hours. S/U grade only. This required doctoral seminar will be taken in the first year of doctoral study. It introduces theoretical perspectives and research problems in both concentrations of the PhD program as well as relation between educational and social changes. Prerequisite: Consent of the instructor, or admission to the PhD in Policy Studies in Urban Education program.

512. The Nature and Interpretation of Evidence in Educational Policy Research. 4 Hours. This required course in educational research methodology provides students with basic research tools and skills in interpreting and representing quantitative and qualitative data. Students learn research design and critique. Prerequisites: Ed 500 and enrollment in the PhD in Policy Studies in Urban Education program or consent of the instructor.

535. Leadership and Educational Supervision. 4 Hours. Same as CIE 551. Theory and practice of supervisory leadership in educational settings; effects of interactive factors on performance assessment and professional development. Field experience requirement. Prerequisite: Ed 430 or 431, or consent of the instructor.

540. Administration of Student Personnel Services. 4 Hours. Administrator support roles and responsibility for pupil personnel services; school-community relations and guidance services.

542. The Counseling Process. 4 Hours. Nature, functions, and goals of counseling in urban schools. Theories with applications for school and agency counseling, and related problems and issues. Prerequisite: PS 540.

550. Foundations of School Administration. 4 Hours. Administrative and legal roles and relations in policy development and execution. Influences of governmental and private organizations. Prerequisite: Consent of the instructor.

551. Administration Problems in Urban Schools. 4 Hours. The urban school system as a bureaucracy and cooperative social system. Analysis of central, district and local school decision-making. Case studies in problem solving. Prerequisite: Consent of the instructor.

552. The School Principalship. 4 Hours. Leadership and management responsibilities of principals in metropolitan schools. Focus on theory, research on principals, case studies, and field encounters with working principals. Prerequisite: PS 550.

554. Administering Effective Schools. 4 Hours. Administrative responsibility for school effectiveness; research-based strategies for improving classroom learning environments; techniques of staff development; personnel and program evaluation. Prerequisite: PS 552.

556. Administrative Issues in Instructional Leadership. 4 Hours. The instructional improvement role of the school administrator. Focuses upon opportunities and constraints in facilitating student learning, teacher professionalism, curriculum development, and parent involvement. Prerequisite: PS 550 or consent of the instructor.

559. Internship in School Administration. 4 Hours. Field experience in administration. Students apply administration skills and concepts learned in class to a project pursued in a field setting. Prerequisite: Completion of all master's degree course requirements.

560. Administration of Programs for Students with Disabilities. 4 Hours. Same as SpEd 560. Alternative administrative arrangements for students with disabilities in schools. Analysis of current legislation, funding, in-service training, and needs and rights of children and parents. Prerequisite: SpEd 410 and CIE 551; or consent of the instructor.

566. Cultural Studies in Education. 4 Hours. This course will examine origins, evolutions, and current cultural studies frameworks, with a focus on educational policy and practice. Prerequisite: Consent of the instructor, or admission to the PhD in Policy Studies in Urban Education program.

567. Economics of Education and Public Policy: An Introduction. 4 Hours. Introduction to the economics of education. It relates education and income, studies and conditions for efficient production of education, teacher markets and school finance. Prerequisite: Consent of the instructor, or admission to the PhD in Policy Studies in Urban Education program.

568. Education and the Law. 4 Hours. Legal rights, privileges, responsibilities, immunities, and authority of pupils, parents, teachers, administrators, school boards, and governmental units in relation to the school. Prerequisite: PS 550 or consent of the instructor.

570. Educational Policy: Historical and Philosophical Analysis. 4 Hours. The evolution of American educational thought and policy in the context of social and intellectual developments in the culture of the United States. Prerequisite: Consent of the instructor.

571. Education Policy: Formation, Implementation, Outcomes. 4 Hours. Examination of social forces outside the school that influence educational policy making, and the results of implementing policy decisions: legislatures, courts, government agencies, interest groups. Prerequisite: Consent of the instructor.

572. Sociology of Education. 4 Hours. Same as Soc 572. Education as a social institution in interaction with other institutions, such as the economy. Topics include the emergence of national systems of legal, purposes of education, inequality and equality.

573. Seminar on Administrative Practice in Education. 4 Hours. Direct case analyses of major topics in the practice of school administration, including collective bargaining, finance, planning, community relations, bilingual and special education, and student services. Prerequisite: PS 550 or consent of the instructor.

574. The Impact of College on Students. 4 Hours. Same as PPA 574. Introduction to the research evidence on the impact of colleges on students. Emphasis is placed on methods of assessing impact and research on college effects. Prerequisite: Consent of the instructor.

575. Higher Education Organization and Administration. 4 Hours. Same as PPA 575. Perspectives on administration in higher education. Understandings from organization theory and research on postsecondary institutions applied to issues in higher education administration. Prerequisite: Admission to the PhD in Public Policy Analysis program or consent of the instructor.

576. History of Higher Education. 4 Hours. Same as PPA 576. Key historical events that have enduring implications for colleges and universities. Emphasis on social, political, economic, intellectual, and legal forces shaping American higher education. Prerequisite: Admission to the PhD in Public Policy Analysis program or consent of the instructor.

577. American Academic Profession. 4 Hours. Same as PPA 577. Historical and systemic foundations of the academic profession. Emphasis on institutional and disciplinary variation in the performance, evaluation, and reward of faculty activities. Prerequisites: Admission to the PhD in Public Policy Analysis program and consent of the instructor.

578. Theoretical Frameworks of Educational Politics. 4 Hours. Basic concepts, hypotheses, research findings and theory development. Nature and function of the theory in educational politics at the federal, state and local levels. Prerequisite: PS 456 or consent of the instructor.

579. Organization and Management in Education. 4 Hours. Models of decision making, organizational effectiveness, and organizational improvement in education. Topical problems in current educational management practice. Prerequisite: PS 550 or consent of the instructor.

581. Collective Bargaining Policy in Education. 4 Hours. Analysis of collective bargaining case studies and agreement with emphasis on implications for education policy formulation. Prerequisite: Consent of the instructor.

582. Cultural Pluralism and Education Policy. 4 Hours. Social philosophical analysis of the theory of cultural pluralism, emphasizing its relation to the liberal-experimentalist tradition in educational thought; selected equal educational opportunity policies; recent federal and state legislation on multicultural education. Prerequisite: Consent of the instructor.

583. Women in Education. 4 Hours. Same as GWS 583. An overview of girls and women's educational experiences and placement. The impact of gender on the realization of educational, economic and social opportunities. Prerequisites: Consent of the instructor, or enrollment in the PhD in Policy Studies in Urban Education program.
587. Topics in Documentary and Field Research in Education. 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Study and practice in documentary and field research methods of collecting, organizing and integrating educational data: interviewing, participant observation, ethnography, case study, historiography. Topics vary. Prerequisite: Consent of the instructor.

588. Critical Race Theory: Race and Racism in Education. 4 Hours. Examines theories of race and racism in education within the interdisciplinary construct of Critical Race Theory. Prerequisite: Consent of the instructor, or admission to the PhD in Policy Studies in Urban Education program.

589. Educational Administration Theory. 4 Hours. Overview of administrative theory including theory functions; theory-practice interface; administrative theory history; and relationships of administrative theory to educational administration and organizations. Prerequisite: PS 550 or consent of the instructor.

590. Professional Career Training in Education Policy. 4 Hours. May be repeated for a maximum of 16 hours of credit. Faculty-supervised training through university teaching, research or internship. Presentation relating experience to theory. Prerequisite: Consent of the instructor.

593. PhD Research Project. 1 to 8 Hours. May be repeated for a maximum of 8 hours of credit. Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. Prerequisite: Admission to the PhD in Education program.

594. Special Topics in Educational Policy. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Exploration of an area not covered in existing course offerings. Topics vary. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 4 Hours. May be repeated for up to 12 hours of credit. Students may register for more than one section per term. Students carry out independent study in policy studies under the direction of a faculty member. Prerequisites: Consent of the advisor and the area chairperson.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Research on the topic of the student’s dissertation. Prerequisite: Consent of the dissertation advisor.

Polish (Pol)

401. Polish Composition and Conversation III. 4 Hours. Development of oral and writing skills: expanding vocabulary and perfecting style. Prerequisite: Pol 302.

402. Polish Composition and Conversation IV. 4 Hours. Continues Pol 401. Prerequisite: Pol 401 or the equivalent.

410. Structure of Modern Polish. 4 Hours. A synchronic linguistic analysis of Polish substantives, pronouns, verbs, deverbal nouns, and minor parts of speech from a syntagmatic and paradigmatic point of view. Prerequisite: Pol 402 or the equivalent.

450. Studies in Polish Drama. 4 Hours. May be repeated for a maximum of 12 hours of credit. Main trends in Polish drama, leading playwrights, their aesthetics and philosophy in the context of European drama and from the Renaissance to the present.

460. Studies in Polish Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Literary trends of Polish poetry and prose; their poetics, aesthetics, and philosophy in their European context.

499. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Graduate students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

510. History of the Polish Language. 4 Hours. Phonological and morphological development; emphasis on lexical, syntactical, and stylistic problems. Linguistic analysis of selected texts. Prerequisite: Pol 410 or the equivalent.

515. Topics in Contemporary Polish Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Variable content.

520. Topics in Historical Polish Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Variable content.

545. Studies in Polish Medieval, Renaissance, and Baroque Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, genre, author or movement. Content varies.

550. Studies in Polish Enlightenment and Romanticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of an author, topic, genre or movement. Content varies.

560. Studies in Polish Positivism and Symbolism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of an author, topic, genre, or movement. Content varies.

565. Studies in Twentieth-Century Polish Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of an author, topic, genre, or movement. Content varies.

570. Studies in Polish Literary Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Literary criticism in the major epochs of Polish literary history.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

Political Science (PolS)


405. The Problem of Justice. 4 Hours. Same as CrJ 405. Premodern and modern views of justice and their practical utility in analyzing legislative, executive, and judicial programs for enhancing or restricting justice. Prerequisites: CrJ 101 plus two 200-level courses in criminal justice or two 200-level courses in political science.

414. Formal Models of Politics. 4 Hours. Introduction to formal political theory, emphasizing spatial voting and collective action models, analytic techniques including game theory, decision theory, utility maximization, and difference equations.

420. Administrative Theory and Behavior I. 4 Hours. Theories of modern administrative behavior and organizational processes; major trends in research findings on organizational behavior and performance; comparison of governmental and nongovernmental organizations. Prerequisite: PolS 460 or consent of the instructor.

425. Administrative Theory and Behavior II. 4 Hours. In-depth study of selected theoretical problems in administrative organizations; emphasis on political contexts and policy implications. Prerequisite: PolS 460 or consent of the instructor.

429. Policy Making and Implementation. 4 Hours. How political factors, institutional setting, procedures, and the prior experiences of government officials affect policy making and implementation. Prerequisite: PolS 460 or consent of the instructor.

435. Special Topics in Bureaucracy. 4 Hours. May be repeated for a maximum of 12 hours of credit. Consideration of timely or enduring issues in policy formulation and bureaucracy not available in regularly offered courses. Prerequisites: PolS 460 and consent of the instructor.

440. Politics of Urban Education. 4 Hours. Same as PS 406. Relations between school governance and urban politics. The role of educational interest groups, school boards, professional educators, and citizens in formulation and execution of educational policy.

451. Law and Public Policy. 4 Hours. The role of law and legal institutions in the development and implementation of public policies.

460. The Structure and Processes of American Public Policy. 4 Hours. Integrated overview of American policy-making institutions and processes. Emphasis on organizational design-making and the impacts of various policy-making institutions. Prerequisite: Consent of the instructor.

465. Topics in the Sociology of Politics. 4 Hours. Same as Soc 465. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is
scheduled. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

467. Public Opinion and Political Communication. 4 Hours. Same as Comm 467. Nature of public opinion and political communication systems. Patterns of opinion distribution and its measurement. Forces shaping public opinion and its impact on public policy. Prerequisite: PolS 200 or the equivalent or consent of the instructor.

472. Global Political Economy. 4 Hours. Exploration of competing perspectives on nation states and economic systems.

482. Democratic Theory. 4 Hours. Democracy as a procedure of government and value commitments associated with this form of government. Special attention paid to classical and modern democracies. Prerequisite: PolS 290 or 291, or consent of the instructor.

485. Gender and Politics. 4 Hours. Same as WS 485. Impact of gender on basic categories of western political thought. Distinctions between reason and emotion, public and private, among others, examined from feminist perspective. Prerequisites: PolS 190 and one 200-level course in political theory, or consent of the instructor.

486. Political Violence. 4 Hours. Use or threat of violence in the political process. Emphasis on major theories of internal violence in various nations viewed both cross-culturally and longitudinally. Prerequisites: PolS 101 and one other course in the social sciences, or consent of the instructor.

497. Directed Readings in Political Science. 4 Hours. May be repeated for credit with consent of the graduate director. Intensive readings on a topic not covered in the regular curriculum. Prerequisite: Consent of the instructor.

498. Independent Research in Political Science. 2 to 6 Hours. May be repeated for credit with consent of the graduate director. May not duplicate work done in PolS 598 or 599. Research on special problems not included in course offerings. Prerequisite: Consent of the instructor.

500. Introduction to Policy and Governance. 4 Hours. Same as PPA 500. Introduces the intellectual traditions and debates that have characterized the study of public policy and the social order. Society-centered and state-centered explanations for policy will be explored.

501. Data Analysis II. 4 Hours. Same as PPA 501. Interpretation and application of multivariate methods of analysis in the social sciences. Regression specification and diagnostics, limited dependent variable models, measurement issues. Prerequisite: PolS 401.

502. Time Series Analysis for Political Science. 4 Hours. Single series (ARIMA) models, event history analysis, Vector autoregression (VAR), panel and pooled models. Prerequisite: PolS 402 or consent of the instructor.

503. Structural Equation Modeling for Political Science. 4 Hours. Systems of equations, structural models, maximum likelihood estimation, LISREL, matrix algebra, GAUSS. Prerequisite: PolS 402 or consent of the instructor.

504. Theoretical Approaches to Policy and Governance. 4 Hours. Same as Phil 504. Different theoretical approaches to the relationship between policy and governance and the philosophical foundations on which those approaches are based.

505. Research Design and Methods. 4 Hours. Overview of the methods and conduct of research in political science. Issues of inference, measurements, data collection, hypothesis testing and ethics.

506. The Profession of Political Science. 2 Hours. S/U grade only. Introduces graduate students to the range of teaching, research and service possibilities in the political science profession. Students are encouraged to take this course during their first year of graduate study.

510. Seminar on Teaching Political Science. 2 Hours. S/U grade only. Seminar on ethics and responsibilities of teaching political science in various academic settings. Teaching methods and technology applicable to community colleges and four-year colleges are explored. This course complements the Preparing Future Faculty Program. The format will include guest speakers from area community and four-year colleges.

536. Public Personnel Systems. 4 Hours. Major problems and issues in the management of human resources in the public sector. Prerequisite: PolS 541 or consent of the instructor.

537. The Legal Environment of Public Administration. 4 Hours. Statutory framework for administrative action; rule-making and adjudicative powers of public agencies; judicial review of administrative action; liability of public officials. Prerequisite: PolS 541 or consent of the instructor.

538. Public Budgeting and Evaluation. 4 Hours. Processes and methods of budgeting and program evaluation in public sector organizations. Analytical techniques, political influences, and budgetary reforms. Prerequisite: PolS 541 or consent of the instructor.

541. Policy Formation, Implementation, and Evaluation. 4 Hours. Same as PPA 541. Introduction to political science theories of how elections, interest groups and state structure affect the formulation of public solutions to societal problems.

542. Distributive/Redistributive Public Policy. 4 Hours. Seminar on the politics of enacting and maintaining distributive policies. Focus is on the parochial and community-wide efficiency of such policies.

544. Regulatory Public Policies. 4 Hours. Exploring the nature and determinants of public policymaking with respect to the regulation of the economy.

549. Topics in Public Policy Analysis. 4 Hours. A research seminar on some aspects of public policy analysis not otherwise covered in the regular curriculum.

551. Introduction to Urban Politics. 4 Hours. Explores relationships between private economy and public policies in American cities; causes of urban decline and renewal development; and urban redevelopment and human capital policies.

553. Urban Public Policy. 4 Hours. Explores the problems of poverty, race, education, transportation policy, and housing in America’s cities, with a special emphasis on Chicago.

556. Neighborhood and Community Politics. 4 Hours. The techniques and effects of community organizing. Major issues include the definition of community and how to encourage positive development. Prerequisite: PolS 551.

558. Graduate Student Field Experience in Political Science. 1 to 8 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Graduate student intern experience. Placement with government agencies, community organizations, or civic organizations, in conjunction with a seminar class and directed readings. Prerequisites: PolS 402 and 500.

559. Topics in State and Local Government. 4 Hours. Case analysis and research in selected problems dealing with structure, functions and administrative processes of American state and local governments. Prerequisites: PolS 500 and 541.

562. Seminar on Legislation and Public Policy. 4 Hours. Review of recent theories and research on structure and policy formation in American legislatures. Emphasis on theoretical development in this field. Prerequisite: PolS 541.

563. Executive Process. 4 Hours. Presidential elections; presidential decision-making; the powers of the president; presidential leadership; the distributive state; policy implementation; federalism and administration; the politics of budgeting. Prerequisite: Admission to the M.A. or PPA programs or consent of the instructor.

564. Seminar in Judicial Process. 4 Hours. The judicial process, as part of political and policy processes. Demands made by, and policy impacts on, individual and organizational litigants and other political actors. Prerequisite: PolS 460.

566. Interest Groups. 4 Hours. Pluralism: the distributive state; radical group theory; public-interest groups; collective actions; corporatism; statism; structural Marxism; social movements and interest groups.

567. Topics in Political Communication. 4 Hours. Same as Comm 567. Intensive study of selected aspects; organizational communication in public institutions, urban political communication patterns, communication elites. Independent research using a variety of community research techniques. Prerequisite: Consent of the instructor.

569. Topics in American Political Processes. 4 Hours. A research seminar on some aspect of American political process. Topics vary. Prerequisites: PolS 402 and 500.

