Rubrics

The following is a list of rubrics used for graduate courses. Please note that not all course rubrics currently list courses in the catalog.

Accounting (ACTG)
Administrative Studies in Nursing (NUAS)
African American Studies (AAST)
Anatomy and Cell Biology (ANAT)
Ancient Greek (GKA)
Anthropology (ANTH)
Architecture (ARCH)
Art and Design (AD)
Art History (AH)
Asian American Studies (ASAM)
Asian Studies (ASST)
Associated Health Sciences (AHS)
Biochemistry and Molecular Genetics (BCMG)
Bioengineering (BIOE)
Biological Sciences (BIOS)
Biomedical and Health Information Sciences (BHIS)
Biomedical Visualization (BVIS)
Biopharmaceutical Sciences (BPS)
Biostatistics (BSTT)
Business Administration (BA)
Campus Courses (CC)
Chemical Engineering (CHE)
Chemistry (CHEM)
Civil and Materials Engineering (CME)
Classics (CL)
Committee on Institutional Cooperation (CIC)
Communication (COMM)
Community Health Sciences (CHSC)
Computer Science (CS)
Criminology, Law, and Justice (CLJ)
Curriculum and Instruction (CI)
Disability and Human Development (DHD)
Earth and Environmental Sciences (EAE)
Economics (ECON)
Education (ED)
Educational Policy Studies (EDPS)
Educational Psychology (EPSY)
Electrical and Computer Engineering (ECE)
Energy Engineering (ENER)
Engineering (ENGR)
English (ENGL)
English as a Second Language (ESL)
Entrepreneurship (ENTR)
Environmental and Occupational Health Sciences (EOHS)
Epidemiology (EPID)
Finance (FIN)
French (FR)
Gender and Women’s Studies (GWS)
Geography (GEOG)
Germanic Studies (GER)
Graduate College (GC)
Graduate College—Life Sciences (GCLS)
Health Information Management (HIM)
Health Policy and Administration (HPA)
Histology (HSTL)
History (HIST)
Honors College Courses (HON)
Human Nutrition (HN)
Industrial Engineering (IE)
Information and Decision Sciences (IDS)
Information Technology (IT)
Interdisciplinary Public Health Sciences (IPHS)
Interdisciplinary Studies in the Arts (ISA)
Italian (ITAL)
Jewish Studies (JST)
Latin (LAT)
Latin American and Latino Studies (LALS)
Learning Sciences (LRSC)
Liberal Arts and Sciences (LAS)
Linguistics (LING)
Lithuanian (LITH)
Management (MGMT)
Marketing (MKTG)
Master of Business Administration (MBA)
Maternal-Child Nursing (NUMC)
Mathematical Computer Science (MCS)
Mathematics (MATH)
Mathematics Teaching (MTHT)
Mechanical Engineering (ME)
Medical Biotechnology (MBT)
Medical Education (MHPE)
Medical Humanities (MHUM)
Medical Laboratory Sciences (MLS)
Medical-Surgical Nursing (NUMS)
Medicinal Chemistry (MDCH)
Medicinal Chemistry and Pharmacognosy (PMMP)
Microbiology and Immunology (MIM)
Movement Sciences (MVSC)*
Music (MUS)
Native American Studies (NAST)
Natural Sciences (NATS)
Neuroscience (NEUS)
Nursing Sciences (NUSC)
Occupational Therapy (OT)
Oral and Maxillofacial Surgery (OSUR)
Oral Medicine and Diagnostic Sciences (OMDS)
Oral Sciences (OSCI)
Orthodontics (ORTD)
Pathology (PATH)
Pediatric Dentistry (PEDD)
Pharmacognosy (PMPG)
Pharmacology (PCOL)
Pharmacy (PHAR)
Pharmacy Administration (PMAD)
Pharmacy Practice (PMPR)
Philosophy (PHIL)
Physical Therapy (PT)
Physics (PHYS)
Physiology and Biophysics (PHYB)
Polish (POL)
Political Science (POL)
Prosthodontics (PROS)
Psychiatric Nursing (NUPS)
Psychology (PSCH)
Public Administration (PA)
Public Health Nursing (NUPH)
Public Policy Analysis (PPA)
Religious Studies (RELS)
Russian (RUSS)
Slavic and Baltic Languages and Literatures (SLAV)
Social Work (SOCW)
Sociology (SOC)
Spanish (SPAN)
Special Education (SPED)
Statistics (STAT)
Surgery (SURG)
Theatre (THTR)
Urban Planning and Policy (UPP)
Women’s Health Nursing (NUWH)

* Note: Beginning with the Spring 2009 semester, the Movement Sciences (MVSC) rubric will change to Kinesiology (KN).
Accounting

ACTG 417 Advanced Financial Accounting 3 OR 4 hrs.
Financial accounting theory for business combinations, consolidated financial statements, international transactions and investments, and partnership accounting. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ACTG 316.

ACTG 435 Auditing 4 hrs.
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(s): ACTG 316.

ACTG 444 Federal Income Tax I 3 OR 4 hrs.
Concepts and provisions of federal income taxation as applicable to individual taxpayers, partnerships, individuals, and trusts. 3 undergraduate hours. 4 graduate hours. Credit is not given for ACTG 445 if the student has credit for ACTG 508. Extensive computer use required. Prerequisite(s): ACTG 315.

ACTG 446 Federal Income Tax II 3 OR 4 hrs.
Concepts and provisions of federal income taxation as applicable to corporate taxpayers and partnerships; special problems in reorganization, liquidations, and personal holding companies. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): ACTG 445 or the equivalent.

ACTG 456 Business Law II: Business Organizations 3 OR 4 hrs.
Business organizations, including: agency, general partnerships, limited partnerships, corporations, limited liability companies, securities regulations, bankruptcy, suretyship, fiduciary, real property, wills and trusts, and accounting liability. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ACTG 355 or the equivalent.

ACTG 465 Governmental and Nonprofit Accounting 3 OR 4 hrs.
Financial transaction analysis and recording system; budget preparation and control; concepts and principles underlying the financial reports of governmental and nonprofit organizations. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ACTG 316.

ACTG 474 Accounting Information Systems 3 OR 4 hrs.
Skills and concepts that enable the documentation, design, and use of accounting information systems, understanding transaction cycles, sound internal controls, accounting software, and the electronic business environment. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Grade of C or better in ACTG 210 and grade of C or better in ACTG 211; and IDS 200.

ACTG 475 Database Accounting Systems 3 OR 4 hrs.
Concepts and principles of designing database systems to perform accounting functions, applications of microcomputer accounting software packages, systems design tools, and computerized transaction cycles. Same as IDS 475. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): ACTG 211 and IDS 200.

ACTG 484 International Accounting 3 OR 4 hrs.
Financial accounting for international operations, multinational managerial accounting and control, comparative international accounting, international reporting issues and international taxation. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ACTG 316.

ACTG 485 Valuation and Analysis 3 OR 4 hrs.
Financial analysis and valuation of firms. Corporate strategies, financial reporting issues, and market perceptions. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): ACTG 315 and FIN 300 for undergraduate students. One accounting and one finance class or consent of the instructor for graduate students.

ACTG 494 Special Topics in Accounting 1 TO 4 hrs.
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. Prerequisite(s): Two courses in accounting or finance beyond ACTG 111 and FIN 300 or the equivalent.

ACTG 495 Competitive Strategy 4 hrs.
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(s): Senior standing in the College of Business Administration and completion of all other CBA core courses, or consent of the instructor.

ACTG 500 Introduction to Financial Accounting 4 hrs.
Concepts and principles of financial accounting for preparation and evaluation of external reports and financial statements. Credit is not given for ACTG 500 if the student has credit for MBA 501. Extensive computer use required. Prerequisite(s): Admission to the MBA or MS in Accounting or Master of Healthcare Administration program.

ACTG 502 Financial Accounting I 4 hrs.
Accounting theory and practice related to asset valuation, revenue recognition, and the determination of short-term liabilities; aspects of financial statement analysis related to these issues. Prerequisite(s): ACTG 500.

ACTG 503 Financial Accounting II 4 hrs.
Contemporary financial accounting issues, including liabilities, pensions, tax allocation, leases, price-level reporting, investments, capital transactions, and financial statement analyses. Prerequisite(s): ACTG 500 and ACTG 502 or the equivalents.

ACTG 506 Management Accounting 4 hrs.
Design of cost accounting systems; alternate costing methods; costing for decision making; budget planning and performance evaluation. Prerequisite(s): ACTG 455.

ACTG 508 Federal Income Tax—Graduate 4 hrs.
Concepts and provisions of federal income taxation generally applicable to individual taxpayers, corporations, and partnerships. Credit is not given for ACTG 508 if the student has credit for ACTG 445. Prerequisite(s): ACTG 500.

Commercial transactions, including: contracts, sales of goods, negotiable instruments, and secured transactions. Prerequisite(s): ACTG 500 or the equivalent.

ACTG 515 Accounting Theory and Paradigms 4 hrs.
Theorizing construction, conceptual framework, and paradigmatic avenues in accounting with relation to applications. Prerequisite(s): ACTG 502 or the equivalent.

ACTG 516 Financial Statement Analysis 4 hrs.
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(s): ACTG 502; or approval of the department.

ACTG 525 Management Control of Strategic Performance 4 hrs.
Contemporary overview of the management control systems measuring technological activities, measuring value added, outsourcing noncore compensation plan and performance measurement. Extensive computer use required. Prerequisite(s): ACTG 506; or approval of the department.

ACTG 535 Advanced Auditing 4 hrs.
Review and evaluation of financial research in auditing behavioral and capital market research. Overview of audit research methodology, examination of Sarbanes-Oxley and its effect on internal controls, auditing standards, and the accounting profession. Extensive computer use required. Prerequisite(s): ACTG 435.

ACTG 537 Fraud Examination 4 hrs.
Concepts and skills necessary for examining financial fraud. Content will include fraud schemes, prevention and detection of fraud, ethics, forensic software tools, auditing techniques, and the law and regulations governing fraud cases. Extensive computer use required. Prerequisite(s): Grade of C or better in ACTG 435; ACTG 445; ACTG 508.