570. Comparative Politics and Public Policy. 4 Hours. Comparative analysis of how different political systems deal with a variety of public policy issues such as environmental protection, social welfare and crime control.
571. Seminar in International Relations. 4 Hours. Previously listed as: PolS 471. State-building and challenges to state authority, democratization and regime change, political economy, environment, war, regionalism and globalization, social movements and international governance.

573. Transitions to Democracy. 4 Hours. Game-theoretic view of democracy. Process and outcomes of transitions to democracy in capitalist and in communist countries. Civil-military relations in the process of transition. Case studies.

579. Topics in Comparative Politics. 4 Hours. Advanced seminar on selected topics in comparative politics. Topic(s) will vary from semester to semester. Prerequisites: PolS 500 and 541.

582. The Philosophy of the Social Sciences. 4 Hours. The ontological and epistemological foundations of alternative approaches to the study of human beings. Naturalistic, hermeneutic, and critical approaches are addressed and assessed.

589. Topics in Political Theory. 4 Hours. Detailed analysis of a political theorist or type of political theory, especially designed to meet programmatic and graduate needs.

590. Advanced Public Policy Workshop. 4 Hours. Same as PPA 590. Interdisciplinary workshop on preparing a dissertation proposal for PPA students. Prerequisites: Advanced standing in the PPA program and completion of PPA core courses.

596. Advanced Readings in Political Science. 1 to 4 Hours. May be repeated for credit with consent of the graduate director. Students may register for more than one section per term. Intensive readings on an advanced topic not covered in the regular curriculum. Prerequisites: PolS 401 and PolS 404 and consent of the instructor.

598. Thesis Research. 0 to 16 Hours. S/U grade only. Open only to degree candidates. Individual study required of all students pursuing advanced degree in political science under thesis option. Prerequisite: Consent of the instructor.

599. Dissertation Research. 0 to 16 Hours. S/U grade only. Open only to degree candidates. Individual study required of all students pursuing PhD degree with specialization in political science. Prerequisite: Consent of the instructor.

Prosthodontics (Pros)

504. Advanced Dental Materials. 3 Hours. A seminar course designed to develop an advanced understanding of dental materials and a fundamental knowledge of materials science. Involves a critical evaluation of the literature. Prerequisites: Rest 320, 321, 322, 323, and 330, or equivalent coursework, or matriculation into the Advanced Certificate in Advanced Prosthodontics program.

517. Advanced Occlusion/TMJ Disorders. 2 Hours. A lecture and seminar discussion of the advanced concepts of occlusion, articulation, occlusal analysis, diagnosis, and treatment of functional disturbances. Prerequisites: Matriculation into the Advanced Certificate in Advanced Prosthodontics program or the MS in Oral Sciences program and consent of the department head.

595. Seminar in Prosthodontics and Biomaterials. 0 to 1 Hour. May be repeated for a maximum of 2 hours of credit. S/U grade only. Students presenting seminars register for 1 hour of credit; others for 0 hour of credit. Current developments in theory and application of prosthodontics and biomaterials with presentations by students, faculty, and visiting scientists. Prerequisites: Matriculation into the Advanced Certificate in Advanced Prosthodontics program or the MS in Oral Sciences program and consent of the department head.

Psychiatric Nursing (NuPs)

400. Group Dynamics, Behavior, and Intervention. 2 to 3 Hours. Master of Science degree-seeking students in the Mental Health Nursing Concentration must register for 3 hours of credit. Concepts, theories and research pertaining to group dynamics and to interventions carried out in groups. Analysis of videotaped group experience.

450. Women and Mental Health Nursing. 3 Hours. Same as GWS 450 and NuSe 450 and NuWH 450. Theories of female psychology; women’s daily lives and mental health; gender differences in mental illness; strategies for improving women’s mental health. Prerequisite: Consent of the instructor.

500. Psychopathology for Mental Health Nursing. 3 Hours. Theories, research and issues related to psychopathology with emphasis on the nursing process. Interactional research paradigm as it relates to nursing.

502. Child and Adolescent Development: Applications to Nursing. 3 Hours. Theory and research on the development of competence through early adolescence. Analysis of development programs directed toward improving individual and family adaptive capacities. Prerequisite: Consent of the instructor.

503. Theoretical Basis for Intervention in Groups and Families. 3 Hours. Examines concepts, theories, and research for nursing assessment/intervention with groups/milieu/families. Emphasis is on nursing roles/responsibilities. Prerequisite: NuPs 400.


505. Advanced Psychiatric Nursing Care of Adults. 3 Hours. Theory and research on intervention models for psychiatric nursing care of the adult. Analysis of selected intrapeutic approaches and techniques. Prerequisite: Consent of the instructor.

515. Developmental, Behavioral Health, and Interventions with Youth. 3 Hours. Normative and atypical developmental processes. Applications emphasize developmentally and culturally sensitive nursing assessment and intervention in children’s lives to improve mental health outcomes. Prerequisite: NuSe 527 or consent of the instructor.

516. Behavioral Health Care I. 3 Hours. Common mental health problems presented in primary and community care settings. Focus on psychopathology, assessment and brief counseling interventions; crisis intervention and triage; emergency care. Prerequisite: Consent of the instructor.

517. Behavioral Health Care II. 3 Hours. Complex mental health problems experienced in psychiatric populations. Focus on stabilization and management of psychotic illnesses, dual diagnosis treatment models, psychoeducational models and psychiatric rehabilitation. Prerequisite: NuPs 516.

518. Family Behavioral Health. 2 Hours. Theories of family development and behavior; functional and dysfunctional communication and behavioral patterns. Theories and strategies for family assessment and intervention. Prerequisite: Consent of the instructor.

521. Clinical Practicum in Behavioral Health I. 3 Hours. Advanced nursing management of common mental health problems. Emphasis on primary care and community settings. Assessment, triage, case management, emergency care and brief interventions. Prerequisite: Credit or concurrent registration in NuPs 517 or consent of the instructor.

522. Clinical Practicum in Behavioral Health II. 3 to 6 Hours. May be repeated for credit. Advanced psychiatric nursing with a selected caseload of clients with serious and complex problems. Emphasis on psychiatric rehabilitation, cognitive-behavioral methods, psychoeducation and dual diagnosis. Prerequisites: NuPs 521 and consent of the instructor.

547. Substance Misuse and Dependence. 3 Hours. Theories, research trends, treatment perspectives, ethical and social issues related to alcohol and other drug misuse and dependence. Prerequisite: Consent of the instructor.

Psychology (Psch)

411. Stereotyping, Prejudice, and Racism. 3 Hours. Psychological research and theory concerning stereotyping, prejudice, and racism. Historical conceptualization, development, causes, expression, and psychological consequences of prejudice, as well as theories of prejudice reduction. Prerequisite: Graduate standing in psychology or consent of the instructor.

415. Health Psychology. 3 Hours. Psychological theory and research concerning the coronary-prone personality, pain management, controlling adherence to medical regimens, biofeedback, smoking, and weight control.

417. Psychology and Law. 3 Hours. Application of psychological theories to the development, operation, and effects of law; evaluation of different and similar approaches of law and psychology. Prerequisite: Psch 312 or consent of the instructor.
420. Social Development of Urban Children. 4 Hours. Same as EPsy 420. General principles of social development and socialization during childhood and the factors common to urban children that illustrate and modify these principles. Prerequisite: Admission to the graduate program in education or psychology, or consent of the instructor.

421. Developmental Psychobiology. 3 Hours. Concepts and theory integrating behavioral and biological developmental processes, with examples from current research issues. Prerequisite: Consent of the instructor.

422. Advanced Developmental Psychology and Educational Processes. 3 Hours. Same as Ed 422. Focuses on cognitive and social development from birth to adolescence. Examines relations between development, learning, and educational processes. Prerequisites: Psch 100 and any one from Ed 210, Psch 259, or 320, or graduate standing and consent of the instructor.

423. Characteristics of Early Adolescence. 3 Hours. Same as EPsy 446. Physiological, social, emotional and cognitive development of early adolescence. The relationship between these developmental characteristics and success in the middle grades. Prerequisites: Admission to the PhD program in psychology; or approval of the College of Education or consent of the instructor, and Ed 210 or 421 or Psch 422.

429. Constructivist Approaches to Development: Piaget and Vygotsky. 4 Hours. Same as EPsy 429. Piaget's and Vygotsky's theories of development of knowledge. Empirical and logical-mathematical forms of knowledge. Thought and action. Thought and language. Prerequisite: Graduate standing in education and Psch 422 or the equivalent or graduate standing in psychology or consent of the instructor.

440. Psychological Test Theory. 3 Hours. Classical and modern theory of tests as developed for assessment of ability, aptitude, and personality. Emphasis on the statistical and mathematical basis of the theories. Prerequisites: Graduate standing, or Psch 343 and consent of the instructor.

443. Advanced Statistics. 3 Hours. Design and analysis of experiments: between, within factorial and mixed factorial designs and introduction to multiple regression. For students planning research careers or advanced degrees. Prerequisite: Psch 343.

450. Advanced Perception. 3 Hours. Methods, results, and interpretation of experimental studies dealing primarily with the role of contextual and experiential factors in perception. Prerequisites: Psch 350 and consent of the instructor.

452. Human Learning and Memory. 3 Hours. Survey of empirical research and theories concerning the human memory system and the encoding, retention, and retrieval of information in that system. Prerequisites: Psch 352 and consent of the instructor.

454. Psychology of Language. 3 Hours. Same as Ling 474 and Comm 454. Introductory survey of methods, theory and research; linguistic foundations, history, and present status of the field.

455. Psychology of Thinking. 3 Hours. Research and theory concerning higher mental processes, including problem solving, reasoning, judgment, and decision making. Prerequisites: Psch 352 and consent of the instructor.

456. Human Factors. 3 Hours. Application of principles of cognitive psychology to the design of equipment and systems for efficient and safe operations and function. Sensory, perceptual, cognitive, and motor skills are emphasized. Prerequisites: Either Psch 350 or 352, and consent of the instructor.

459. Cognitive Methods. 3 Hours. Hands-on training in the methods of cognitive psychology, especially computational modeling and the analysis of verbal protocols and other types of trace data.

460. Advanced Learning. 3 Hours. Methods, results, and interpretation of experimental studies of basic learning processes in animal and human subjects. Prerequisites: Psch 360 and 361 and consent of the instructor.

462. Advanced Physiological Psychology. 4 Hours. Anatomical and physiological substrates of behavior. Prerequisites: Psch 262 and consent of the instructor.

463. Human Psychophysiology. 3 Hours. Theory and research on relationships between human bodily processes and psychological processes, including electrocortical, cardiovascular, electromyographic, and electrodermal studies of perception, cognition, arousal, emotion, and development. Prerequisite: Psch 242.

465. Sensory Processes. 3 Hours. Psychophysical and physiological studies of sensory systems and processes. Primary emphasis on the early processing of visual stimuli. Prerequisites: Psch 351 and consent of the instructor.

466. Motivation. 3 Hours. Review of empirical data and theories concerning the physiological basis of motivational processes in animals and humans. Prerequisites: Psch 360 and consent of the instructor.

467. Fundamentals of Neuroscience. 3 Hours. Basic principles of neurophysiology and neuropharmacology including logic bases of nerve action, chemistry of synapses, and actions of pharmacological agents.

481. Interviewing. 1 Hour. S/U grade only. Lecture on the theory and practice of clinical interviewing with supervised experience. Prerequisite: Graduate standing in psychology or consent of the instructor.

494. Special Topics in Psychology. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced treatment of an announced topic.

495. Seminar in Psychology. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Seminar devoted to special topics in psychology.

505. Advanced History of Psychology. 3 Hours. The history of scientific psychology, with an emphasis on the forerunners of major contemporary research problems. Prerequisite: Completion of Master's thesis.

508. Colloquium on the Teaching of Psychology. 1 Hour. S/U grade only. Required training to prepare graduate students for contact teaching in the Department of Psychology. Prerequisite: Consent of the instructor.

509. Teaching Psychology: Theory and Research. 2 Hours. Review of research on human learning and instructional techniques; models of measurement and assessment techniques. Application to teaching undergraduate psychology courses. Prerequisites: Psch 508 and consent of the instructor.

510. Attitudes and Social Cognition. 3 Hours. Survey of theory and research in social psychology, including attitudes and social cognition. Prerequisite: Consent of the instructor.

513. Interpersonal Relations and Group Processes. 3 Hours. Survey of theory and research in social psychology, including interpersonal relations and group processes. Prerequisite: Consent of the instructor.

514. Contemporary Trends in Social Psychology. 3 Hours. Critical analysis of contemporary trends in social psychology, such as emotion in social behavior, applications to the legal system. Content varies. Prerequisite: Consent of the instructor.

515. Theoretical Perspectives on Women and Gender. 3 Hours. Same as WS 515. Critical examination of psychological theories and research on women and gender, including biological, psychoanalytic, socialization, power, and social constructionist perspectives. Prerequisite: Graduate standing in Psychology or Psch 315 and consent of the instructor.

516. Research Methods in Social Psychology. 3 Hours. Critical analysis of current theories in social psychology. Prerequisites: Psch 512, 513, and 514, or consent of the instructor.

517. Social Psychology of Education. 4 Hours. Same as EPsy 502. Social psychological factors influencing academic and social outcomes in schools. Achievement motivation, peer relations, social values in relation to student characteristics and school practice. Prerequisite: Admission to the PhD in Education program or the PhD in Psychology program, or consent of the instructor.

518. Seminar in Social and Personality Psychology. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Critical discussion of selected topics, such as helping and altruism, social judgment, group processes, attitude formation and change. Content varies. Prerequisite: Consent of the instructor.

519. Current Topics in Social Psychology. 1 Hour. May be repeated for credit. S/U grade only. Discussion of recently published research and ongoing research by department faculty and graduate students. Prerequisite: Consent of the instructor.

520. Development in Infancy and Early Childhood. 4 Hours. Same as EPsy 526. Consideration of development in the
preschool years. Stress on theory, research, individual child study, and educational implication. Prerequisite: Psch 422 or the equivalent.

522. Cognitive Development. 3 Hours. A review of contemporary research on cognitive processes from birth to young adulthood. Prerequisite: Consent of the instructor.

523. Developmental Psycholinguistics. 3 Hours. Same as Ling 572 and Comm 524. Theories, research methods and research findings in the area of language development. Biological, cognitive, and social influence; disorders of language development. Prerequisite: Consent of the instructor.

524. Social Development. 3 Hours. Review of contemporary research in social development and its context from infancy to young adulthood. Prerequisite: Consent of the instructor.

525. Achievement Motivation. 4 Hours. Same as EPsy 530. The psychology of achievement motivation will be explored from the perspectives of personality, social, and educational psychology. Prerequisite: Graduate standing in education or psychology or consent of the instructor.

526. Developmental Psychopathology. 3 Hours. Major sources and manifestations of maladjustment in childhood with an emphasis on emotional and intellectual handicaps. Prerequisite: Consent of the instructor.

527. Seminar in Moral Development, Character Formation, and Education. 4 Hours. Same as EPsy 527. Philosophical assumptions, psychology research, and theory underlying current approaches to moral and character education. Cultural and developmental factors in value formation. Prerequisite: Psch 422 or the equivalent, or admission to the PhD program in Education, PhD program in Psychology, or PhD program in Social Work, or consent of the instructor.

528. Seminar in Developmental Psychology. 1 to 4 Hours. Presentation of selected theoretical and empirical topics in developmental psychology. Prerequisite: Consent of the instructor.

529. Current Topics in Developmental Psychology. 1 Hour. May be repeated for credit. S/U grade only. Presentation of current research projects by faculty and students. Prerequisite: Consent of the instructor.

530. History and the Varied Epistemologies of Community Psychology. 3 Hours. Analysis of historical factors, including persons, contexts and policies, affecting the development of community research approaches. Implicit causal and value assumptions appraised of varied approaches. Prerequisite: Consent of the instructor.

531. Community Research. 3 Hours. Philosophical bases, values, and processes of community research; comparative evaluation of research methods; assessment of mental health issues in community settings, and community prevention programs. Prerequisites: Psch 530 and consent of the instructor.

532. Community Intervention. 3 Hours. Same as DHD 532. Theory, research, practice and evaluation of community interventions; types and effectiveness of community intervention; role of the community intervenor. Prerequisite: Consent of the instructor.

533. Advanced Community and Prevention Research. 3 Hours. Overview of community psychology theory and intervention research in areas like prevention, empowerment, diversity, ecology, competence enhancement, and social change from historical and contemporary perspectives. Prerequisite: Graduate standing in psychology or consent of the instructor.

537. Seminar in Action Research. 3 Hours. May be repeated for credit. S/U grade only. Supervised action research in community settings including entry, data collection, ethics, feedback and report preparation. Prerequisite: Graduate standing in the Community and Prevention Research Specialization of the PhD in Psychology or consent of the instructor.

538. Seminar in Community and Prevention Research. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Examination of a selected topic in community and prevention research. Prerequisite: Psch 530 or consent of the instructor.

539. Current Topics in Community and Prevention Research. 1 Hour. May be repeated for credit. S/U grade only. Ongoing seminar with faculty and graduate students to discuss contemporary issues in community and prevention research. Prerequisite: Consent of the instructor.

541. Introduction to Computing in Psychology. 1 Hour. S/U grade only. An introduction to applications of computing in psychological research. Several projects are required. Prerequisite: Consent of the instructor.

542. Research Methods in Psychology. 3 Hours. Evaluating research methods; method—success; ethics; experimental, correlational, and quasi-experimental methods; data collection and analysis in natural settings; unobtrusive measures; causal inference. Prerequisite: Consent of the instructor.

543. Research Design and Analysis. 4 Hours. Experimental design, advanced analysis of variance (ANOVA) and statistical analyses for experimental and quasi-experimental designs, interpretation and writing results in APA style, SPSS. Prerequisite: Graduate standing in psychology or consent of the instructor.

544. Latent Variable Models. 3 Hours. Statistical methods and practical issues relevant to latent variable models with special emphasis on factor analysis and structural equation modeling. Prerequisite: Psch 545.