ACTG 545 Taxes and Business Policy 4 hrs.
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. Prerequisite(s): ACTG 345 and ACTG 446.
ACTG 565 Advanced Government and Nonprofit Accounting 4 hrs. Financial accounting principles applicable to governments and nonprofit organizations. Transactions and events are analyzed, leading to the preparation and analysis of financial statements. Prerequisite(s): ACTG 503 or equivalent.

ACTG 570 The Legal and Ethical Environment of Business 4 hrs. An examination of the decision-making process on both the individual and organizational levels. The effect of moral, legal, and economic factors on the decision-making process. Course information: Prerequisite(s): ACTG 502; or consent of the instructor.

ACTG 585 Corporate Valuation and Accounting Information 4 hrs. Valuation using discounted cash flow and multiples. Use of financial disclosures to construct forecasts. How multiples behave. How accounting affects valuation ratios. Credit is not given for ACTG 585 if the student has credit for ACTG 485. Prerequisite(s): ACTG 502; and FIN 510 or FIN 520; or approval of the department.

ACTG 590 Case-Based Research in Accounting 4 hrs. Development of skills necessary to research and interpret accounting standards and guidelines to resolve recognition and disclosure issues using real-life and simulated cases. Prerequisite(s): ACTG 503 or equivalent.

ACTG 593 Accounting Research: Methodology and Communication 4 hrs. 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(s): ACTG 502.

ACTG 594 Special Topics in Accounting—Graduate 1 TO 4 hrs. 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. May be repeated. Students may register in more than one section per term. Extensive computer use required. Prerequisite(s): Approval of the department.

ACTG 596 Independent Study in Accounting—Master's 1 TO 4 hrs. 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. Prerequisite(s): ACTG 515 and ACTG 525.

ACTG 599 PhD Thesis Research 0 TO 16 hrs. Research on topic of the doctoral dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Faculty acceptance of thesis proposal.

Administrative Studies in Nursing

NUAS 501 Administrative Nursing Models 2 hrs. Appraisal and synthesis of theory, research, and practice in the organization and management of delivery of nursing and healthcare services, including currently used models of nursing care delivery. Prerequisite(s): Consent of the instructor.

NUAS 502 Strategic Planning and Outcomes Evaluation for Clinical Programs 3 hrs. Analysis of trends and issues affecting healthcare systems in the context of planning appropriate strategies for the development and growth of clinical programs and services. Prerequisite(s): Consent of the instructor.

NUAS 505 Nursing Systems Operations Management 3 hrs. Nursing systems operations management of health services. Examines the managerial role at individual, program, work unit, department, and organizational levels. Includes focus on interaction of the organization and environment. Same as NUPH 505. Prerequisite(s): Consent of the instructor.

NUAS 512 Healthcare Human Resources Management 3 hrs. Focuses on the development of a strategic human resource plan to support the mission of the healthcare organization. Current human resources management and organizational performance research findings are explored. Same as NUPH 512. Prerequisite(s): Consent of the instructor.

NUAS 517 Financial Resource Management for Nursing Decision Makers 3 hrs. Provides the clinical decision maker with state-of-the-art tools to plan, implement, and evaluate the financial viability of healthcare programs and initiatives. Same as NUPH 517. Prerequisite(s): Consent of the instructor; knowledge of Excel is required.

NUAS 520 Internship in Advanced Nursing 1 TO 3 hrs. Intensive field study for advanced nursing practice with emphasis on integration of graduate course work. Same as NUPH 520. May be repeated. Prerequisite(s): Consent of the instructor.

NUAS 560 Leadership Reflections: Building a Personal Map 2 hrs. Reflective practice experience focuses learners to identify personal leadership styles and develop personal leadership growth plans. Prerequisite(s): Admission to the Executive Leadership Concentration of the Doctor of Nursing Practice.

NUAS 561 Collaboration for Strategic Financial Management in Healthcare 3 hrs. Builds on basic financial management skills to prepare the learner to synthesize financial theories and concepts in order to apply knowledge to strategic decision making. Prerequisite(s): NUAS 517 or equivalent course.

NUAS 562 Ethical Leadership in Providing Healthcare 2 hrs. Provides an opportunity for the student to analyze and critique current ethical issues impacting nurse leaders and formulate a personal ethics code. Prerequisite(s): NUAS 528 or the equivalent and credit or concurrent registration in NUSC 509.

NUAS 563 Transforming the Healthcare Organization 3 hrs. Builds on concepts from strategic management to provide a framework for the learner’s synthesis project. Applications include: project management, strategic planning, and change management processes applied in a transdisciplinary manner. Prerequisite(s): NUAS 502 or the equivalent credit or concurrent registration in NUSC 509.

NUAS 564 Systems Approach to Healthcare Quality and Safety 3 hrs. Focuses on the critical review of current quality and safety guidelines and systems impacting healthcare agencies. Prerequisite(s): NUAS 565 or the equivalent credit or concurrent registration in NUSC 509 and credit or concurrent registration in NUSC 563.

NUAS 565 Seminar in Nursing Executive Leadership 1 TO 3 hrs. Specific topics as announced each semester. In-depth study of selected current topics in executive leadership for nurse leaders. May be repeated.

African American Studies

AAST 405 Urban Ethnography 3 OR 4 hrs. The study of processes and meanings in African American communities in urban areas. Includes interviews, participant observation, focus groups. Same as SOC 406. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): AAST 100; and junior standing or above.

AAST 406 Politics of Race, Gender, and Class 3 OR 4 hrs. Formation of social status categories, individual and collective identity construction, the mechanisms of group-based marginalization and stigmatization. Also looks at relationship between social status categories. Same as GWS 406. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): AAST 100 or GWS 102 or GWS 101; or graduate or professional standing; or consent of the instructor.

AAST 407 Seminar in Comparative Racialization 3 OR 4 hrs. Provides an interdisciplinary and comparative approach to the making and remaking of “race” and the resultant racialized experiences of different groups in the U.S. and globally. Same as SOC 407. Prerequisite(s): AAST 247 or AAST 248 or AAST 340 or SOC 225; and senior standing or above; or consent of the instructor.

AAST 410 Seminar in Black Child Development 3 OR 4 hrs. Race, class, and cultural theories of black child development. Examination of socialization process and developmental outcomes, with particular attention to social attitudes and behaviors. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): AAST 201 or PSCH 100 or consent of instructor.
AAS T 441 Topics in African History 3 OR 4 hrs. Specific topics announced each term. Same as HIST 441. 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): 3 hours of African history, African American studies, or consent of the instructor.

AAS T 445 History of Islam in the African World 3 OR 4 hrs. A comprehensive study of the history of Islam and its role among the people of African descent in sub-Saharan Africa and the United States. Same as HIST 445. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Consent of the instructor.

AAS T 481 Topics in African and African American History 3 OR 4 hrs. African and/or African American history for students with significant background in the field. Topics vary. Same as HIST 485. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): AAST 247 or AAST 248 or HIST 104 or HIST 247 or HIST 248 or consent of the instructor.

AAS T 490 Topics in African American Literature 3 OR 4 hrs. African American literature and culture for students with significant background in the field. Topics vary. Same as ENGL 473. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): AAST 357 or AAST 360 or ENGL 357; and senior standing or above; or consent of the instructor.

AAS T 492 Topics in African American Social Science Research 3 OR 4 hrs. Inclusive examination of selected specialized topics based on instructor's field. Topics are drawn from research in political science, psychology, sociology, and history. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): AAST 100 or consent of the instructor.

AAS T 496 Topics in Race, Ethnic, and Minority History 3 OR 4 hrs. Specific topics are announced each term. Same as HIST 496. 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): 3 hours of history or consent of the instructor.

AAS T 497 Anatomy and Cell Biology

AAS T 403 Human Neuroanatomy 3 hrs. Morphological organization of the nervous system. Functional correlations of neural structures. Same as NEUS 403. Meets eight weeks of the semester. Prerequisite(s): Graduate standing and consent of the instructor. Must be in a degree program.

AAS T 414 Neuroanatomy for Allied Health Program 3 hrs. Basic development and gross features of the central nervous system and systems neuroanatomy: motor, sensory, and integrative functional areas.

AAS T 439 Gross Human Anatomy I 3 hrs. Gross structure of the adult human thorax, abdomen, pelvis, and perineum, emphasizing spatial relationships and functional/clinical relevance. Includes embryology and radiology topics. Limited to six (6) students. Prerequisite(s): Graduate standing in a degree-granting program only and consent of the instructor.

AAS T 440 Gross Human Anatomy II 4 hrs. Gross structure of the adult human head, neck, deep back, and limbs, emphasizing spatial relationships and functional/clinical relevance. Includes embryology and radiology topics. Limited to six (6) students. Prerequisite(s): Graduate standing in a degree-granting program only and consent of the instructor.

AAS T 441 Gross Human Anatomy 5 hrs. Functional and structural anatomy of the body. For allied health students. Prerequisite(s): Graduate standing and consent of the instructor or enrollment in the Doctor of Physical Therapy program or AIS in Biomedical Visualization program.

AAS T 442 Cell Structure and Human Histology 5 hrs. Structure and function of cells and fundamental tissues. Function and microscopic anatomy of organs. Prerequisite(s): Graduate standing and consent of the instructor.

AAS T 520 Concepts of Synthetic Function and Morphology 2 hrs. 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, synaptic plasticity, and synaptic specificity. Prerequisite(s): Consent of the instructor.

AAS T 521 Plasticity in the Nervous System 2 hrs. 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(s): ANAT 403 or consent of instructor.

AAS T 523 Biology of MicroRNAs and other Small RNAs 2 hrs. History, overview, and biology of small RNA pathways, including microRNAs, siRNAs, RNA interference, roles in various biological processes, implication in disease pathophysiology, and potential therapies. Satisfactory/ Unsatisfactory grading only.

AAS T 525 Molecular and Cellular Mechanisms of Neurodegenerative Diseases 2 hrs. Molecular, cellular, and physiological mechanisms underlying neurodegeneration in neurodegenerative diseases and trauma to the central and peripheral nervous system of humans. Same as NEUS 525. Recommended background: A basic course in neuroscience.