545. Multivariate Analysis. 3 Hours. The statistical analysis of functional relationships among two or more variables; multivariate regression, canonical correlation, discriminant analysis, multivariate analysis of variance, principal components, factor analysis, logistic regression, cluster analysis. Prerequisites: Psch 543 and graduate standing in psychology, or consent of the instructor.

546. Theory and Practice in Program Evaluation. 3 Hours. Introduction to theory, design and practice of program evaluation. Emphasis will be on theories of social programming, selecting appropriate methods, and politics of evaluation. Prerequisites: Psch 531 or the equivalent, 543, and 545; or consent of the instructor.

547. Psychological Scaling. 3 Hours. Scaling theory and methodology with emphasis on measurement in psychophysics and social psychology. Prerequisite: Consent of the instructor.

548. Seminar in Methods and Measurement. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Seminar on a preannounced topic in methodology, measurement or mathematical psychology. Prerequisite: Consent of the instructor.

549. Current Topics in Psychology and Law. 1 Hour. May be repeated for credit. S/U grade only. Discussion of recently published research and ongoing research in psychology and law by department faculty, graduate students and outside speakers. Prerequisite: Consent of the instructor.

550. Proseminar in Educational Psychology. 2 Hours. Same as EPsy 500. S/U grade only. Interdisciplinary colloquia on selected topics in educational psychology. Serves as introduction to faculty research. Prerequisite: Admission to the PhD in Education or the PhD in Psychology program, or consent of the instructor.

551. Cognition and Instruction. 4 Hours. Same as EPsy 501. Current research on relations among cognitive processes, learning, and instruction. Prerequisite: Admission to the PhD in Education or the PhD in Psychology program, or consent of the instructor.

552. Cognition and Instruction: Advanced Constructivist Approaches. 4 Hours. Same as EPsy 529. Piaget’s and Vygotsky’s theories of knowledge development. Emphasis on competing approaches concerning the relation of thought to action, to language, and to social relations. Prerequisites: Psch 429 or the equivalent, and admission to the PhD program in the College of Education or Psychology or consent of the instructor.

558. Seminar in Cognitive Psychology. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Detailed critical review of selected topics in cognitive psychology: emphasis on current research and theoretical developments. Prerequisite: Consent of the instructor.

559. Current Topics in Cognitive Psychology. 1 Hour. May be repeated for credit. S/U grade only. Discussion of current research and theoretical issues in broad areas of cognitive psychology. Prerequisite: Consent of the instructor.

564. Clinical Psychopharmacology. 3 Hours. Behavioral, cognitive, and biological effects of psychotropic drugs in psychiatric populations. Theoretical, methodological and empirical issues related to the pharmacological treatment of psychopathology. Prerequisite: Consent of the instructor.

568. Seminar in Biopsychology. 1 to 4 Hours. May be repeated for credit. Current research issues and studies in biopsychology.
are discussed in terms of methodology and theory. Topic to be announced each semester. Prerequisite: Consent of the instructor.

569. Current Topics in Biopsychology. 1 Hour. May be repeated for credit. S/U grade only. Presentation of current research projects by staff and students. Prerequisite: Consent of the instructor.

570. Personality Psychology. 3 Hours. Contemporary research in personality psychology and a review of theoretical approaches to the study of personality structure and processes. Prerequisite: Consent of the instructor.

571. Psychopathology. 3 Hours. Detailed consideration of disorders of behavior including description, etiology, prognosis and experimental and clinical research; also consideration of development and functions of classification systems of abnormal behavior and their relation to clinical decision making. Prerequisites: Psch 570 and consent of the instructor.

572. Clinical Assessment and Decision Making. 3 Hours. Psychometric principles, research and theory with special emphasis on clinical inference and decision making with structured personality test. Prerequisites: Psch 571 and consent of the instructor.

573. Cognitive and Behavioral Assessment. 3 Hours. Theory and research-based coverage of intellectual, neuropsychological, and behavioral assessment. Focus is on methods and interpretation of psychological testing including both objective and projective methods. Prerequisites: Psch 572 and consent of the instructor.

574. Techniques of Psychological Intervention. 3 Hours. May be repeated for credit. Students may register for more than one section per term. Intervention skills, modalities, concepts and techniques for different patient populations and presenting problems. Topics will vary each semester and include: cognitive-behavior therapy, psychodynamic therapy, group therapy and family therapy. Prerequisites: Psch 571 and consent of the instructor.

575. Psychotherapy Theory and Research. 3 Hours. Research methods and theory related to psychotherapy and behavior change, with an emphasis on design, evaluation, and results of empirically-based psychotherapy studies. Prerequisite: Psch 571 and consent of the instructor.

576. Stress, Coping, Support, and Health. 2 Hours. Individual, environmental, organizational and group processes that facilitate or impede the expression of psychological health. Prerequisites: Psch 571 and consent of the instructor.

577. Ethics and Professional Development. 1 Hour. Ethical dimensions of psychology including clinical practice, research and teaching; ethical codes, confidentiality, client rights, dual relationships, legal issues, competency, social responsibility, moral reasoning, values. Prerequisite: Graduate standing in psychology or consent of the instructor.

578. Seminar in Clinical Psychology. 1 to 4 Hours. In-depth coverage of selected current topics in clinical psychology. Emphasis is on current research. Prerequisite: Consent of the instructor.

579. Current Topics in Clinical Psychology. 1 Hour. May be repeated for credit. S/U grade only. Research and case presentations in clinical psychology. Prerequisite: Consent of the instructor.

581. Practicum in Interviewing. 1 Hour. S/U grade only. Interviewing practicum through the Office of Applied Psychological Services. Students observe and conduct clinical interviews under supervision. Prerequisites: Psch 481 and consent of the instructor.

582. Practicum in Psychological Assessment. 4 Hours. May be repeated for credit. S/U grade only. Students may register for more than one section per term. Supervised practice in psychodiagnostic testing in various facilities associated with the graduate training program in clinical psychology. Prerequisites: Psch 573 and consent of the instructor.

583. Practicum in Clinical Intervention. 4 Hours. May be repeated for credit. S/U grade only. Students may register for more than one section per term. Instruction and supervision in the practice of psychological intervention, application of basic psychological principles to varied parent populations. Prerequisites: Psch 574 and consent of the instructor.

584. Practicum for Clinical Trainees on Assessment, Intervention, and Research. 0 to 3 Hours. May be repeated for credit. S/U grade only. Presentation and discussion of trainee assessment, intervention, and research projects. Prerequisite: Acceptance into either a NIMH- or OAPS-sponsored training program.

587. Practicum in Instruction in Psychology. 2 to 9 Hours. May be repeated for a maximum of 12 hours of credit. S/U grade only. Students may register for more than one section per term. Seminar on course planning and supervised teaching of an undergraduate course. Prerequisite: Consent of the instructor.

591. Research Apprenticeship. 2 to 3 Hours. May be repeated for a maximum of 3 hours of credit. S/U grade only. Directed training in conducting research in specific areas of psychology, and in developing skills related to the research. Prerequisite: Consent of the instructor.

594. Advanced Special Topics in Psychology. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced seminar devoted to special topics in psychology. Prerequisite: Consent of the instructor.

595. Advanced Seminar in Psychology. 1 to 3 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced seminar devoted to special topics in psychology. Prerequisite: Consent of the instructor.

596. Independent Study. 1 to 12 Hours. May be repeated for credit. S/U grade only. Research on or study of topics not included in regular classes or thesis and dissertation research. Prerequisite: Consent of the instructor.

598. Thesis Research. 0 to 16 Hours. May be repeated for a maximum of 12 hours of credit. S/U grade only. Research on the topic of the master’s thesis. Prerequisite: Consent of the instructor.

599. Dissertation Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Research on the topic of the doctoral dissertation. Prerequisite: Consent of the instructor.

Public Administration (PA)

400. Public Administration Theory. 4 Hours. Development of public administration as a professional and scholarly area of knowledge and practice focusing on administrative reform and its intellectual roots. Politics versus administration, efficiency, effectiveness, representative bureaucracy, and market versus bureaucratic alternatives. Prerequisite: Admission to the MPA program or consent of the instructor.

405. Introduction to Research Methods and Data Analysis. 4 Hours. Research methods relevant to the practice and study of public administration such as causation, measurement, and survey research. Data collection, organization, manipulation, and graphing. Univariate statistics: measures of central tendency, dispersion, and standardization. Prerequisite: Admission to the MPA program or consent of the instructor.

410. Economics for Public Administration and Policy Decisions. 4 Hours. Builds on topics in Public Administration 405. Bivariate statistics, significance testing, contingency table analysis, bivariate and multivariate regression, analysis of variance, and time series. Some quantitative decision analysis: decision trees and queuing. Prerequisites: PA 405 and admission to the MPA program or consent of the instructor.

415. Organization Theory and Public Management. 4 Hours. Theories and concepts of organizational behavior and public management from economics, sociology and political science. Organizational decision making, bureaucracy, organizational change and learning, public versus private organizations, leadership, and organizational culture. Prerequisite: Admission to the MPA Program or consent of the instructor.

436. Financial Management of Government. 4 Hours. Overview of issues and concepts important for administration and management of government’s financial affairs: government accounting, purchasing, cash management and investment, risk management, pension and benefits administration, debt management and capital financing. Prerequisite: Admission to the MPA program or consent of the instructor.

440. Governmental Accounting. 4 Hours. Introduction to major concepts, principles, and objectives of governmental accounting (including fund accounting) and budgetary control systems for local and
state government. Designed for students with little or no background in accounting. Prerequisite: Admission to the MPA Program or consent of the instructor.

445. Intergovernmental Management. 4 Hours. Relationships between federal, state and local governments focusing on management of overlapping programmatic, regulatory and fiscal responsibilities. Constitutional, political, fiscal, and administrative features and how they have evolved since the 1960s. Prerequisite: Admission to the MPA Program or consent of the instructor.

450. Innovative Management Practices for Public Administration. 4 Hours. Current, innovative managerial practices to improve the performance/efficiency of government and the quality of management. Performance monitoring, strategic planning, process and productivity analysis, reengineering, and possible use of spreadsheets and other software. Prerequisite: Admission to the MPA Program or consent of the instructor.

455. Management of Information Technology in Government. 4 Hours. Concepts and methods of planning, implementing, and managing new information technology or modifying existing technology. Factors contributing to difficulties of implementing information technology decisions and strategies for increasing the likelihood of changing current technology. Prerequisite: Admission to the MPA Program or consent of the instructor.

460. Computers in Public Administration. 4 Hours. Database theory and constructing and managing databases relevant to the operation of government. Utilizes database software and allows students to gain practice with complex database programs and development of a database system. Prerequisite: Admission to the MPA Program or consent of the instructor.

465. Evaluating Public Programs. 4 Hours. Different qualitative and quantitative methods used to evaluate the performance and effectiveness of public (and nonprofit) programs and policies. Course requires some familiarity with research methods and statistical techniques. Prerequisites: PA 406 and admission to the MPA Program or consent of the instructor.

470. Ethics and Accountability. 4 Hours. Better government through institutionalizing ethics and accountability. Effectiveness of boards of ethics; Inspector General; codes of ethics, and educational programs. History of ethics within the Western intellectual tradition and relevant empirical research on ethical behavior. Prerequisite: Admission to the MPA Program or consent of the instructor.

475. Labor Management Relations in Public Sector. 4 Hours. Skills and knowledge to manage labor relations in government. Constitutional influences on public employment, rights of public employees, management and labor unions; civil service laws and regulations, collective bargaining practices, and non-discrimination, and equal opportunity. Prerequisite: Admission to the MPA Program or consent of the instructor.

480. Online Public Administration. 4 Hours. Application of the Internet for public management. Web-based service delivery, online governance, the technological divide, and the changing role of public managers. Prerequisite: Consent of the instructor.

490. Field Experience in Public Administration. 6 Hours. Students work in an organization such as a government agency, community group, or nonprofit organization. Students are required to submit written work and guide group discussions relevant to their experience and agency. Prerequisite: Admission to the MPA program or consent of the instructor.

494. Special Topics in Public Administration. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Consideration of timely or enduring issues in public administration not available in regularly offered courses. Prerequisite: Admission to the MPA program or consent of the instructor.

501. Democratic Theory and Public Administration. 4 Hours. The conflicts and compatibilities between the requirements of democracy and those of public administration. How democratic preferences are affected by the rise of the administrative state. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

502. The Legal Context of Public Administration. 4 Hours. Legal basis and statutory framework for administrative agencies and actions in government. Relationship between courts and public agencies, rulemaking and adjudicative powers of public agencies, and impact of specific laws on government. Prerequisite: Admission to the MPA program or consent of the instructor.

503. Public Personnel Management. 4 Hours. History and current innovations in managing personnel and other areas of human resources. Compensation, classification, affirmative action, performance appraisal, labor relations, and unions. Statutory and court decisions affecting government personnel issues. Prerequisite: Admission to the MPA Program or consent of the instructor.

504. Budgeting for Public Administration. 4 Hours. Processes and methods relevant to government finances and fiscal health: revenues, taxation, budget formulation, operating budgets, cost analysis, planning and performance, budget reforms, politics, capital budgeting, and role of budgeting in management. Prerequisites: PA 410 and admission to the MPA program or consent of the instructor.

505. The History and Development of Public Administration Research and Theory. 4 Hours. The history and development of modern public administration, with emphasis on the U.S. model. Major scholarly movements; institutional developments; other factors shaping the present state of the discipline. Prerequisite: Admission to the PhD Program in Public Administration or approval of the instructor.

510. Organization Theory and Behavior in Public Administration Research. 4 Hours. Analysis of major theoretical models of organizations; decision-making; control and accountability; change and development; inter-organizational relations; the organization-environment interface. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

515. The Bureaucracy and Policy process. 4 Hours. Theories and research issues concerning the role of administrators in policy formation. Case studies and research on federal, state, and local agencies. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

520. Comparative and Developmental Public Administration. 4 Hours. Analysis of theoretical, methodological, and practical issues in comparing public administration cross-culturally. Theoretical models and empirical studies of bureaucracies and administrative problems. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

525. Human Resource Development and Management in Public Administration. 4 Hours. A review of the literature of public personnel administration including recruitment, examination, selection, evaluation, promotion, and career development. Motivation theory, equal rights, and affirmative action issues. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

531. Intergovernmental Administration. 4 Hours. Examines division of functions among levels of government, areas of overlapping program responsibility, intergovernmental finance flows, administrative and regulatory relationships. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

535. Organizational Planning and Design. 4 Hours. Relation between organizational structure and performance. Diagnosis and treatment of organizational pathologies. Design of organizational advisory and planning processes. Comparative merits of select organizational structures. Prerequisite: Admission to the PhD program in Public Administration or approval of the program director.

540. Research Design for Public Administration. 4 Hours. Logic and methods of quantitative and nonquantitative research in public administration. Issues in measurement; causal inference; experimental and quasi-experimental designs; and methods of data collection. Prerequisite: Admission to the PhD program in Public Administration or approval of the program director.

541. Advanced Data Analysis I. 4 Hours. Elements of matrix theory; introduction to the theory of estimation; hypothesis testing; logit and probit models; factor analysis; and principal components analysis. Application of techniques to public administration research. Prerequisite: PA 540.

542. Advanced Data Analysis II. 4 Hours. For those likely to pursue careers in the more quantitative aspects of public administration research. Discrete multivariate analysis and regression; multivariate analysis of variance; other advanced techniques. Prerequisite: PA 541.

543. Financial Management in Public Administration. 4 Hours. Principles of financial management and applications in various institutional and programmatic settings. Forecasting techniques,
computer applications, innovations in public borrowing and debt management. Prerequisite: Admission to the PhD program in Public Administration or approval of the instructor.

593. Independent Research in Public Administration. 4 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Advanced study and analysis of a topic selected by a student under the supervision of a faculty member. Prerequisites: Approval of the director of graduate studies and consent of the instructor.

594. Special Topics in Public Administration. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced study and analysis of a topic under guidance of select faculty. Prerequisites: Approval of the director of graduate studies and consent of the instructor.

596. Independent Study in Public Administration. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced study and analysis of a topic under guidance of select faculty. Prerequisites: Approval of the director of graduate studies and consent of the instructor.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual study and research. Prerequisite: Open only to degree candidates, upon approval of topic and by dissertation committee.

Public Health Nursing (NuPH)

400. Introduction to Occupational Health Nursing. 2 Hours. Theoretical bases for application of public health nursing practice to working population in occupational settings. Prerequisite: Consent of the instructor.

402. School Nursing Theory and Trends. 2 Hours. Theoretical frameworks, health needs, and legal mandates for school-aged populations are explored. School nursing practice models are studied as related to managing school health programs. Prerequisite: Consent of the instructor.

420. School Nursing Practicum. 3 Hours. Concepts and principles of school nursing applied within the school community. Clinical experience with an emphasis on development of a school health program. Prerequisites: Concurrent registration in NuPH 402 and consent of the instructor.

455. Women's Health: A Primary Health Care Approach. 3 Hours. Same as CHSc 456 and NuSc 455 and NuWH 455. Health promotion and disease prevention in women's health. Includes community experience with community women. Primary health care approaches examined. Prerequisite: Consent of the instructor.

485. International Nursing, 2 Hours. Forum for exchange of ideas, experiences, and readings on effect of political structures, socio-cultural and economic forces on health care systems and nursing education. Prerequisite: Consent of the instructor.

500. Health Maintenance & Promotion in Primary Care Nursing. 2 Hours. Prepares nurse practitioners to provide health maintenance and promotion to families and individuals in primary care settings. Prerequisite: Credit or concurrent registration in NuSc 532 or consent of the instructor.

515. Advanced Nursing Management in Community-Focused Health Services. 3 Hours. Same as NuAS 515. Theory and research in leadership, management, and community-focused assessment for advanced nursing practice in complex and integrated health systems. Prerequisite: NuSc 528 or consent of the instructor.

516. Evaluation of Health Services Outcomes for Nursing. 3 Hours. Same as NuAS 516. Program planning and evaluation in community-focused health services. Measurement of quality, performance, and impact on health programs and services. Interdisciplinary perspective. Integrated quality improvement systems. Prerequisite: NuAS 515 or consent of the instructor.

517. Budget and Finance of Health and Nursing Services. 3 Hours. Same as NuAS 517. Financial management techniques, supply and demand, cost behaviors, and revenue sources, provider reimbursement and public and private health insurance for health and nursing services will be analyzed. Prerequisite: NuPH 515 or consent of the instructor.

518. Field Study in Health and Nursing Management. 3 Hours. Same as NuAS 518. Field study emphasizing leadership within population-focused nursing management practice including organization and management concepts from public and private perspective. Prerequisite: NuPH 516 and 517 or consent of the instructor.

524. Primary Care Nursing of Acute and Chronic Disorders I. 4 Hours. Prepares nurse practitioners to assess, diagnose and manage stable chronic and acute episodic illnesses encountered in primary care settings. Prerequisite: NuPH 500.

525. Primary Care Nursing of Acute and Chronic Disorders II. 6 Hours. Second of a two-course sequence designed to prepare nurse practitioners to assess, diagnose and manage stable chronic and acute episodic illnesses encountered in primary care settings. Prerequisite: NuPH 524.

526. Organizational Analysis of Home Care Systems. 3 Hours. Utilizes organizational framework to analyze the home care industry. Structure, function, history, trends, reimbursement and legislation are examined with respect to public health nursing. Prerequisite: Consent of the instructor.

528. Advanced Clinical Practice in Primary Care Nursing. 1 to 5 Hours. S/U grade only. Health care issues, advanced clinical skills and supervised practicum experiences specific to student's selected practice area or population groups in rural, urban or international settings. Prerequisite: NuPH 524.

529. Practicum in Occupational Health Nursing. 1 to 5 Hours. Practicum emphasizing interdisciplinary experience in the identification of work-related health problems, their treatment, and follow-up. Learning activities are individualized to meet the student's learning needs. Prerequisites: NuPH 400 and credit or concurrent registration in EOHS 421 and 482 and 551.

560. Models/Frameworks of Health Service Delivery/Health Behavior. 2 Hours. Critiques health services delivery and health promotion/disease prevention behavior models; examines cultural, community and organizational models and contextually, socially, and psychologically based health behavior models. Prerequisite: NuSc 505 or consent of the instructor.

561. Research in Health Services Delivery and Health Behavior. 2 to 4 Hours. Analyzes culturally, community, and organizationally based research on health delivery models; analyzes research reflecting cognitive and affective influences on health promotion/disease prevention behavior. Prerequisite: Consent of the instructor.

562. Measurement Issues/Health Service Delivery/Promotion Behavior. 2 Hours. Extends beyond overview courses. Critically examines those measurement concepts, techniques, and issues important to advanced research in health services delivery and health promotion behavior. Prerequisites: NuSc 515 or equivalent and consent of the instructor.

565. Advanced Research in Women's Health. 1 to 2 Hours. Same as NuSc 565 and NuWH 565. Advanced seminar for doctoral students in graduate nursing concentration in women's health. Faculty and students present and critique on-going and developing research. Prerequisite: Consent of the instructor.

570. International Dimensions in Women's Health. 3 Hours. Same as NuSc 570 and NuWH 570. Critical examination of the health of women from a global perspective. Emphasizes resources and strategies nurse researchers use to monitor women's health across cultures and countries. Prerequisite: Consent of the instructor.

Public Policy Analysis (PPA)


500. Introduction to Policy and Governance. 4 Hours. Same as PolS 500. Introduces the intellectual traditions and debates that have characterized the study of public policy and the social order. Society-centered and state-centered explanations for policy will be explored.

501. Data Analysis II. 4 Hours. Same as PolS 501. Interpretation and application of multivariate methods of analysis in the social sciences. Regression specification and diagnostics, limited dependent variable models, measurement issues. Prerequisite: PPA 401.

540. Economics for the Social Sciences. 4 Hours. Same as Econ 540. Credit is not given for Econ/PPA 540 if the student has credit in Econ 501 or 520. Introduction to economics for graduate students in the social sciences. Economic cost, incentives, resource allocation and economic institutions. Supply and demand analysis.
Economic behavior of consumers and households, business firms, government and not-for-profit institutions.

541. Policy Formulation, Implementation, Evaluation. 4 Hours. Same as PolS 541. Introduction to political science theories of how elections, interest groups and state structure affect the formulation of public solutions to societal problems.

544. Research Design for Policy Analysis. 4 Hours. Same as Ed 544. Alternative research design models and program evaluation methodologies; quantitative and qualitative approaches; ethnographic and historiography; experimentation and quasi-experimentation; causal modeling. Prerequisites: Admission to the PhD program in Public Policy Analysis and one graduate-level course in statistics.

574. The Impact of College on Students. 4 Hours. Same as PS 574. Introduction to the research evidence on the impact of college on students. Emphasis is placed on methods of assessing impact and research on college effects. Prerequisite: Consent of the instructor.

575. Higher Education Organization and Administration. 4 Hours. Same as PS 575. Perspectives on administration in higher education. Understandings from organization theory and research on postsecondary institutions applied to issues in higher education administration. Prerequisite: Admission to the PhD program in Public Policy Analysis or consent of the instructor.

576. History of Higher Education. 4 Hours. Same as PS 576. Key historical events that have enduring implications for colleges and universities. Emphasis on social, political, economic, intellectual, and legal forces shaping American higher education. Prerequisite: Admission to the PhD program in Public Policy Analysis or consent of the instructor.

577. American Academic Profession. 4 Hours. Same as PS 577. Historical and systemic foundations of the academic profession. Emphasis on institutional and disciplinary variation in the performance, evaluation, and reward of faculty activities. Prerequisites: Admission to the PhD program in Public Policy Analysis and consent of the instructor.

584. Methods of Urban Policy Analysis. 4 Hours. Same as UPP 584. Analytic, allocative and evaluative techniques in public policy analysis. Preparation of case studies in problem analysis and policy recommendation. Prerequisite: Consent of the instructor.

590. Advanced Public Policy Workshop. 4 Hours. Same as PolS 590. Interdisciplinary workshop on preparing a dissertation proposal for PPA students. Prerequisites: Advanced standing in the PPA program and completion of PPA core courses.

Religious Studies (RelS)

415. Milton. 4 Hours. Same as Engl 415. Survey of Milton's poetry and prose, with emphasis on Paradise Lost. Prerequisites: 6 hours of English from Engl 241, 242, 243, 300; or consent of the instructor.

446. Race, Ethnicity, and Gender in American Religion. 4 Hours. Same as Soc 446. Religious institutions in the U.S. as a crucible for racial, ethnic, and gender identities, group formation, and intergroup relations; major world religions represented in the U.S. Prerequisite: Soc 100 or consent of instructor.

478. The Bible as Literature. 4 Hours. Same as Engl 478, JST 478. Literary analysis of the English Bible (including the Apocrypha) in its historical and religious contexts; study of the King James Version and successive revisions of it. Prerequisites: 6 hours of English from Engl 241, 242, 243, 300; or consent of the instructor.

479. Religion and Literature. 4 Hours. Same as Engl 479. Literary works considered in the light of several religious traditions. Prerequisites: 6 hours of English from Engl 241, 242, 243, 300; or consent of the instructor.

495. Topics in Religious History. 4 Hours. Same as Hist 495. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of history or consent of the instructor.

Russian (Russ)

400. Russian for Scholarly Translation. 4 Hours. Does not satisfy the foreign language requirement. An elective for students in fields other than Russian language and literature. Learning to translate specialized texts in the humanities, social, and natural sciences.

401. Russian Composition and Conversation III. 4 Hours. Oral presentations, compositions, conversation: daily life and current events. Problems of grammar and syntax. Improving pronunciation and intonation. Reading. Prerequisite: Russ 302 or the equivalent.

402. Russian Composition and Conversation IV. 4 Hours. Continuation of Russ 401. Prerequisite: Russ 401 or the equivalent.

410. Structure of Modern Russian. 4 Hours. A synchronic linguistic analysis of Russian substantives, adjectives, pronouns, verbs, deverbal nouns, and minor parts of speech from a syntagmatic and paradigmatic point of view. Prerequisite: At least 4 semester hours of Russian or the equivalent.

450. Studies in the Russian Novel. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a major novelist, movement, or special theme. Content varies. Prerequisite: 24 hours of Russian or consent of the instructor.

460. Studies in Russian Literature. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a major author, movement, genre, or special topic. Content varies. Prerequisite: 24 hours of Russian or consent of the instructor.

499. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Graduate students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

510. History of the Russian Language. 4 Hours. Formation and development of standard Russian to the end of the eighteenth century. Analysis of selected texts. Prerequisite: Russ 410 or Slav 505 or the equivalent.

515. Topics in Contemporary Russian Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Variable content. Prerequisite: Russ 410 or the equivalent.

520. Topics in Historical Russian Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Specific topics are announced each term.

550. Studies in Russian Romanticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, author, or movement. Content varies.

555. Studies in Russian Realism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, author, or movement. Content varies.

560. Studies in Russian Neo-Realism and Modernism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, author, or movement. Content varies.

565. Studies in Soviet Prose. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic or movement. Content varies.

570. Studies in Russian Literary Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a critical school or movement. Content varies.


596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

Slavic (Slav)

405. Problems in Slavic Grammars. 4 Hours. May be repeated for a maximum of 12 hours of credit. Systematic review of important topics in grammar and syntax. Content varies. Required for department undergraduate majors in Slavic programs. Prerequisite: Russ 302 or Pol 302 or Slav 302, or the equivalent.

410. Structure of Modern Serbian. 4 Hours. A synchronic linguistic analysis of Serbian phonology and morphology; with fundamentals of syntax. Prerequisite: Slav 104 or the equivalent, or consent of the instructor.

433. Topics in Eastern European History. 4 Hours. Same as Hist 433. May be repeated for credit. Students may register for more than one section per term. Specific topics are announced each term. Prerequisite: 3 hours of European history or consent of the instructor.
460. Studies in East European Literatures and Culture. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a topic, author, genre, or movement. Prerequisite: 24 hours of Slavic or Baltic or consent of the instructor.

470. Educational Practice with Seminar I. 6 Hours. Graduate credit only with the approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

471. Educational Practice with Seminar II. 6 Hours. Graduate credit only with the approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Slav 470, and approval of the department.

499. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Graduate students may register for more than one section per term. Investigation of special problems under the general direction of a staff member. Prerequisites: Consent of the instructor and the head of the department.

505. Old Church Slavonic. 4 Hours. Phonology, morphology, and basic elements of syntax. Readings in selected texts. Prerequisite: Three years of a Slavic language or consent of the instructor.

510. History of Serbian Language. 4 Hours. A diachronic linguistic analysis of Serbian phonology and morphology with fundamentals of syntax. Prerequisite: Slav 104 or the equivalent or consent of the instructor.

515. Topics in Contemporary Serbian Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Variable content. Prerequisite: Slav 410.

520. Topics in Historical Serbian Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Variable content. Prerequisite: Slav 505 or consent of the instructor.

525. Topics in Serbian Syntax. 4 Hours. May be repeated for a maximum of 12 hours of credit. Content varies.

530. Topics in Ukrainian Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Content varies.

535. Topics in Comparative Slavic Linguistics. 4 Hours. May be repeated for a maximum of 12 hours of credit. Comparative study of various linguistic aspects of the Slavic languages.

536. Topics in Comparative Slavic Literatures. 4 Hours. May be repeated for a maximum of 12 hours of credit. Comparative study of a literary topic or movement. Content varies.

542. Studies in Serbian Poetry. 4 Hours. May be repeated for a maximum of 12 hours of credit. Specific topics are announced each semester.

545. Studies in Serbian Prose I. 4 Hours. May be repeated for a maximum of 12 hours of credit. Specific topics of the Serbian short story and novel are announced each term.

546. Topics in Serbian Prose II. 4 Hours. May be repeated for a maximum of 12 hours of credit. Specific topics of Serbian drama are announced each semester.

548. Studies in Yugoslav Literatures. 4 Hours. May be repeated for a maximum of 12 hours of credit. Specific topics are announced each term.

550. Studies in Yugoslav Literary Historiography and Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Major concepts and movements in South Slavic literary history.

560. Studies in Ukrainian Renaissance and Baroque Literature. 4 Hours. Ukranian prose, poetry and drama of the sixteenth, seventeenth, and eighteenth centuries.

562. Studies in Ukrainian Romantic and Post-Romantic Poetry. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a period or movement in nineteenth- and early twentieth-century Ukrainian poetry. Content varies.

563. Studies in Twentieth-Century Ukrainian Poetry. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a period or movement. Content varies.

565. Studies in Nineteenth-Century Ukrainian Prose. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of genre, topic, period, movement or author. Content varies.

566. Studies in Twentieth-Century Ukrainian Prose. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of genre, topic, period, movement or author. Content varies.

568. Studies in Ukrainian Drama. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of a period, movement or author. Content varies.

570. Studies in Ukrainian Literary Historiography and Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Study of methodology, periods, schools and groups, individual literary historians and critics. Content varies.

575. Studies in Slavic Literary Theory. 4 Hours. May be repeated for a maximum of 12 hours of credit. Russian, Czech, Polish and Serbian contributions to literary theory: formalism, structuralism, semiotics, phenomenology. Taught in English.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Investigation of special problems under the general direction of a faculty member. Prerequisites: Consent of the instructor and the head of the department.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Open only to PhD degree candidates. Students engaged in research and writing theses will be assigned to this course at the discretion of the department. Independent research on a topic approved for a graduate thesis. Prerequisite: Consent of the department.

Social Work (SocW)

401. Human Behavior and the Social Environment. 3 Hours. No credit given if the student has credit in SocW 355. Human development through the life cycle including urban family, group, community, and organizational interactions with social, cultural, psychological factors. Prerequisite: Consent of the instructor, or admission to the MSW program.

411. Social Work in a Multicultural Society. 3 Hours. No credit given if the student has credit in SocW 537. Place of social work in a multicultural society; focus on racial and ethnic minority groups, particularly African Americans, Latinos, Asian Americans, and Native Americans. Prerequisite: Admission to the MSW program.

420. Policy I: Social Welfare Policy and Services. 3 Hours. No credit given if the student has credit in SocW 550. Social work history; structure and development policies; policy analysis and policy advocacy skills for social and economic justice. Prerequisite: Admission to the MSW program.

430. Practice I: Generalist Practice with Individuals, Families, and Groups. 3 Hours. No credit given if student has credit in SocW 501. Generalist practice principles applied to individuals, families, and groups including content on community context, racial and ethnic minorities, poor, oppressed, and other urban vulnerable communities. Prerequisite: Admission to the MSW program.

431. Practice II: Generalist Practice with Task Groups, Organizations, and Communities. 3 Hours. No credit given if student has credit in SocW 502. Generalist practice principles applied to task groups, organizations, and communities including focus on community context and the poor, oppressed and other urban vulnerable communities. Prerequisite: SocW 430.

460. Research I: Social Work Research. 3 Hours. No credit given if student has credit in SocW 560. Research methodology basics applied to social work: problem formulation, design, measurement, sampling, data analysis, computerization, ethics, qualitative and quantitative methodologies. Prerequisite: Admission to the MSW program.

480. Special Studies in School Social Work Practice. 3 Hours. Ecological and strengths-based interventions in urban school systems. Prerequisite: Admission to the post-MSW Type 73 program.

501. Practice I. 2 Hours. Overview of generalist social work practice identifying concepts, values, and skills designed to assist individuals, groups, families, organizations, and communities to achieve personal and social change.


Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
as applied to practice with individuals, families and groups. Prerequisite: SocW 501.

503. Family Practice in Urban Communities. 3 Hours. Empowering at-risk urban families using strengths-based intervention; brief treatment models; attention to diversity, community, poor, and other urban at-risk populations. Prerequisite: SocW 430.

504. Group Theory and Practice. 3 Hours. Theory and practice of social work with empower groups in both clinical and large system settings; diversity and equity issues. Prerequisite: SocW 430.


506. Community Organizing for Action and Social Change. 2 Hours. Advanced knowledge and skills in community organizing for direct action to achieve social change for and with disadvantaged urban populations. Prerequisite: SocW 505 or consent of the instructor.

507. Agency-Based Community Practice. 2 Hours. Advanced knowledge and skills in agency-sponsored community practice with disadvantaged urban populations. Prerequisite: SocW 505 or consent of the instructor.

510. Practice in Concentrations. 2 to 4 Hours. May be repeated for credit. Theory and skill development in the use of practice methods in selected fields such as child and family, health, management and policy, mental health, occupational social work, and school social work. Topics vary according to areas of concentration. Prerequisites: SocW 502 and 536, or consent of the instructor.

511. Practice with Children. 3 Hours. Direct treatment with urban at-risk children including situations involving homelessness, substance abuse, violence; treatment modalities emphasizing family, community. Prerequisite: SocW 430.

512. Brief Individual Treatment in Managed Care. 3 Hours. Brief treatment interventions (cognitive behavioral, psycho dynamics, and solution focused) with adult clients in urban managed care settings; focus on strengths-based interventions and diversity. Prerequisite: SocW 430.

513. Advanced Family Practice. 2 Hours. An ecological/integrative systems perspective is used in developing skills at an advanced level in clinical assessment of and intervention with families. Prerequisites: SocW 503 and 535.

514. Practice with Families in Transition. 2 Hours. Critical issues in families on the continuum from divorcing to single parent to reconstituted systems. Dynamics of these systems as well as specific appropriate interventions. Prerequisites: SocW 503 and 535.

515. Practice with Courage. 3 Hours. Practice with urban couples with attention to diversity, poverty and other urban at-risk factors and problems including substance abuse, violence, mental disorders, and sexual problems. Prerequisite: SocW 430.

516. Practice with Family Violence, Neglect, and Abuse. 3 Hours. Ecological approach to family violence: physical, psychological and sexual abuse of children, women and elders at practice and policy levels; urban vulnerable population. Prerequisite: SocW 430 or consent of the instructor.

517. Practice with Family Violence, Neglect, and Abuse. 3 Hours. Ecological approach to family violence: physical, psychological and sexual abuse of children, women and elders at practice and policy levels; urban vulnerable population. Prerequisite: SocW 430 or consent of the instructor.