AAS T 527 Cellular and Systems Neurobiology 3 hrs. Molecular and cellular properties of ion channels in neurons and sensory cells and their relationship to brain and sensory systems. Same as BIOS 527. Prerequisite(s): Credit in one neuroscience course or consent of the instructor.

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

AAS T 554 Neuroendocrinology 2 hrs. 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(s): ANAT 403 or the equivalent.

AAS T 560 Practicum in the Teaching of Anatomy 1 hour. Provides an opportunity for supervised discussion and evaluation of materials and methods in teaching the basic anatomical sciences. Satisfactory/ Unsatisfactory grading only. May be repeated. No graduation credit. For anatomy and cell biology teaching assistants. Prerequisite(s): Consent of the instructor.

AAS T 585 Cell Biology 4 hrs. Functional and structural organization of the cell with emphasis on the cellular basis of physiological activity. Same as MIM 585, and PHYB 585.

AAS T 586 Cell and Molecular Neurobiology 3 hrs. Structure and function of voltage-dependent and neurotransmitter-gated ion channels; the role of these ion channels in synaptic transmission, synaptic modification, and neurodegeneration. Same as BIOS 586. Prerequisite(s): BIOS 442 or consent of the instructor.

AAS T 595 Department Seminar 1 hour. 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. Satisfactory/Unsatisfactory grading only.

AAS T 596 Independent Study 1 TO 4 hrs. Independent study under the direction of a faculty member.

AAS T 598 Master's Thesis Research 0 TO 16 hrs. Thesis research under the direction of a faculty member. Satisfactory/ Unsatisfactory grading only.

AAS T 599 Research in Anatomy 0 TO 16 hrs. Independent research, directed by a faculty member. Satisfactory/ Unsatisfactory grading only.

• African American Studies
• Anatomy and Cell Biology
**Ancient Greek**

ANTH 408 Advanced Topics in Ancient Greek Literature 3 OR 4 hrs. Intensive reading of ancient Greek literature. Topics vary. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 9 hours. Students may register in more than one section per term. 

Prerequisite(s): 4 hours of Ancient Greek at the 200-level or the equivalent.

GKA 498 Independent Reading 3 OR 4 hrs. Individual study under faculty direction. For students qualified by preparation and interest. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. 

Prerequisite(s): 4 hours of Ancient Greek at the 200-level or the equivalent.

**Anthropology**

ANTH 401 Linguistic Anthropology 3 OR 4 hrs. Exploitation of the relationship between language and culture in a cross-cultural perspective. Attention to methods of field research as well as theory and substantive issues. 3 undergraduate hours. 4 graduate hours.

ANTH 405 Human Growth and Nutrition 3 hrs. 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. 

Same as EPID 405.

ANTH 409 Ancient Maya Writing, Language, and Culture 3 OR 4 hrs. Recent trends in Maya epigraphy, information gained from Maya hieroglyphs, linguistics, and historical ethnographies are applied to anthropological analyses of past lifeways. 

Same as LALS 409. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): Junior standing or above; and consent of the instructor.

ANTH 411 Urban Cultural Problems 3 OR 4 hrs. A study of the processes of urbanization and of cultural and social adjustments to the city; illustrated by case studies. 3 undergraduate hours. 4 graduate hours.

ANTH 413 Social Organization 3 OR 4 hrs. Theory and method in the study of kinship and social organization, for advanced undergraduate and graduate students. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): ANTH 213 or graduate standing or consent of the instructor.

ANTH 414 Symbolic Anthropology 3 OR 4 hrs. The interpretation of cultures through their rituals, religions, culture, and other types of symbolism. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): ANTH 101 or consent of the instructor.

ANTH 415 Foundations in Anthropology and Global Health I 3 OR 4 hrs. Explores the field of cultural medical anthropology and provides a theoretical foundation allowing for understanding and exploration of anthropology's role in international health. 

Same as IPHS 415. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): Grade of B or better in ANTH 216; and junior standing or above; or consent of the instructor.

ANTH 416 Foundations in Anthropology and Global Health II 3 OR 4 hrs. Provides an evolutionary and biocultural approach to human biology, physiology, health, and disease. 

Same as IPHS 416. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): Grade of B or better in ANTH 232; and junior standing or above; or consent of the instructor.

ANTH 417 Marxist Approaches to Anthropology 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours.

ANTH 418 Ethnographic and Qualitative Research Methods 3 OR 4 hrs. Practical introduction to the techniques of social scientists for research in natural social settings: participant observation, nonparticipant observation, interviewing, use of documentary sources, etc. 

Same as GEOG 418. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): Junior standing or above.

ANTH 420 Seminar in Archaeology and Ethnicity 3 OR 4 hrs. Case studies of investigations in archeology using research monographs and other primary sources. Substantive data and related theoretical problems are examined simultaneously. 3 undergraduate hours. 4 graduate hours. 

May be repeated to a maximum of 15 hours. 

Prerequisite(s): Junior standing or consent of the instructor.

ANTH 421 Geomorphology and Archaeology 3 OR 4 hrs. Relevance of geomorphologic processes and landform development to archaeology; role of geomorphology in archaeological surveys, paleogeographic reconstruction, and archaeological interpretation. 

Elements of geoarchaeology. Same as GEOG 421. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): ANTH 221 or EAS 101 or consent of the instructor.

ANTH 422 Prehistory of the Levant and the Nile Valley 3 OR 4 hrs. Detailed analysis of Levantine and Nile Valley prehistory during the Pleistocene and early Holocene. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): ANTH 221 or ANTH 222 or consent of the instructor.

ANTH 423 Andean Prehistory 3 OR 4 hrs. An overview of the cultural evolution of the Andean region from the arrival of the first inhabitants to the development of the Inca empire. 

Same as LALS 423. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): ANTH 228 or ANTH 269; or consent of the instructor.

ANTH 424 Violence 3 OR 4 hrs. Studies 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. 

Same as CJL 425. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): CJL 101 and CJL 200.

ANTH 425 Field Techniques in Archaeology 4 hrs. 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. 

Same as GEOG 425. May be repeated to a maximum of 8 hours. 

Prerequisite(s): ANTH 102 or consent of the instructor. 

Recommended: Concurrent registration in ANTH 426 or GEOG 426.

ANTH 426 Laboratory Techniques in Archaeology 4 hrs. Exposes students to laboratory methods in archaeology through the analysis of excavated materials. Students are instructed in laboratory techniques. 

Same as GEOG 426. May be repeated to a maximum of 8 hours. 

Prerequisite(s): ANTH 102 or consent of the instructor. 

Recommended: Concurrent registration in ANTH 425 or GEOG 425.

ANTH 427 Theory and Application in Ethnoarchaeology 3 OR 4 hrs. Focuses on the application of scientific experimentation and ethnographic information to enhance our understanding of the archaeological record, material culture, and past human behavior. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): One 100- or 200-level archaeology course; or graduate standing and consent of the instructor.

ANTH 428 Chiefdoms 3 OR 4 hrs. Focus on traditional nonstate, yet complex, societies known as "chieftoms." Examines the organization and evolution of such societies through a combination of ethnographic, historical, and archaeological data. 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): ANTH 101 or ANTH 102; or consent of the instructor.

ANTH 429 Archaeological Methods 3 OR 4 hrs. This course will familiarize students with various methodologies used by archaeologists and geoarchaeologists. Course will concentrate on a different method each time it is taught. 

Same as GEOG 429. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 times(s). Students may register for more than one section per term.

ANTH 430 Seminar in Primate Biology 4 OR 5 hrs. Theoretical and substantive issues in the study of nonhuman primates and hominids, as represented in current journals and topical volumes. 4 undergraduate hours. 5 graduate hours. May be repeated up to 2 times(s). Students may register for more than one section per term.

ANTH 437 Bioarchaeology 5 hrs. 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(s): Grade of B or better in ANTH 237; and consent of the instructor.

ANTH 440 The Experience of Culture Difference: Culture Shock 3 OR 4 hrs. Explores experience of different cultures, the process of learning a different culture, and issues arising from the nature of the encounter in fieldwork, 3 undergraduate hours. 4 graduate hours. 

Prerequisite(s): One course in social or cultural anthropology, or experience in another culture.
ANTH 441 Psychoanalytic Anthropology I: Cross-Cultural Theory 3 or 4 hrs.
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. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): One course in anthropology or psychology; or consent of the instructor.

ANTH 442 Psychoanalytic Anthropology II: Cross-Cultural Applications 3 or 4 hrs.
Explores ways in which anthropologists and analysts have used psychoanalysis to understand individuals, practices, and institutions of other cultures. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ANTH 441 or consent of the instructor.

ANTH 443 Leadership Psychology, Strategy, Culture 3 or 4 hrs.
Psychological and anthropological theories of leadership developed on our culture will be tested against descriptions of leadership in diverse non-Western societies. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): One course in anthropology.

ANTH 444 Dreams, Dreaming, and Dream Beliefs 3 or 4 hrs.
The dreaming experience examined from the point of view of psychological interpretation, laboratory experiments, and anthropological study of dreams in other cultures. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): One course in anthropology or psychology and junior or senior standing; or consent of the instructor.

ANTH 445 Structuralism in Anthropology 3 or 4 hrs.
Explores the theoretical approach offered by structuralism emphasizing that elements of culture must be understood in terms of their relationship to the entire system. 3 undergraduate hours; 4 graduate hours.

ANTH 453 Seminar in Cultural Ecology 3 or 4 hrs.
Cultural ecology and cultural evolution, emphasizing peasant farming and other subsistence systems. Soil management under shifting and sedentary agriculture. Same as GEOG 453. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ANTH 101 or GEOG 151 or consent of the instructor.

ANTH 454 A Dynamic Human Habitat: Amazonia Past, Present, and Future 3 or 4 hrs.
Traces the dynamic interaction of humans and their habitats in Amazonia from prehistory until today, illustrating the co-evolution of its environments and populations. 3 undergraduate hours; 4 graduate hours.

ANTH 455 Quantitative Methods 3 or 4 hrs.
Introductory statistics course in statistical methods for anthropological problem solving. Primary emphasis is on univariate and bivariate statistics, such as means standard deviations, correlation, chi square, t-tests, and simple regressions. Same as GEOG 455. 3 undergraduate hours; 4 graduate hours. Extensive computer use required. Prerequisite(s): Junior standing or above; and consent of the instructor.