518. Practice with Economically Disadvantaged Families. 2 Hours. Approaches to practice with economically disadvantaged families including advocacy, crisis intervention, and brief family therapy interventions. Emphasis on ethnic or racial minority status clients and single parent families. Prerequisites: SocW 502 and 535.

521. Aging Populations: Social Work Response. 3 Hours. Psychological, social, biological aging factors of individuals and families; emphasis on practice skills for community, long-term care and hospital-based services with urban emphases. Prerequisite: SocW 410 or consent of the instructor.

522. Crisis Intervention. 3 Hours. Nature of crises including suicide and large-scale disaster; strengths-based interventions in urban settings; medical and mental health facilities, schools, community centers, and neighborhoods. Prerequisites: SocW 430.

523. Drug and Alcohol Abuse and Social Work. 3 Hours. History and pharmacology of alcohol and other drugs; etiology of abuse and dependence; assessment and treatment models; practice in multi-disciplinary settings; emphasis on urban systems. Prerequisites: SocW 430.


525. Social Work with Women. 3 Hours. Same as GWS 525. Research, policy, and practice approaches to working with women in diverse urban settings; empowerment and diversity perspectives. Prerequisites: SocW 410; or consent of the instructor.


527. Topics in Social Services. 3 Hours. Critical review of selected areas of social work, social services, and social welfare. Prerequisites: Consent of the instructor, and admission to the MSW program.

528. Information Management in Social Welfare. 2 Hours. Use of information technology to support management decision-making, planning, and evaluation. Information as an organizational asset and professional resource. Systems and decision-making concepts for study of the development, implementation, management and improvement of information systems and services. Prerequisites: SocW 502 and 561, or consent of the instructor.

530. Leadership in Human Service Organizations. 3 Hours. Executive leadership of urban social service agencies; study of leadership theories and strategies. Prerequisite: SocW 410.

532. Social Work in Corrections. 3 Hours. Policy and practice roles of social workers in correctional settings with emphasis on race, ethnicity, gender, sexual orientation and poverty factors. Prerequisite: SocW 410 or consent of the instructor.

533. Sexual Minority Communities. 3 Hours. Community and social justice framework applied to gay, lesbian, bisexual and transgendered populations; historical development of sexual minority communities; overview of social work response. Prerequisite: Admission to the MSW program or consent of the instructor.

534. Independent Study in Practice. 1 to 3 Hours. May be repeated for a maximum of 6 hours of credit. Independent study in practice area not covered by existing course offerings. Prerequisite: Consent of the instructor.

535. Human Behavior and the Social Environment. 3 Hours. Human development from prenatal through late adulthood: physiological, social, and cultural influences on development.

536. Human Service Organizations in the Community. 2 Hours. The human service organization and the community as social systems; theories and models of HSOs and communities. Prerequisite: SocW 535.

537. Intergroup Relations in a Multicultural Society. 2 Hours. Economic, political, and social forces influencing economic and social status of minorities examined from an ecological perspective, as are minority impacts on total society. Prerequisite: Consent of the instructor.

538. Human Sexuality: Social Work Applications. 2 Hours. Sexual development and understanding of normal and abnormal sexual behavior with focus on increasing professional skills and sensitivity to clients with sexual concerns. Prerequisite: SocW 535 or consent of the instructor.

539. Mental Health Issues with Children and Adolescents. 3 Hours. Critical, strengths-based understanding of current classification and diagnostic systems for assessment and treatment planning with children and adolescents. Prerequisite: SocW 410; or consent of the instructor.

540. Mental Health Issues with Adults. 3 Hours. Critical, strengths-based understanding of current classification and diagnostic systems for assessment and treatment planning with adults. Prerequisite: SocW 410; or consent of the instructor.

541. Psychopathology in Mental Health. 2 Hours. Psychopathology through the life cycle including clinical diagnosis, understanding of severe to mild mental disorders in adults, adolescents, and children and family interaction. Implications for social work

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
practice in mental health settings. Prerequisite: SocW 535 or consent of the instructor.

542. Human Behavior and Health Care. 2 Hours. Interrelatedness of physical, social, and psychological factors of illness and implications for social functioning of patients and families; knowledge base required for hospital social workers, etc. Prerequisite: SocW 535 or consent of the instructor.

543. Organizational Theory in Social Welfare. 2 Hours. Examination of organization theory and analysis. Understanding organizational structures and processes within human service organizations. Critiques of models for organizational designs and research on human service organizations. Prerequisite: SocW 535 or consent of the instructor.

544. Community Violence. 3 Hours. Urban community violence; impact on individuals and society; policies and theories critically studied from race, class, and gender perspectives; social work implications. Prerequisite: SocW 410 or consent of the instructor.

545. HIV/AIDS: Social Work Challenges. 3 Hours. HIV prevention and intervention in urban setting; system and ecological understanding of impact of HIV on society and role of social work practice and policy. Prerequisite: SocW 410 or consent of the instructor.

549. Independent Study in Human Behavior and the Social Environment. 1 to 3 Hours. May be repeated for a maximum of 6 hours of credit. Independent study in HBSE areas not covered by existing course offerings. Prerequisites: Consent of the instructor and approval of the college.

550. Social Welfare Policy and Services. 2 Hours. History, economic and social base, as well as the nature and scope of the United States social welfare system and its response to the needs and problems of its citizens. Current provisions and alternatives in social security and other social welfare programs and services.

551. Policy II: School Social Work Policy. 3 Hours. Critical analysis of federal, state, and local policies relevant to social work practice in urban school systems. Prerequisite: SocW 420.

552. Policy II: Child and Family Policy. 3 Hours. Critical analysis of policies affecting welfare of families and children; focus on child welfare, juvenile justice, adult criminal justice, mental health, and special education systems. Prerequisite: SocW 420.

553. Policy II: Health Care Systems and Policies. 3 Hours. Critical analysis of current health care programs and policies including policy change skills; content on urban poor and at-risk populations. Prerequisite: SocW 420.

554. Policy II: Mental Health Policy. 3 Hours. Critical analysis of policies and structures in mental health delivery system with focus on urban and chronically mentally ill populations. Prerequisite: SocW 420.

555. Occupational Social Policy and Services. 2 Hours. Introduction to occupational social work and the provision of services in work settings. Theoretical framework for delivery of social services in work settings, values, issues, and corporate policy development relevant to occupational social work. Prerequisite: SocW 550 or consent of the instructor.

556. Policy II: Community and Administrative Practice. 3 Hours. Critical analysis of national, state, and local policies affecting urban community building and development. Prerequisite: SocW 420.

558. Social Work and the Law. 3 Hours. Social work input in legal system: family law, family violence, crime, delinquency, civil rights, education, health, mental health, social advocacy, social work practice regulation. Prerequisite: SocW 420 or consent of the instructor.

559. Independent Study in Social Welfare Policy and Services. 1 to 3 Hours. May be repeated for a maximum of 6 hours of credit. Independent study in SWPS areas not covered by existing course offerings. Prerequisites: Consent of the instructor and approval of the college.

560. Social Work Research. 2 Hours. Application of basic concepts of research methodology to social work including problem formulation, design, measurement, sampling, and data analysis. Basic principles and concepts for evaluation of social work practice through single system and group designs. Critique of selected studies. Prerequisite: 3 hours of social statistics or the equivalent.


562. Information and Decision Support Systems for the Social Services. 3 Hours. Functions of information and decision support systems: accountability; assessment of service delivery; planning, management, and direct practice decision-making. Analysis of data and information requirements and capabilities. Methodologies for development or redesign of decision support and information systems. Conceptual, measurement, ethical, and staff engagement factors specific to social services. Prerequisite: SocW 560.


565. Research Seminars: Social Service Issues. 3 Hours. Methodologies and results of research in selected fields of social services; special issues and problems in practice; relationship of research, theory, and practice; priorities for future research. Prerequisite: SocW 560 or consent of the instructor.

567. Research Project. 0 to 8 Hours. S/U grade only. May be repeated for credit. Application of research methods to social work problems in an individual or group project or library research project. Preparation of a formal report based on field study processes and findings. Prerequisites: SocW 560 or consent of the instructor, and approval of the college.

569. Independent Study in Research. 1 to 3 Hours. May be repeated for a maximum of 6 hours of credit. Independent study in research methodology or areas not covered by existing course offerings. Prerequisites: Consent of the instructor and approval of the college.

570. Field Instruction I. 5 Hours. S/U grade only. Students are assigned to social agencies where, under the supervision of an agency field instructor, selected micro and macro system cases are carried for social work services. Prerequisite: Consent of the instructor.

571. Field Instruction II. 5 Hours. S/U grade only. Students are assigned to social agencies where, under the supervision of an agency field instructor, they carry selected cases or groups for social work services. Prerequisites: SocW 570 and consent of the instructor.

572. Field Instruction III. 8 Hours. S/U grade only. Students are assigned to social agencies where, under the supervision of an agency field instructor, selected micro and macro system cases are carried for social work services. Prerequisites: SocW 571 and consent of the instructor.

573. Field Instruction IV. 8 Hours. S/U grade only. Students are assigned to social agencies where, under the supervision of an agency field instructor, selected micro and macro system cases are carried for social work services. Prerequisites: SocW 572 and consent of the instructor.

574. Special Studies in Field Instruction I. 2 to 4 Hours. S/U grade only. Practicum experiences in approved social agencies/organizations where students carry selected cases, applying knowledge to skill applications under the supervision of an agency field instructor. Prerequisite: Consent of the instructor.

575. Special Studies in Field Instruction II. 2 to 4 Hours. S/U grade only. Practicum experiences in approved social agencies/organizations where students carry selected cases, applying knowledge to skill applications under the supervision of an agency field instructor. Prerequisite: Consent of the instructor.

577. Social Welfare History. 3 Hours. Social work history in context of political, economic, and social developments; focus on gender, class, and race; critical application of theoretical models. Prerequisite: Admission to the PhD in Social Work program or consent of the instructor.

579. Integrative Seminar. 2 Hours. May be repeated for a maximum of 4 hours of credit. Application of concepts of social work practice, policy, and research to selected fields of social service. Focus on appropriate service delivery models and intervention strategies. Prerequisites: Concurrent registration in SocW 575 and consent of the instructor.

580. Practice III: Community and Administrative Practice. 3 Hours. Management of human service organizations;
resource acquisition and management; planning; community relations; focus on urban, community-based agencies. Prerequisite: SocW 431.

581. Practice IV: Community and Administrative Practice. 3 Hours. Advanced urban community building and developing; emphasis on poor, at-risk communities. Prerequisite: SocW 580.

582. Practice III: Practice with Children and Families. 3 Hours. Ecological and strengths-based practice with urban children and families; special focus on child welfare. Prerequisite: SocW 431.

583. Practice IV: Practice with Children and Families. 3 Hours. Advanced critical analysis and application of ecological and strengths-based practice emphasizing interactions of children and families with urban courts, schools, and child welfare systems. Prerequisite: SocW 582.

584. Practice III: Health Care. 3 Hours. Theoretical basis and skills for health social work in diverse settings; bio-psychological understanding of health and disease; emphasis on direct practice with urban clients and families. Prerequisite: SocW 431.

585. Practice IV: Health Care. 3 Hours. Advanced knowledge and skills in health care settings; specific populations including urban poor and at-risk populations; emphasis on urban community and organizational levels. Prerequisite: SocW 584.

586. Practice III: Mental Health. 3 Hours. Strengths-based assessment in urban settings; diversity issues; managed care settings; critical use of current mental health diagnostic and classification systems. Prerequisite: SocW 431.

587. Practice IV: Mental Health. 3 Hours. Advanced urban mental health practice; diversity issues; focus on children and adolescents and their families; critical application of current mental health diagnosis and classification. Prerequisite: SocW 586.

588. Practice III: School Social Work. 3 Hours. Ecological and strengths-based perspectives on development of basic competencies for urban school social work; diversity issues. Prerequisite: SocW 431.

589. Practice IV: School Social Work. 3 Hours. Advanced interventions in urban school systems; use of groups, consultation, classroom interventions, family empowerment, conflict resolution and community interventions; diversity issues. Prerequisite: SocW 588.

590. Analysis of Social Work Practice Approaches. 3 Hours. Historical and current developments in the conceptualization of social work practice. Implications of practice approaches for contributing to social justice. Values and ethics addressed. Extensive computer use required. Prerequisite: Admission to the PhD in Social Work program or consent of the instructor.

591. Social Welfare Policy Analysis and Development. 3 Hours. Analysis of social welfare policies with particular attention to issues of social and economic justice; conceptual models for analysis; application of models to selected problems. Prerequisite: Admission to the PhD in Social Work program or consent of the instructor.

592. Models of Social Work Scholarship and Knowledge Development. 3 Hours. Functions of scholarship in social work, contributions of scholarship to social and economic justice, research methodologies and knowledge building processes for practice and policy analysis. Extensive computer use required. Prerequisite: Admission to the PhD in Social Work program or consent of the instructor.

593. Quantitative Methods in Social Work Research. 3 Hours. Selected statistical and analytical methods as applied to social issues. Use of computerized tools, sampling, hypothesis testing, descriptive and inferential procedure, introduction to multivariate analysis. Extensive computer use required. Prerequisite: Admission to PhD in Social Work program or consent of the instructor.


595. Seminar in Social Work Education. 3 Hours. Preparation for roles as social work educators. Historical development of social work education with special emphasis on relation between curriculum design and the accreditation process. Pedagogical issues such as selecting educational objectives, teaching methods, and evaluation of student performance. Student must participate in a teaching laboratory. Prerequisite: Admission to the PhD in Social Work program.

596. Proseminar on Selected Topics and Issues in Social Work. 2 to 4 Hours. May be repeated for credit. Review and critique of selected areas of social work content, theory, or practice. State of current knowledge and needed research stressed. Prerequisite: Admission to the PhD in Social Work program.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual research, under faculty direction, on social work doctoral dissertation. Prerequisite: Consent of the instructor.

Sociology (Soc)

400. Sociological Analysis. 4 Hours. Procedures for analyzing original or secondary research data; writing literature reviews, proposals, data summaries, and research reports; computer-assisted data analysis and text preparation. Prerequisites: Soc 201 and 202 or 6 hours of upper-division courses in the social sciences including at least one course in introductory statistics and research methods, or consent of the instructor.

401. Sociological Statistics. 4 Hours. Descriptive and inferential statistics for graduate and advanced undergraduate sociology majors and related fields. Tests of means, regression, correlation, analysis of variance, and related topics. Prerequisites: Soc 201 and 202 or consent of the instructor.


405. Writing in the Social Sciences. 4 Hours. Leads to effective, clear writing for a social science audience. Teaches how to organize ideas, avoid tiresome jargon and write with precision. Prerequisite: 6 hours of upper-division social science courses.

408. Fieldwork: Ethnographic and Qualitative Fieldwork Techniques. 4 Hours. Same as Anth 418. Practical introduction to the techniques of anthropologists and qualitative sociologists for research in natural social settings; participant observation/nonparticipant observation, using interview, use of documentary sources. Prerequisite: Anth 213 or Soc 202 or consent of the instructor.

409. Topics in Sociological Research. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the course is scheduled. Prerequisites: Soc 201 and 202, or consent of the instructor.

410. Advanced Survey of Social Psychology. 4 Hours. Survey of the major theories, methods, and research in sociological social psychology. Prerequisite: Soc 110 or consent of the instructor.

419. Topics in Social Psychology. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of a specialized topic announced when the course is scheduled. Prerequisite: Soc 110 or 410, or graduate standing in sociology, or consent of the instructor.

423. Age Groups and the Social Order. 4 Hours. Age groups in primitive, industrial, and postindustrial societies; concepts of the life cycle; life-course transitions; cohorts; aging populations; intergenerational relations; politics of aging. Prerequisite: 6 hours of upper-division sociology.

424. Sociology of Gender. 4 Hours. Same as WS 425. Variety and change in gender roles; patterns and consequences of gender inequality; gender and sexuality; gender and social institutions such as family; economy. Prerequisite: 6 hours of upper-division sociology or gender and women's studies courses or consent of the instructor.

425. Race and Ethnic Relations. 4 Hours. Critical examination of the conceptual frameworks and empirical findings in the study of race and ethnic relations. Prerequisite: 6 hours of upper-division sociology including Soc 225, or consent of the instructor.

426. Topics in Race and Ethnic Relations. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is scheduled. Prerequisite: 6 hours of upper-division sociology including Soc 225, or consent of the instructor.

430. Topics in Deviance and Social Control. 4 Hours. May be repeated for a maximum of 12 hours of credit. Intensive examination of a specialized topic announced when the class is
433. Sociology of Law. 4 Hours. The origin and development of law in various social settings; relationship to other social norms with special attention to the difference between legal and nonlegal forms of social control. Prerequisite: 6 hours of upper-division sociology including Soc 230, or consent of the instructor.

440. Topics in Organizations and Institutions. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is scheduled. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

441. Social Stratification. 4 Hours. The nature of systems of differentiation and ranking in societies and their consequences; emphasis on class structure in the United States; prestige, status, power, and social mobility in the United States and other societies. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

444. Industrial Sociology. 4 Hours. Same as Mgmt 444. Analysis of industrial society and industrial institutions, the meaning of work and work relations, technology and economic change. Prerequisite: 6 hours of upper-division sociology or management, or consent of the instructor.

445. Sociology of the Family. 4 Hours. Variety and change in family patterns, family formation and break-up, parents’ and children’s effects on each other, influences of culture and political economy, consequences for other institutions. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

446. Race, Ethnicity, and Gender in American Religion. 4 Hours. Same as RELS 446. Religious institutions in the U.S. as a crucible for racial, ethnic, and gender identities, group formation, and intergroup relations; major world religions represented in the U.S. Prerequisite: Soc 100 or consent of instructor.

447. Organizations. 4 Hours. Same as Mgmt 447. Characteristics of business, government, and not-for-profit organizations; approaches used to study organizations; theoretical and empirical analysis of organizational processes. Prerequisite: 6 hours of upper-division sociology, management, or political science, or consent of the instructor.