ANTH 461 Museum Collecting: Documentation, Registration, and Curation 4 hrs.
Introduction to the collection of anthropological objects for museum curation. Ethics of collecting, standards for documentation, legal aspects of collecting, ethnographic interviewing, registration of objects and archives, curation, and housing.

ANTH 462 Museum Exhibit Research and Design 4 hrs.
Introduction to architectural museum exhibits. Issues of representation and cultural politics, museums’ roles in the communities they serve, developing a story around objects, and the technical aspects of exhibit design.

ANTH 470 Classic Ethnographies 3 or 4 hrs.
Analysis of method and theory reflected in selected classic ethnographic works, studied in their historical contexts and contemporary uses. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ANTH 101 or ANTH 213 or consent of the instructor.

ANTH 474 Urban Centers of Africa 3 or 4 hrs.
A study of the indigenous urban centers of sub-Saharan Africa, the multicultural cities of colonial and contemporary Africa, and the processes of detribalization. 3 undergraduate hours; 4 graduate hours.

ANTH 475 Indians of the Andes and the Amazon 3 or 4 hrs.
Intensive research in theoretical and ethnographic problems in South American Indian social structures and cultures. Special attention will be given Levi- Strauss’ ideas on the formulation of cultural theory in South America. Same as LALS 475. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ANTH 213 or consent of the instructor.

ANTH 476 Rise and Fall of the Inca Empire 3 hrs.
Using an integration of ethnographic, historical, and archaeological information, this course is designed to provide a thorough introduction to the study of the Inca. Prerequisite(s): Sophomore standing or above.

Principles and practices of processing and interpretation of remotely sensed imagery including aerial photographs, radar, and multispectral satellite images. Hands-on use of image-processing software. Same as GEOG 477. Extensive computer use required.

ANTH 478 Paleoindians and Peopling of the Americas: From Alaska to Tierra del Fuego 3 or 4 hrs.
Summarizes current knowledge of the first migration of humans to the New World, analyzes its significance, and evaluates the controversies. 3 undergraduate hours; 4 graduate hours.

ANTH 479 Culture and Colonialism in South Asia 3 or 4 hrs.
Examines the emergence of colonial cultures of domination and resistance on the Indian subcontinent from the eighteenth century to 1947. Same as ASST 479 and HIST 479. 3 undergraduate hours; 4 graduate hours.

ANTH 480 Sociolinguistics 3 or 4 hrs.
Variations in language that correlate with variation in societies and smaller social groups; interactions of languages and societies. Same as LING 480. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): LING 405 or junior standing and consent of the instructor.

ANTH 481 Geographic Information Systems I 4 hrs.
Components and performance properties of geographic information systems. Geographic hierarchies and data structures. Problems and solutions in handling large geographic files. Prerequisite(s): GEOG 100 and one from GEOG 278; GEOG 386, IDS 100; or consent of the instructor.

ANTH 482 Geographic Information Systems II 4 hrs.
Application of raster- or grid-based geographic information systems to the spatial analysis of landscapes. Same as GEOG 482.

ANTH 483 Geographic Information Systems III 4 hrs.
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. Same as GEOG 483. Prerequisite(s): GEOG 482 or ANTH 482 or consent of the instructor.

ANTH 484 Mapping with Microcomputers 4 hrs.
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. Same as GEOG 478. Prerequisite(s): GEOG 475 or consent of the instructor.

ANTH 485 Computer Cartography 4 hrs.
The fundamentals of cartography and cartographic design. The use of state-of-the-art, Windows-based computer mapping software for querying and displaying cartographic data contained in GIS databases. Same as GEOG 485.

ANTH 490 Independent Study 1 to 6 hrs.
Independent reading under the supervision of a faculty member. May be repeated to a maximum of 8 hours with approval. Students may register in more than one section per term. Prerequisite(s): Junior standing and consent of the instructor.
ANTH 494  Special Topics in Anthropology  3 OR 4 hrs.
Reading, study, and discussion of selected problems for graduate students and majors in Anthropology. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

ANTH 496  Internship  1 TO 4 hrs.
Professional field experience with an agency or organization in the private or public sector on projects related to the student's area of specialization. Same as GEOG 496. May be repeated to a maximum of 8 hours. Only 4 hours of credit may be applied toward the Minor in Geography. Prerequisite(s): Declared major in Anthropology, minor in Geography or full graduate standing in Anthropology or Geography, and consent of the faculty advisor, head of the department, or the director of internship programs.

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

ANTH 501  Social and Cultural Theory II  4 hrs.
Continuation of ANTH 500. Prerequisite(s): ANTH 500.

ANTH 502  Theory and Method in Archaeology  4 hrs.
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.

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

ANTH 508  Research Design and Grant Writing  4 hrs.
Each student will produce a research grant proposal, similar in style and length to an NSF proposal. May be repeated 2 times. Prerequisite(s): Approval of the department.

ANTH 510  Seminar in Social Organization  4 hrs.
Theoretical and substantive issues about how societies are organized. Same as GEOG 510. May be repeated to a maximum of 12 hours.