448. Sociology of Development. 4 Hours. Historical, economic, political, social, and geographic factors shaping national and international development experiences and outcomes. Prerequisite: 6 hours of upper-division social science courses or consent of the instructor.

451. Medical Sociology. 4 Hours. Survey of major topics in sociology of health and medicine including social definitions of health and illness, patient-practitioner interaction, the organization of health institutions and professions. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

452. Social Epidemiology. 4 Hours. Social and cultural factors in health and disease; individual and social reactions to health and disease. Methods of social epidemiology applied to chronic and acute disease. Prerequisites: Soc 201 and 451, or consent of the instructor.

453. Health Care Systems. 4 Hours. Organization of medical and health care in the United States and other selected countries, methods of delivering care to various populations with emphasis on urban medicine. Prerequisite: Soc 451 or consent of the instructor.

455. Topics in Medical Sociology. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is scheduled. Prerequisite: Soc 451 or consent of the instructor.

465. Topics in Sociology of Politics. 4 Hours. Same as Poli 465. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is scheduled. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

471. Population. 4 Hours. Same as Epidemiology 471. The measurement and study of major trends and differentials in fertility, mortality, migration, growth, and compositional characteristics of the population of the United States and other nations. Prerequisite: 6 hours of upper-division sociology including Soc 201, or consent of the instructor.

473. Cities and Regions. 4 Hours. Characteristics, conditions, and consequences of structure and change of cities and metropolitan regions. Spatial, political economy, cultural perspectives. Census, ecological, historical, comparative data for cities. Prerequisite: 6 hours of upper-division sociology including Soc 201, or consent of the instructor.

475. Topics in Population and Human Ecology. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is scheduled. Prerequisite: 6 hours of upper-division sociology including Soc 201, or consent of the instructor.

476. Topics in Urban Sociology. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive examination of a specialized topic announced when the class is scheduled. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

477. The Urban Community in Chicago. 4 Hours. Nature and development of Chicago community areas and suburbs; segregation and change in community areas; basis and structure of metropolitan communities. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

485. Classical Sociological Theory. 4 Hours. Survey and analysis of classical European and American social theory, such as Marx, Weber, Durkheim, Veblen, and Park. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

487. Contemporary Sociological Theory. 4 Hours. Review and evaluation of major currents in sociological theory since the 1940’s. Prerequisite: 6 hours of upper-division sociology or consent of the instructor.

488. Theories in Social Psychology. 4 Hours. In-depth treatment of major theoretical traditions in social psychology. Prerequisite: Soc 110 or 410, or consent of the instructor.

496. Independent Study or Research. 1 to 9 Hours. May be repeated for credit with the approval of the department. Students may register for more than one section per term. Extensive readings in specialized areas of sociology or empirical research. Prerequisites: 18 hours of sociology (excluding Soc 296 and 299), consent of the instructor, and approval of the department.

500. Sociological Research Methods I. 4 Hours. Introduction to research design, data gathering and data reduction; logic of problem formulation, units of analysis, measurement, data analysis.

501. Sociological Research Methods II. 4 Hours. Evaluating sociological research, data analysis and reporting; proposal writing and evaluation; professional issues including research ethics; student presentation of master’s research proposals. Prerequisite: Soc 500.

509. Seminar: Sociological Research Methods. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

510. Seminar: Social Psychology. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics. Prerequisites: Soc 410 and 488, or consent of the instructor.

520. Seminar: Race, Ethnicity, and Gender. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

528. Societal Analysis of Aging, Health, and Health Care. 3 Hours. Same as CHSc 528. Analysis of aging, health and health care issues mainly from sociological and public health perspectives. Review and application of appropriate concepts, theories and methods. Prerequisite: CHSc 425 or consent of the instructor.

530. Seminar: Deviance and Social Control. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

540. Seminar: Social Institutions. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

547. Seminar: Social Organization. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
548. Seminar: Comparative Societies. 1 to 7 Hours. May be repeated for credit. Students may register for more than one section per term. Intensive analysis of specialized topics.


551. Seminar: Sociology of Health and Medicine. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics. Prerequisite: Consent of the instructor.

565. Seminar: Political Sociology. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

571. Seminar: Population and Human Ecology. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

572. Sociology of Education. 4 Hours. Same as PS 572. Education as a social institution in interaction with other institutions, such as the economy. Topics include the emergence of national systems of education, purposes of education, inequality and educational reform. Prerequisites: Consent of the instructor or enrollment in the Ph.D. in Policy Studies in Urban Education program.

585. Seminar: Sociological Theory. 1 to 7 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

593. Colloquium on College Teaching of Sociology. 0 to 4 Hours. May be repeated for credit. Sociological analysis of contemporary university teaching; strategies and techniques for presentation of sociology at the college level.

595. Departmental Seminar. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Presentation and discussion of issues of professional concern to sociologists including current research, consulting, teaching and applied sociology.

596. Independent Study. 1 to 12 Hours. May be repeated for credit. Students may register for more than one section per term. Research on special problems not included in the graduate thesis. Prerequisites: Consent of the instructor and approval of the department.

597. Project Research. 0 to 16 Hours. S/U grade only. May be repeated for a maximum of 6 hours of credit. Supervised writing and research on topic of the master’s paper. Prerequisites: Soc 501 and consent of the instructor.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of specialized topics.

English (Eng)

400. History of the English Language. 4 Hours. Origins and development of English; phonological, morphological, syntactic development of the language; foreign influences; origin of dialects. Prerequisite: Span 205 or 300, or consent of the instructor.

402. Spanish Syntax. 4 Hours. Structure of the grammatical system of Spanish. Analysis of the most important syntactic phenomena with emphasis on the meaning and function of grammatical forms. Prerequisite: Span 305 or consent of the instructor.

403. Advanced Spanish Syntax. 4 Hours. Structure of the grammatical system of Spanish. In-depth analysis of selected syntactic phenomena. Prerequisite: Span 402 or the equivalent or consent of the instructor.

404. Spanish Phonology and Morphology. 4 Hours. Analysis of the phonological and morphological structure of Spanish. Emphasis on the production and mental representation of sounds. Prerequisites: Spanish 205 or the equivalent.

405. Advanced Spanish Phonology and Morphology. 4 Hours. Advanced and detailed study of the phonological and morphological structure of Spanish. Emphasis on current theories. Prerequisite: Span 404 or the equivalent or consent of the instructor.

406. Spanish Sociolinguistics. 4 Hours. Past and current theoretical and empirical sociolinguistics as applied to the study of variation within Spanish and U.S. Hispanic communities. Prerequisite: Span 402 or 404 or consent of the instructor.

408. Hispanic Dialectology. 4 Hours. Descriptive and historical analysis of the most salient linguistic phenomena of peninsular and American Spanish dialects. Prerequisite: Span 300 or 404 or the equivalent.

410. Spanish Medieval Literature. 4 Hours. Literary, social, and cultural developments in Medieval Spain, as reflected in Cantar de mio Cid, Libro de buen amor, El conde Lucanor and La Celestina. Prerequisite: Span 310.

412. Literary Forms in the Early Spanish Golden Age. 4 Hours. Renaissance and sixteenth-century lyric poetry: examples of picaronesia, pastoral, and mystical prose. Prerequisite: Span 310.

413. Literary Forms in the Later Spanish Golden Age. 4 Hours. The comedias; culturanismo and conceptismo; the prose of Quevedo and Gracian. Prerequisite: Span 310.

414. Don Quijote. 4 Hours. Detailed study of the text; novelistic techniques and influence on the development of the novel. Prerequisite: Span 310.

420. Modern Spanish Literature I: From Cadalso to Galdos. 4 Hours. Literary movements in the eighteenth and nineteenth centuries with special emphasis on Romanticism and Realism. Prerequisite: Span 311.

421. Modern Spanish Literature II: From Unamuno to Garcia Lorca. 4 Hours. Representative authors and tendencies from the end of the nineteenth century to the outbreak of the Civil War. Prerequisite: Span 311.

422. Contemporary Spanish Literature: From Cela to the Present. 4 Hours. The most important authors and tendencies in twentieth-century Spain. Prerequisite: Span 311.

430. Spanish American Literature of the Colonial Period. 4 Hours. Conquest to independence. From the narrative of discovery, conquest and indigenous traditions, to Renaissance epic, Baroque poetry, and the literature of the Enlightenment. Prerequisite: Span 312.


432. Modern Spanish American Literature II. 4 Hours. Representative authors and movements from post-modernismo through Vanguardismo and the tendencies of the last twenty years. Emphasis on poetry. Prerequisite: Span 312.

433. Modern Spanish American Narrative. 4 Hours. The development of fiction in Spanish America from the Romantic era to the neo-realist novel and short story of the 1930’s. Prerequisite: Span 312.

434. Contemporary Spanish American Narrative. 4 Hours. Emergence of the New Fiction. Representative works of the 1940’s from South and Central America, Mexico, and the Caribbean, through contemporary developments of the “boom”. Prerequisite: Span 312.

435. Advanced Topics in Hispanic Literature. 4 Hours. Intensive study of a particular genre, theme, author or period within Spanish, Latin American or Latino literature with emphasis on literary analysis and critical writing. Prerequisites: Span 210, 211 and consent of the instructor.

436. Special Topics in the Teaching of Spanish. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each term in which course is given. Taught in English. Some semesters may be taught in Spanish. Prerequisite: Approval of the Department.

450. Foreign Language Teaching Methodology. 4 Hours. Same as Fr 481 and Ita 460. Theories of second language learning. Evaluative procedures emphasizing oral proficiency testing, analysis of textbooks, Preparation and presentation of micro-lessons. Twenty hours of high school observation. Prerequisites: Three courses at the 200- and 300-levels.

451. Educational Practice with Seminar I. 6 Hours. Graduate credit only with approval of the department. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisites: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.
452. Educational Practice with Seminar II. 6 Hours. Graduate credit only with approval of the department. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Prerequisite: Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in Span 451, and approval of the department.


455. Internship in Teaching Practice. 4 Hours. Practicum in teaching Spanish as a second language to college adults, in developing communicative competence and in relating language to culture; classroom visitation. Prerequisite: Restricted to departmental teaching assistants in Spanish.

471. Spanish Culture and Society. 4 Hours. Same as Anth 471 and LALS 471. Introduction to themes in Spanish culture and society based primarily upon the literature in anthropology. Parallel sets of readings in Spanish and English.

500. Research in Hispanic Studies. 4 Hours. May be repeated for a maximum of 8 hours of credit. Basic concepts of linguistic and literary theory; introduction to areas of research in linguistics and literature. Prerequisite: Admission to the graduate program in Hispanic Studies or consent of the instructor.

502. Theoretical and Research Foundations of Communicative Language Teaching. 4 Hours. Same as Fr 502. No credit given if student has credit in Span 450 or Fr 450 or Ger 407. This course introduces students to contemporary theory and research on second language acquisition. Emphasis is on understanding the research and examining classroom practice. Taught in English. Prerequisite: Appointment as a teaching assistant. For students outside the department: consent of the instructor.

505. Seminar in Spanish Descriptive Linguistics. 4 Hours. May be repeated for a maximum of 8 hours of credit. Topics in phonology; morphology, syntax, semantics or pragmatics of Spanish. Prerequisites: One 400-level Spanish course and one from Spanish 402, 404, or 408, or consent of the instructor.

507. Seminar in Second Language Acquisition and Bilingualism. 4 Hours. May be repeated for a maximum of 8 hours of credit. Current theoretical and research directions of bilingualism and second language acquisition. May include original empirical research projects.

510. Seminar in Spanish Medieval Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. An intensive study of relevant genres, periods, figures and movements of Spanish medieval literature.

512. Seminar in Golden Age Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Particular areas, genres, works or figures in sixteenth- and seventeenth-century Spanish literature.

520. Seminar in Modern Spanish Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Particular areas, genres, works or figures in modern Spanish literature.

530. Seminar in Spanish American Literature. 4 Hours. May be repeated for a maximum of 8 hours of credit. Intensive study of relevant genres, periods, figures and movements in Spanish-American literature.

535. Concepts and Methodologies in Hispanic Interdisciplinary Studies. 4 Hours. May be repeated for a maximum of 8 hours of credit. Inception and development of Latin American society from interdisciplinary perspectives. Cultural evolution from the encounter of European values and indigenous cosmogony to New World syncretism.

540. Seminar on Language in Context. 4 Hours. Past and current theoretical and empirical directions as applied to the study of oral and written discourse and its social context. Prerequisites: One 400-level Spanish course, and two from Span 402, 404, 406, and 408.

594. Special Topics in Hispanic Studies. 4 Hours. May be repeated for a maximum of 8 hours of credit. Topics which involve multiple approaches to problems in linguistics and literature, or which cross the chronological and geographical boundaries established in the seminars.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Provides for areas of study not regularly covered by departmental offerings. Study proposals must conform to departmental guidelines. Prerequisite: Consent of the instructor.

598. MA Thesis Research. 0 to 16 Hours. S/U grade only. Students involved in thesis research and writing are assigned to the course at the discretion of the graduate committee. Prerequisite: Consent of the graduate committee.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for a maximum of 24 hours of credit. S/U grade only. The writing of a PhD thesis based on original research in the area of the candidate’s major specialization (literature, linguistics, or culture). Prerequisites: Admission to candidacy for the doctoral degree and consent of director of graduate studies.

Special Education (SpEd)

410. Survey of Characteristics of Learners with Disabilities. 3 Hours. Fulfills requirements for Illinois House Bill 150. Field experience required. Learning and personality characteristics of exceptional learners. Diagnostic processes and educational approaches are examined. Prerequisite: Ed 210 or 421, or graduate standing and consent of the instructor.

423. Assessment of Monolingual and LEP Children with Disabilities. 4 Hours. Psychoeducational assessment of monolingual and limited English proficient children with learning disabilities. First and second language development. Theoretical and practical aspects of measurement and testing. Prerequisite: SpEd 410 or the equivalent.

424. Assessment of Students with Special Needs. 4 Hours. Theoretical and practical application of standardized and alternative testing of children with learning and behavior difficulties. Prerequisite: SpEd 410.

426. Curricular/Behavioral Considerations for Learners with Special Needs. 4 Hours. Instructional practices related to academics, classroom management, individualized and group instruction for students with special needs. Prerequisite: SpEd 424 or the equivalent or consent of the instructor.

427. Curricular and Behavioral Considerations for LEP Learners with Special Needs. 4 Hours. Exploration of best practice instruction and behavior management for limited English proficient students with learning disabilities, behavioral disabilities, and/or mild cognitive delays. Prerequisite: SpEd 410 or the equivalent, or consent of the instructor.


448. Topics in Special Education. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Course or workshop on preannounced topic on the education of handicapped children, adolescents, or adults. Prerequisites: SpEd 410 and consent of the instructor.

461. Political and Socio-Cultural Perspectives on Special Education. 3 Hours. Same as Ed 461. Students will examine issues of access and equity through legislation, litigation, and socio-cultural perspectives and be introduced to major theoretical frameworks that influence special education programs. Field work required.

462. Assessment of Individuals with Disabilities. 3 Hours. To prepare students in the use of formal and informal assessment in making decisions regarding placement, instructional planning, and evaluation of students with disabilities. Field work required. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

463. Instructional Adaptations in Reading and Writing I. 3 Hours. Emphasizes the components of designing, implementing, and assessing reading and writing instruction for individuals with disabilities at the elementary level. Field work required. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

465. Cognitive Development and Disabilities. 3 Hours. Same as EpPsy 465. Theory and research on cognitive development in children with disabilities from infancy through adolescence, in the context of typical development. Models for cognitive assessment and

Note: Hours and prerequisites listed here apply to graduate students only. 500-level courses are restricted to graduate students.
466. Language Development, Diversity, and Disabilities. 3 Hours. Same as EPsy 466. Theory and research on language development in children with disabilities, in the context of typical development. Models for language assessment and intervention. Field work required. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

467. Social and Emotional Development and Disabilities. 3 Hours. Same as EPsy 467. Exploration of the risk factors and different theoretical approaches associated with the social and emotional development of youth ages 5–21 with and without disabilities. Field work required. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

471. Curricular Adaptations for Learners with Significant Disabilities. 3 Hours. This course is designed to address methods of instruction, assessment, planning for instruction, development and evaluation of learning environments, and instructional delivery for students with significant disabilities. Field work required. Prerequisites: SpEd 465 and 466 and 467; or consent of the instructor.

472. Promoting Academic and Prosocial Behavior I. 3 Hours. Same as Ed 472. Explores the importance of school-wide and classroom structure and climate in the educational process. Strategies to promote academic success and desired social behavior. Field work required. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

473. Teaching Math and Science with Adaptations. 3 Hours. Same as Ed 473. Provides prospective teachers with assessment strategies and a range of adaptations, modifications, and interventions in math and science for students with disabilities. Field work required. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

481. Theoretical Foundations of Bilingual/ESL Special Education. 4 Hours. Overview of historical, political, pedagogical, and theoretical issues involved in the education of students with special learning needs and who are second language learners. Prerequisite: SpEd 410 or the equivalent or consent of the instructor.

482. Forging Collaborations with Family and Community. 3 Hours. Same as Ed 482. Develops skills necessary to work in partnership with the families of children with disabilities and community members. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

500. Research Methods in Special Education. 4 Hours. Research strategies and statistical methods for the assessment of applied and theoretical research studies in special education. Prerequisite: SpEd 410 or consent of the instructor.

506. Characteristics of Infants and Young Children with Disabilities. 4 Hours. Biological and environmental factors in infancy may cause developmental disabilities. Impact of such factors on developing sensory, motor, cognitive, social, and emotional competencies reviewed. Prerequisites: Ed 422 and SpEd 500; or consent of the instructor.

507. Children with Disabilities and the Family. 4 Hours. Strategies for working with families of young children with disabilities. Focus on parents and siblings within community context. Design and implementation of individual family service plans. Prerequisite: SpEd 506 or 511 or 513 or 515.

508. Intervention for Infants and Young Children with Disabilities. 4 Hours. Intervention methods for infants and young children at-risk for or showing developmental delays. Systems perspective on utilizing family and community to support intervention. Field experience. Prerequisite: SpEd 506.

509. Assessment of Infants with Disabilities and their Families. 4 Hours. Acquaints students with major norm-referenced developmental tests, screening tests, and systematic observation techniques appropriate for infants/families. Prerequisite: SpEd 506.


512. Instructional Methods for Students with Learning Disabilities. 3 Hours. Development and evaluation of individualized educational programs for learning disabled students, including instructional methods and materials. Field experience. Prerequisite: SpEd 511.

513. Characteristics of Mental Retardation. 3 Hours. The nature, characteristics and educational implications for the cognitive, social, and physical development of persons with mental retardation. Field experience. Prerequisite: SpEd 500.

514. Instructional Methods for Students with Mild Mental Retardation. 2 Hours. Instructional theory, methods, and techniques; and behavioral and academic objectives for students with mild mental retardation. Field experience. Prerequisites: SpEd 513 and concurrent registration in SpEd 515.

515. Instructional Methods for Students with Moderate to Profound MR. 2 Hours. Instructional theory and techniques, instructional methods and materials, and behavioral and academic objectives for moderate, severe, and profound mental retardation. Field experience. Prerequisites: SpEd 513 and concurrent registration in SpEd 514.

516. Characteristics of Students with Emotional and Behavioral Disorders. 3 Hours. Exploration of the risk factors and different theoretical approaches associated with the development and prevention of serious emotional and behavioral disorders. Field experience. Prerequisites: SpEd 424 and 426.

517. Instructional Methods for Students with Emotional and Behavioral Disorders. 3 Hours. Instructional programming for the academic and social development of students with serious emotional and behavioral disorders. Strategies for effective classroom and behavioral management. Field experience. Prerequisite: SpEd 516.

522. Special Educator as Consultant. 4 Hours. Training for consultants in educational and employment settings: consultation models, observation, and coaching skills to use with educators, parents, employers, and community-agency personnel. Prerequisite: SpEd 410 or equivalent or consent of the instructor.

537. Special Education Practicum. 6 to 12 Hours. Practice teaching in the field of special education; focus on teaching students who are experiencing social and/or emotional disturbance, mental retardation, or learning disabilities. Prerequisites: Completion of 100 clock hours of pre-student-teaching field experiences; completion of a sequence in an area of special education; and consent of the advisor. Applications are due two semesters in advance.

538. Internship in Special Education. 1 to 9 Hours. Students may register for more than one section per term. Clinical, research or field-based internship experiences for Special Education majors. Prerequisites: SpEd 424 and 426 and 500; and consent of the instructor one semester prior.

564. Proseminar in Special Education. 4 Hours. Various areas of special education research are reviewed. Topics include areas of faculty research. Prerequisites: SpEd 500 or consent of the instructor; and admission to PhD program in Special Education.

572. Promoting Academic and Prosocial Behavior II. 2 Hours. Provides an in-depth examination of serious problem behavior and the skills to develop individualized programs to address the academic and social needs of challenging students. Field work required. Prerequisite: SpEd 472 or consent of the instructor.

573. Understanding Research in Special Education. 3 Hours. Overview of research methodology appropriate for teachers of special populations with emphasis on developing skills in critically reading research reports. Prerequisite: SpEd 461 or the equivalent or consent of the instructor.

576. Internship in Assessment. 3 Hours. Internship experiences in an assessment clinic for special education majors. Field work required. Prerequisite: SpEd 462 or the equivalent or consent of the instructor.

577. Field Teaching Internship Experience. 3 Hours. Field-based internship experiences for special education. Field work required. Prerequisite: Approval of the program faculty.

578. Classroom-Based Inquiry Internship. 3 Hours. Field-based internship experiences in special education classrooms. Field work required. Prerequisite: Approval of the program faculty.

579. Research Internship. 3 Hours. Students work on a specific research project under the direction of a faculty member. Field work required. Prerequisites: SpEd 573, or the equivalent and consent of the instructor.

580. Student Teaching in Special Education. 6 Hours. Practice teaching in the field of special education. Field work required. Prerequisites: SpEd 463 and 471 and 473 and 572 and 573 and 576 and 577; and approval of the program faculty.
583. Instructional Adaptations in Reading and Writing II. 3 Hours. Students learn advanced strategies for designing, implementing, and analyzing reading and writing instruction for individuals with disabilities at the middle school and secondary level. Field work required. Prerequisites: SpEd 461 and 463; or consent of the instructor.

592. Seminar on Theory and Research in Special Education. 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Systematic in-depth review of theory and research on selected topics in special education. Prerequisites: SpEd 500 and consent of the instructor.

593. PhD Research Project. 1 to 8 Hours. May be repeated for a maximum of 8 hours of credit. Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. Prerequisite: Admission to the PhD in Education program.

595. Seminar in Special Education. 4 Hours, S/U grade only. Discussion of current literature in the field of special education. Prerequisite: SpEd 564.

596. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Students independently study related topics not covered by courses, under faculty supervision. Prerequisites: SpEd 500 or the equivalent, and consent of the advisor and the instructor.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Research on the topic of the student's dissertation. Prerequisite: Consent of the dissertation advisor.

Statistics (Stat)

401. Introduction to Probability. 4 Hours. Probability spaces, random variables and their distributions, conditional distribution and stochastic independence, special distributions, sampling distributions, limit theorems. Prerequisite: Grade of C or better in Math 210.

411. Statistical Theory. 4 Hours. Estimation, tests of statistical hypotheses, best tests, sufficient statistics, Rao-Cramer inequality, sequential probability ratio tests, the multivariate normal distribution, nonparametric methods. Prerequisite: Grade of C or better in Stat 401.

416. Nonparametric Statistical Methods. 4 Hours. Distribution-free tests for location and dispersion problems, one-way and two-way layouts, the independence problem, regression problems involving slopes, detecting broad alternatives, resampling methods. Prerequisite: Grade of C or better in Stat 381 or 411.

431. Introduction to Survey Sampling. 4 Hours. Simple random sampling, sampling proportions, estimation of sample size, stratified random sampling, ratio estimators, regression estimators, systematic and cluster sampling. Prerequisite: Grade of C or better in Stat 411 or 481.


462. Applied Probability Models II. 4 Hours. Renewal theory, regenerative processes, semi-Markov processes, queueing theory, exponential models, M/G/1 and G/M/1 systems, reliability, bounds on the reliability function, system life, Brownian motion, stationary processes. Prerequisite: Grade of C or better in Stat 461.

471. Linear and Nonlinear Programming. 4 Hours. Linear programming, simplex algorithm, degeneracy, duality theorem, sensitivity analysis, convexity, network simplex methods, assignment problems, constrained and unconstrained minima, quasi-Newton methods, Ellipsoid methods of Kachian. Prerequisite: Grade of C or better in Math 310.

473. Game Theory. 4 Hours. Games in extensive and normal form. Minimax theorem. Solving matrix games via linear programming. Nash equilibria for nonzero-sum games, Shapley value, bargaining models. Prerequisite: Grade of C or better in Math 310 or Stat 401.

477. Introduction to Reliability Theory. 4 Hours. Structural and probabilistic properties of coherent systems, notions of aging and classes of life distributions, preservation properties, dependent components, optimal allocation models. Prerequisite: Grade of C or better in Stat 401 or consent of the instructor.

481. Applied Statistical Methods II. 4 Hours. Linear regression, introduction to model building, analysis of variance, analysis of enumerative data, nonparametric statistics, product and system reliability, quality control. SAS and SPSSX applications. Prerequisite: Grade of C or better in Stat 381.

486. Statistical Consulting. 4 Hours. Introduction to statistical consulting methods and techniques. Handling and transformation of raw data sets in CMS. Statistical analysis of data sets with SAS and SPSSX. Prerequisite: Grade of C or better in Stat 411 or 481.

494. Special Topics in Statistics, Probability, and Operations Research. 4 Hours. May be repeated for credit. Students may register for more than one section per term. Course content is announced prior to each semester in which it is given. Topics drawn from areas such as distribution theory, Bayesian inference, discrete optimization, applied probability models, resampling techniques, bioinformatics, environmental sampling. Prerequisite: Approval of the department.

496. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Students independently study related topics not covered by courses, under faculty supervision. Prerequisites: SpEd 500 or the equivalent, and consent of the advisor and the instructor.

501. Probability Theory I. 4 Hours. Abstract measure theory, probability measures, Kolmogorov extension theorem, sums of independent random variables, the strong and weak laws of large numbers, the central limit theorem, characteristic functions, law of iterated logarithm, infinitely divisible laws. Prerequisite: Math 534 or consent of the instructor.


511. Advanced Statistical Theory I. 4 Hours. Statistical models, criteria of optimum estimation, large sample theory, optimum tests and confidence intervals, best unbiased tests in exponential families, invariance principle, likelihood ratio tests. Prerequisite: Stat 411.

512. Advanced Statistical Theory II. 4 Hours. Basic concepts in decision theory, prior and posterior distributions, Bayesian decision theory, hierarchical models, robustness, minimax analysis, invariance principle, sequential analysis, completeness. Prerequisite: Stat 511.

521. Linear Statistical Inference. 4 Hours. Estimation and testing in linear models, generalized inverses of matrices, n-dimensional normal distribution, quadratic forms, likelihood ratio tests, best invariant tests, analysis of variance. Prerequisite: Stat 411.


531. Sampling Theory I. 4 Hours. Foundations of survey design and inference for finite populations; the Horvitz-Thompson estimator; simple random, cluster, systematic survey designs; auxiliary size measures in design and inference. Prerequisite: Stat 411.

532. Sampling Theory II. 4 Hours. Uses of auxiliary size measures in survey sampling; cluster sampling; systematic sampling; stratified sampling; superpopulation methods; randomized response methods; resampling; nonresponse; small area estimations. Prerequisite: Stat 531.


536. Optimal Design Theory II. 4 Hours. Construction of optimal designs: BIB, Latin square and generalized Youden, repeated measurements, treatment-control studies; construction of factorial designs including orthogonal arrays. Prerequisite: Stat 535 or consent of the instructor.

561. Applied Stochastic Processes I. 4 Hours. Kolmogorov consistency theorem and classification of stochastic...
562. Applied Stochastic Processes II. 4 Hours. Martingales, Brownian motion, branching processes, stationary processes. Prerequisite: Stat 461 and Math 533 or consent of the instructor.


577. Reliability Theory. 4 Hours. Coherent structures, paths and cuts, modules, shape and properties of reliability function, association, classes of life distributions based on aging, dependence, multivariate models. Prerequisite: Stat 461.

591. Advanced Topics in Statistics, Probability, and Operation Research. 4 Hours. May be repeated for credit. Special topics. Topics drawn from areas such as: data analysis; Bayesian inference; nonlinear models; time series; computer-aided design; reliability models; game theory. Prerequisite: Approval of the department.

593. Graduate Student Seminar. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. For graduate students who wish to receive credit for participating in a learning seminar whose weekly time commitment is not sufficient for a reading course. This seminar must be sponsored by a faculty member. Prerequisite: Approval of the department.

595. Research Seminar. 1 Hour. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Current developments in research with presentations by faculty, students, and visitors. Researchers and practitioners from academia, industry and government will present talks on topics of current interest. Prerequisite: Approval of the department.

596. Independent Study. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Research work under the supervision of a faculty member leading to the completion of a master's thesis. Prerequisite: Approval of the department.

598. Master's Thesis. 0 to 16 Hours. S/U grade only. Research work under the supervision of a faculty member leading to the completion of a master's thesis. Prerequisite: Approval of the department.

599. Thesis Research. 0 to 16 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Prerequisite: Approval of the department.

Surgery (Surg)

597. Project Research. 0 to 16 Hours. S/U grade only. Research investigation of problems in surgery. Prerequisite: Consent of the instructor.

598. Master's Thesis Research. 0 to 16 Hours. S/U grade only. Research investigation of problems in surgery. Prerequisite: Consent of the instructor.

Theatre (Thtr)

423. Playwriting. 4 Hours. Same as Engl 495. The development of scripts for stage performance. Prerequisites: Approval of the department and submission and approval of a playwriting sample or dialog-centered fiction prior to registration.

444. Drama in Its Cultural Context I. 4 Hours. Drama in its social and cultural context, through the sevenenth century.

445. Drama in Its Cultural Context II. 4 Hours. Drama in its social and cultural context, eighteenth to twentieth centuries.

452. Performing the Classics I. 4 Hours. May be repeated for a maximum of 8 hours of credit. Techniques of performing Greek, Commedia dell'arte, and/or Elizabethan drama. Topics vary. Prerequisite: Grade of B or better in Thtr 262.

453. Space, Action, Motivation. 4 Hours. Techniques in the physicalization of performance. Focus on the body in space as both primary and integrated theatrical communication.

456. Performing the Classics II. 4 Hours. May be repeated for a maximum of 8 hours of credit. Techniques of performing Restoration through nineteenth-century styles of drama. Topics vary. Prerequisite: Grade of B or better in Thtr 262.

460. Theatre Architecture and Production. 4 Hours. Seminar on aesthetic and technical problems presented by the intersection of theatre, stage, audience and play. Field study of types of Chicago theatres and stages. Prerequisites: Thtr 150, and 250 or 255 or 444; or consent of the instructor.

464. Special Projects in Theatrical Design. 4 Hours. May be repeated for a maximum of 12 hours of credit. Twentieth-century styles: design for the contemporary stage. Problems in conceptualization, realization, and execution. Prerequisites: Thtr 250 or Thtr 256; or Thtr 257 and Thtr 259; or graduate standing in theatre.

465. Stage Direction. 4 Hours. Exploration of conceptual, planning and implementation skills of the stage director from script implementation to rehearsal and performance. Performance projects required. Prerequisite: Grade of B or better in Thtr 262.

466. Special Projects in Performance Training. 4 Hours. May be repeated for a maximum of 12 hours of credit. Training in varying advanced techniques of performance. Prerequisite: Consent of the instructor.

470. Contemporary Performance Techniques. 4 Hours. May be repeated for a maximum of 8 hours of credit. The relationship of contemporary theory and performance techniques with attention to both text and non-text based forms. Topics vary. Performance projects required. Prerequisite: Grade of B or better in Thtr 262; or graduate standing in theatre.

472. Investigative Collaboration. 4 Hours. May be repeated for a maximum of 8 hours of credit. Collaboration as the primary means for theatrical creation. Production teams assigned to joint-production projects. Topics vary. Prerequisite: Grade of B or better in Thtr 262; or graduate standing in theatre.

474. Internship. 3 to 8 Hours. May be repeated for credit. Only 3 hours may be counted toward theatre major requirements. Students work in an approved professional setting. Individual projects developed through conferences with a faculty member and a field supervisor. Prerequisites: 12 hours of upper-division courses in theatre, with a 3.00 grade point average (A=4.00) in those courses; recommendation of two faculty members and approval of the department obtained in the semester prior to internship.

491. Study Abroad in Theatre. 0 to 16 Hours. May be repeated for credit with the approval of the department. Study abroad within an approved foreign exchange program or department-sponsored program. Prerequisite: Approval of the department.

498. Independent Study. 1 to 4 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Individual investigation of special problems that may be student-initiated or related to faculty research. May also be used for special University-sponsored projects, such as interdisciplinary seminars. Prerequisite: Approval of the department.

502. Introduction to Research in Theatre. 4 Hours. Focuses on the research directors and scholars need to do to make informed choices.

521. Topics in Theatre History. 4 Hours. May be repeated for a maximum of 8 hours credit. Varying topics of a scope sufficiently broad to illuminate general problems of theatrical style and convention and/or periodization and historical development.

522. Theories of Theatre. 4 Hours. May be repeated for a maximum of 12 hours of credit. Nature of the theatrical experience. Emphasis on topics varies, for example theory of comedy; semiotics of theatre; dada, surrealism, expressionism, futurism. Prerequisites: At least 3 of the following: Thtr 209, 245, 262, 284, 425; or consent of the instructor.

523. Special Topics in Dramatic Criticism. 4 Hours. May be repeated for a maximum of 12 hours of credit. Intensive analysis of an individual critic or school, or critical history of an important play.

596. Independent Research. 1 to 4 Hours. May be repeated for a maximum of 6 hours of credit. Students may register for more than one section per term. Department approved research projects.
not included in thesis research. Prerequisite: Consent of the director of graduate studies.

597. Thesis Production. 0 to 8 Hours. S/U grade only. Under guidance of an advisor and committee, the student creates a theatre or video production, together with a written explanation of the work's intended significance. Prerequisite: Approval of the faculty thesis production committee.

598. Thesis Research. 0 to 16 Hours. S/U grade only. Students may register for more than one section per term. Under guidance of an advisor and committee, the student develops and conducts a research project addressing a theatre problem of a basic or applied nature. Prerequisite: Approval of the faculty thesis-research committee.

**Urban Planning and Policy (UPP)**

403. Introduction to Urban Planning. 4 Hours. Patterns of city growth, physical, socio-economic, and environmental issues. Contemporary planning issues. Future of cities. Prerequisite: Consent of the instructor.

420. Great Cities: London & Chicago. 1 to 8 Hours. Comparative investigation of urban, economic, social, and political issues in the two global cities. Includes classes, study, and living in London. Field work required. Prerequisite: Selection by the Office of Study Abroad and an advisor committee.

461. Urban and Regional Transportation Methods. 4 Hours. Same as CEMM 404. Methods and models for analyzing and forecasting transportation requirements, costs, and capacities. Prerequisite: Consent of the instructor.

470. Cohort Seminar for Urban Developers. 4 Hours. Application of the financial calculator, use of spreadsheets, and other tools commonly used in real estate-based urban development projects. Prerequisite: Consent of the instructor.

471. Housing and Community Development for Urban Developers. 4 Hours. Housing policy at federal, state and local levels affecting urban housing markets. Emphasis on assessment of market conditions affecting community development decisions. Prerequisite: UPP 470 or consent of the instructor.

472. Development Finance for Urban Developers. 4 Hours. Key financial principles of real estate development, particularly those related to the financing of affordable housing. How to develop a real estate pro forma. Prerequisite: Consent of the instructor.

473. Organizational Essentials for Urban Developers. 4 Hours. Theory and practice of management in public and non-profit settings. Focus on developing communication, leadership and legal skills for each step in development. Prerequisite: Consent of the instructor.

474. Community Development Process for Urban Developers. 4 Hours. Developing affordable housing: development team, acquisition strategy, legal issues, construction management and project sustainability, as it pertains to different types of housing developments. Prerequisite: Consent of the instructor.

475. Sustaining the Housing for Urban Developers. 4 Hours. Introduces students to a range of management issues: property management and maintenance, resident relations and services, and financial/asset management as it relates to sustaining affordable housing. Prerequisite: Consent of the instructor.

500. History and Theory of Urban Planning. 4 Hours. Analysis of the development of the planning field and of the theories that have been developed for planning for change in the urban community.

501. Urban Space, Place, and Institutions. 4 Hours. Political and economic approaches to urban structure and change. Includes intergovernmental relations, administrative organization and planning initiatives in urban space and institutions. Prerequisite: Graduate standing in the Master of Urban Planning and Policy program or consent of the instructor.

502. Planning Skills: Computers, Methods, and Communication. 4 Hours. Focus on the use of computers to learn methods and communication skills commonly used in planning practice. Prerequisite: Graduate standing in the Master of Urban Planning and Policy program or consent of the instructor.

503. Data Analysis for Planning and Management I. 4 Hours. Basic introduction to data analysis techniques most commonly used in urban planning. Addresses issues of decision-making based on limited or imperfect information. Prerequisite: Consent of the instructor.

504. Economic Analysis for Planning and Management. 4 Hours. Basic micro, macro, and welfare economics theory; related analytical concepts including input-output, economic base, benefit cost. Economic forces which shape urban areas and affect public policy. Prerequisite: Consent of the instructor.

507. Computer Topics in Urban Planning. 4 Hours. Specialized computational abilities for various planning areas including data base, project scheduling, statistics, graphics, and simulations. Topics will vary each semester. Prerequisite: Graduate standing in the Urban Planning and Policy program.

508. Geographic Information Systems for Planning. 4 Hours. Same as Geog 589. Applications of Geographic Information Systems to urban planning and policy making. Prerequisite: Graduate standing in urban planning and policy or consent of the instructor.

511. Resource and Expenditure Planning. 4 Hours. Sources of governmental revenues with emphasis on local planning and administration. Legal and equity issues. Debt financing and management. Financial accounting. Pension fund management. Prerequisite: Graduate standing in the Master of Urban Planning and Policy program or consent of the instructor.

512. Evaluation Methods. 4 Hours. Methods used to evaluate policies and programs; quasi-experimental designs, valuation problems, and emerging evaluation methods. Prerequisite: Consent of the instructor.

513. Data Analysis for Planning and Management II. 4 Hours. Advanced topics in data analysis and model building including specific models used in urban planning. Prerequisite: UPP 503.

515. Joint Planning Studio. 4 Hours. Analysis, evaluation and development of plans for clients. Prerequisites: UPP 500 and 503.

516. Issues of Class and Race in Planning. 4 Hours. Critically examines the significant role of race, class, ethnicity and gender as factors in planning public policy formation, implementation, and evaluation. Prerequisite: Consent of the instructor.

517. Regional and Metropolitan-Wide Planning. 4 Hours. History of regional planning. Prerequisite: UPP 500.

518. Management Skills. 4 Hours. Management theory and practice with particular focus on public and non-profit organizational settings. Political context of management, budgeting and professional communication.

520. International Development I: Theory and Applications. 4 Hours. Overview of international development theories and their practical applications. Particular emphasis is placed on globalization. Urban versions and applications of these theories. Prerequisite: Consent of the instructor.

521. International Development II: Comparative Planning and Policies. 4 Hours. Policies and practice of public sector planning and development in three regional areas of the world: Europe, South America, and Asia. Prerequisite: UPP 520 or consent of the instructor.

522. International Development Planning Studio. 4 Hours. Learning experience based on team work and the application of planning approaches to issues of development in an international perspective. Prerequisites: UPP 520 and 521 or consent of the instructor.

525. International Development: Special Topics. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Special topics selected for intensive analysis in international development planning. Prerequisite: Consent of the instructor.

530. Economic Development I: Analysis. 4 Hours. Theoretical perspectives, data, data sources and research techniques for analysis of regional, metropolitan and neighborhood economies. Prerequisite: UPP 504.

531. Economic Development II: Planning. 4 Hours. Overview of development strategies including financing, business development, industry retention and human resources; implementation and evaluation. Prerequisite: UPP 530.

532. Current Perspectives on Economic Development. 4 Hours. An examination of economic changes with specific reference to industrial transformation and the theoretical basis to these changes in order to clarify the policy debates. Prerequisites: UPP 504 and 530.

May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Special topics selected for intensive analysis in economic development. Prerequisite: Consent of the instructor.

535. Economic Development: Special Topics. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Special topics selected for intensive analysis in economic development. Prerequisite: Consent of the instructor.

536. Urban Employment Planning. 4 Hours. The importance of employment as a focus in planning and policy making. History, theories and methodologies of urban markets, labor market analysis methodologies and emergent public policies. Prerequisite: UPP 504 or consent of the instructor.

537. Economic and Environmental Planning. 4 Hours. Analytical and economic methods for environmental planning and management. Applications to selected problems. Prerequisite: UPP 504 or 554.

540. Community Development I: Theory. 4 Hours. Critically examines community development as a field of practice, policy intervention, implementation and analysis; emphasis on community and social dynamics of disadvantaged groups. Prerequisite: Consent of the instructor.

541. Community Development II: Practice. 4 Hours. Examines the methods and techniques used or adapted in community development as a field of planning practice, analysis and evaluation: emphasis on community based settings, applications and foci. Prerequisite: Consent of the instructor.

542. Metropolitan Housing Planning. 4 Hours. Urban housing market structure and dynamics; impacts of government housing policy on market; development of local housing plans. Prerequisite: UPP 504 or consent of the instructor.

543. Planning for Community-Based Health and Human Services. 4 Hours. Investigates the needs of special populations such as the elderly or mentally ill, the role of the planner in serving these groups and community based strategies to meet needs.

545. Community Development: Special Topics. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Special topics selected for intensive analysis in community development. Prerequisite: Consent of the instructor.

546. Health Planning Perspectives and the Health Care System. 4 Hours. Evolution of health care planning; organizational and political contexts for professional practice; current issues in health policy and service delivery planning. Prerequisite: Consent of the instructor.

547. Community Organization Practice. 4 Hours. Critically examines the context, development, status, and problems of organizing groups within communities of place, conditions and interest at various levels of analysis, relative to public formation, implementation and evaluation. Prerequisites: UPP 540 and 541; and consent of the adviser and the instructor.

550. Physical Planning I: Theoretical Foundations. 4 Hours. Physical form, economic characteristics, social qualities and government structure of cities, suburbs and regions; theories of urban spatial organization and planning. Prerequisite: Consent of the instructor.

551. Physical Planning II: Methods. 4 Hours. Fundamentals of construction and infrastructure of cities and regions, including site engineering and landscape architecture, natural environmental factors, utilities and infrastructure, cost/benefit analysis, and context of local government and planning process. Prerequisite: UPP 550.

552. Physical Planning III: Studio. 4 Hours. Analysis, evaluation, and development of land use and urban design plans for selected projects and clients. Prerequisite: UPP 551.

553. Land Use Law. 4 Hours. Legal constraints on land use control; constitutional and statutory principles and judicial review. Prerequisite: UPP 558.

554. Environmental Planning. 4 Hours. The relationship of federal and state environmental policies and legislation to urban and regional planning efforts. Prerequisite: Consent of the instructor.

555. Physical Planning: Special Topics. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Special topics selected for intensive analysis in such areas as housing and urban design. Prerequisite: Consent of the instructor.

556. Urban Design. 4 Hours. Methods and tools for analysis, policy making and evaluation of urban spaces, including theoretical approaches and trends, design elements, social dimensions, methods, policy formulation, computer applications, and project examples. Prerequisite: Consent of the instructor.

557. Site Planning. 4 Hours. Quantitative and qualitative tools for analysis and evaluation of site plans, including standards of site plans, spreadsheet computer models, elements of site design, landscape architecture, and red penciling site plans.

558. Land Use Planning. 4 Hours. Urban land use planning strategies and various land use control techniques which can be employed to carry out development policies; social implications of land use policy and practice. Prerequisite: Consent of the instructor.

559. Urban Transportation I: Introduction. 4 Hours. Transportation planning and linkages between it and urban land use and regional economic development. Recent trends, traditional problems and emerging issues.

561. Urban Transportation II: Policy and Methods. 4 Hours. Formation and implementation of transportation policy at the national, regional and local levels. Students will prepare an in-depth study of a major policy issue. Prerequisite: UPP 560 or consent of the instructor.

562. Urban Transportation III: Laboratory. 4 Hours. Software packages for urban transportation planning, transportation GIS and air quality modeling. Heavy reliance on case studies. Prerequisite: UPP 561 or consent of the instructor.

563. Transportation Management. 4 Hours. Transit system planning, scheduling, pricing policy, and management; traffic control techniques and demand management; paratransit alternatives. Prerequisite: UPP 560.

564. Programming and Implementation of Transportation Projects. 4 Hours. Case study analyses of the context for and techniques used in the planning, programming and implementation of transportation improvement projects. Prerequisite: UPP 560 or consent of the instructor.

565. Transportation: Special Topics. 1 to 4 Hours. May be repeated for a maximum of 8 hours of credit. Students may register for more than one section per term. Examination of specific and current problems in urban and regional transportation. Topics to be determined at the time the course is offered. Prerequisites: UPP 546, 560 and 585, or consent of the instructor.

566. Advanced Methods of Urban Transportation Planning I. 4 Hours. Transportation planning strategies, procedures for analyzing travel patterns, travel demand models, trip distribution models and network equilibrium. Prerequisites: UPP 461, 560 and 585, or consent of the instructor.

567. Advanced Transportation Planning II. 4 Hours. Same as CEMM 504. Analysis and design of transportation networks using methods from mathematical programming and optimal control theory; integration of travel choice models with urban location and network design models. Prerequisite: UPP 566 or consent of the instructor.

568. Intelligent Transportation Systems Planning. 4 Hours. Basic concepts in ITS, overview of national ITS architecture, ITS planning methods, design issues, strategic deployment planning, cost benefit evaluation. Case study approach. Prerequisite: UPP 562.

569. Advanced Planning Theory. 4 Hours. Study of theoretical ideas and debates about planning; the rational model and its competitors; critical review of planning methods and practice; composing alternative plans. Prerequisite: Consent of the instructor.

570. Methods of Policy Analysis. 4 Hours. Same as PPA 584. Analytic, allocative, and evaluative techniques in public policy analysis. Preparation of case studies in problem analysis and policy recommendation. Prerequisite: Consent of the instructor.

571. Data Analysis Methods: Regression Analysis. 4 Hours. Theory and methods of regression analysis are covered with emphasis placed on applications to different fields, chosen based on student interest. Prerequisite: UPP 513 or consent of the instructor.

591. Professional Practice Experience. 4 Hours. Reviews issues and problems in professional practice; analyzes prerequisites for rational, strategic and ethical planning; considers career...
options; and defines professional goals. Includes professional experience for students without professional planning experience. Prerequisite: Graduate standing in urban planning and policy and an approved internship agreement or waiver of the internship.

593. Independent Research in Urban Planning and Policy. 1 to 8 Hours. May be repeated for credit. Students may register for more than one section per term. S/U grade only. Advanced study and analysis of a topic selected by a student under the guidance of a faculty adviser. Prerequisite: Consent of the instructor.

594. Topics in Urban Planning and Policy. 1 to 4 Hours. May be repeated for a maximum of 12 hours of credit. Students may register for more than one section per term. Intensive analysis of selected planning problems or policy issues. Prerequisite: Consent of the instructor.

596. Independent Study in Urban Planning and Policy. 1 to 4 Hours. May be repeated for credit. Students may register for more than one section per term. Advanced study and analysis of topic selected by student under the guidance of the faculty adviser. Prerequisite: Consent of the instructor.

597. Master's Project Research. 0 to 4 Hours. S/U grade only. Preparation of plan, research report, or other document which demonstrates readiness for professional planning responsibility. Prerequisite: Open only to degree candidates, upon approval of student's faculty adviser.

598. Master's Thesis Research. 0 to 16 Hours. S/U grade only. Preparation of a major research paper under the guidance of a faculty committee. Prerequisite: Open only to degree candidates, upon consent of the director of graduate studies.

599. PhD Thesis Research. 0 to 16 Hours. May be repeated for credit. S/U grade only. Individual study and research. Prerequisite: Open only to degree candidates, upon approval of topic by dissertation committee.

Women's Health (NuWH)

450. Women and Mental Health Nursing. 3 Hours. Same as GWS 450 and NuPs 450 and NuSc 450. Theories of female psychology; women’s daily lives and mental health; gender differences in mental illness; strategies for improving women’s mental health. Prerequisite: Consent of the instructor.

455. Women's Health: A Primary Health Care Approach. 3 Hours. Same as CHSc 456 and NuPH 455 and NuSc 455. Health promotion and disease prevention in women’s health. Includes community experience with community women. Primary health care approaches examined. Prerequisite: Consent of the instructor.

507. Scientific Basis for Women's Health and Perinatal Nursing I. 2 Hours. Same as NuMC 507. Focuses on anatomy, physiology and endocrinology of reproduction, pregnancy, labor and birth as scientific basis for women's health and perinatal nursing. Prerequisite: Consent of the instructor.

517. Health Care of Women I. 5 Hours. Same as NuMC 517. Health care of women from adolescence to senescence with emphasis on human sexuality, control of fertility, sexually transmitted diseases, and antepartum care. Prerequisite: Credit or concurrent registration in NuMC 508 or consent of the instructor.

518. Health Care of Women II. 5 Hours. Same as NuMC 518. Health care of women from adolescence to senescence with emphasis on intrapartum, postpartum, common gynecologic problems, and management of other common conditions. Prerequisite: NuWH 517 or consent of the instructor.

550. Issues for Research and Practice in Women's Health. 3 Hours. Same as NuAS 550 and NuSc 550. Analysis of gender-related definitions of health and illness in theory issues and research evaluation criteria for women's health care practice are developed as a basis for research. Prerequisite: Consent of the instructor.

555. Theories and Methods in Women's Health Nursing Research. 3 Hours. Same as NuSc 555. Critical analysis of theoretical and methodological approaches in women's health nursing research. Emphasis on evaluation schema useful to researchers. Prerequisites: NuWH 550 and consent of the instructor.
How to Reach UIC

By Car

From the north
Take the Kennedy Expressway (I-90/94) east-bound to the Eisenhower Expressway (I-290) west-bound.

East side: Keep to the right, exit immediately at Morgan Street, south to the campus.
West side: Exit at Ashland Avenue, south to Taylor Street, west to the campus.

From the south
Take the Dan Ryan Expressway (I-90/94) west-bound to Roosevelt Road.

East side: West on Roosevelt Road to Halsted Street.
West side: West on Roosevelt Road to Ashland Avenue, north to Taylor Street, west to the campus.

From the east
Take Harrison Street or Roosevelt Road west.

East side: West on Harrison Street or Roosevelt Road to Halsted Street.
West side: West on Harrison Street to Ashland Avenue, south to Taylor Street, west to the campus.

or

West on Roosevelt Road to Ashland Avenue, north to Taylor Street, west to the campus.

From the west
Take the Eisenhower Expressway (I-290) east-bound.

East side: Exit at Racine Avenue, south to the campus.
West side: Exit at Ashland Avenue, south to Taylor Street, west to the campus.

Public Transportation

RTA
The Regional Transportation Authority (RTA) is a special service unit of local government that operates public transportation systems for the six counties of northeastern Illinois—Cook, DuPage, Kane, Lake, McHenry, and Will. The RTA system includes the Chicago Transit Authority (CTA), which provides bus and rapid transit service within the city of Chicago and to 38 suburban municipalities; Metra, the commuter rail division, which provides commuter rail service connecting downtown Chicago with 68 Chicago locations and 100 suburban communities; and Pace, the suburban bus division, which provides fixed-route bus, paratransit, and vanpool services to approximately 200 communities throughout the suburbs and from suburban locations to the city of Chicago.

The RTA Travel Information Center is open from 5:00 a.m. to 1:00 a.m. daily. For transit information or to order maps or timetables, call 836-7000 from any northeastern Illinois area code (312, 630, 708, 773, 815, or 847), or log on to their Web site at www.rtachicago.com.

CTA
The UIC campus is served by the CTA's Blue Line (O'Hare/Forest Park and 54/Cermak branches) rapid transit trains and several bus routes. West-side train service includes stops at the handicapped-accessible 54/Cermak train Polk Street station and the O'Hare/Forest Park train Medical Center station. East-side train service includes both O'Hare/Forest Park and 54/Cermak stops at Racine and UIC/Halsted stations. Connections to all other CTA rail lines can be made in the Chicago Loop. For information on CTA service, call 1-888-YOUR-CTA (1-888-968-7282), or log on to their Web site at www.transitchicago.com.

Metra
Metra's system of 12 lines serves 230 stations in the six-county area and connects with Pace and CTA buses and trains. For information on Metra service, call the RTA Travel Information Center at 836-7000 from any northeastern Illinois area code (312, 630, 708, 773, 815, or 847), or log on to their Web site at www.metrarail.com.

UIC provides commuter bus service between the Ogilvie Transportation Center (formerly North Western Station), Chicago Union Station, and the UIC campus. Commuter bus tickets are sold in books of 25 by the cashiers in Chicago Circle Center and the Marshfield Building, and at the Campus Information Center in the Chicago Illini Union.

From the Ogilvie Transportation Center (formerly North Western Station) and Union Station, commuters may also use CTA bus No. 60 (Blue Island-26th Street) to reach the UIC campus. From the LaSalle Street Station and the Randolph Street Station, Metra commuters may take a west-bound Blue Line (Congress/Douglas A or B) train to one of the campus stops.

Pace
For information on Pace service, call the RTA Travel Information Center at 836-7000 from any northeastern Illinois area code (312, 630, 708, 773, 815, or 847), or log on to their Web site at www.pacebus.com.
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