ANTH 514  Gender Issues in Cross-Cultural Perspectives  4 hrs.
Selected substantive and theoretical issues in the cross-cultural study of gender roles, conceptions, and relations. Same as GWSS 514. Prerequisite(s): ANTH 500 or consent of the instructor.

ANTH 516  Anthropology and Global Health  4 hrs.
Critical examination of global health issues from social science and public health perspectives. Includes consideration of cultural underpinnings, geopolitical influences, design of appropriate and effective interventions, and policy formation. Same as IPHS 516. Prerequisite(s): Graduate or professional standing and consent of the instructor.

ANTH 520  Seminar in Archaeological Theory and Method  4 hrs.
Theoretical and substantive issues in the study of prehistory and the recovery and interpretation of the archaeological record. May be repeated. Prerequisite(s): ANTH 502 or consent of the instructor.

ANTH 521  Analysis of Stone Artifacts  4 hrs.
Analyzing stone objects.

ANTH 530  Seminar in Physical Anthropology  5 hrs.
A critical examination of current literature on methods and theories dealing with the evolution of primate biology and behavior. May be repeated. Students may register in more than one section per term.

ANTH 531  Anthropological Genetics  4 hrs.
Basic overview of genetic theory and techniques, followed by a survey of the contributions of human genetics to human adaptation and evolution. Prerequisite(s): Grade of B or better in ANTH 508 or grade of B or better in BIOS 220; or consent of the instructor.

ANTH 532  Advances in Ancient DNA  4 hrs.
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. Prerequisite(s): Grade of B or better in ANTH 531 or grade of B or better in BIOS 220.

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

ANTH 534  Dental and Medical Anthropology  4 hrs.
Examination of the biological and physical anthropology of hominid teeth and the craniofacial complex with relevance to medical anthropology, ethnopharmacology, forensic sciences, and paleopathology topics. Same as OSCI 534 and PMPG 534. Fieldwork required. A lab experience, independent study, and a research paper is required for 3 hours of credit. Prerequisite(s): Graduate standing and consent of the instructor.

ANTH 555  Landscape Archaeology and GIS  4 hrs.
Study of the space between settlements: meanings these spaces have for peoples of the past and today; theoretical approaches to landscape; methods for archaeological landscape analysis through GIS and remote sensing techniques. Prerequisite(s): Consent of the instructor.

ANTH 570  Regional Application of Anthropology  4 hrs.
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. May be repeated.

ANTH 591  Readings in Anthropology and Global Health  1 TO 8 hrs.
Student along with his/her advisor will develop a series of readings focused on a specific topic of interest to the student. Same as IPHS 591. May be repeated up to 1 term(s). Prerequisite(s): Consent of the instructor.

ANTH 592  Research in Anthropology and Global Health  1 TO 8 hrs.
Research and methods class combined with practical fieldwork in anthropology and global health. Same as IPHS 592. May be repeated to a maximum of 8 hours. Fieldwork required. Prerequisite(s): Consent of the instructor.

ANTH 593  Special Topics in Anthropology and Global Health  4 hrs.
Covers special topics in anthropology and global health. Same as IPHS 593. May be repeated if topics vary. Prerequisite(s): Graduate or professional standing; and consent of the instructor.

ANTH 594  Special Topics in Anthropology  4 hrs.
Study of a limited topic in anthropology. May be repeated to a maximum of 12 hours. Students may register in more than one section per term.

ANTH 595  Graduate Seminar in Anthropology  1 hour.
Presentations of current research by faculty followed by student discussion. Course is to be taken during student's final year in the graduate program as one of the core courses. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Admission to the graduate program in anthropology.

ANTH 596  Independent Study  2 TO 6 hrs.
Independent research is done under the supervision of a faculty member. May be repeated to a maximum of 12 hours with approval. Students may register in more than one section per term. Approval to repeat course granted by the department. Prerequisite(s): Consent of the instructor.

ANTH 597  Project Research  2 TO 6 hrs.
The student will do an independent research project with the aid of a faculty advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Approval to repeat course granted by the department. Prerequisite(s): Consent of the instructor.

ANTH 599  PhD Thesis Research  0 TO 16 hrs.
Research on doctoral dissertation topic. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Advancement to candidacy for the PhD in Anthropology.

ARCH 412  Women and the Environment  3 OR 4 hrs.
Women's place in the built environment; the role of gender in environmental experience, including women as users, designers, planners, policy makers, and critics. Same as GWSS 412. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Advanced undergraduate or graduate standing, or consent of the instructor.

ARCH 414  Professional Practices  3 hrs.
Relationship of the discipline of architecture to the profession. Exposure to interdisciplinary studies that may lead to alternative careers in allied businesses and professions. Prerequisite(s): ARCH 252 and approval of the department.
ARCH 443 Professional Practice I 2 hrs. Legal and ethical considerations in architectural practice; operation and management guidelines. Overview of the history of the professional architectural practice. Prerequisite(s): Completion of the second plateau or approval of the school.

ARCH 444 Professional Practice II 2 hrs. Business and financial considerations in architectural practice; scope of services, communications and marketing guidelines. Interrelationship with clients, consultants, and the manufacturing and construction industry. Prerequisite(s): ARCH 443 and approval of the school.

ARCH 465 Comprehensive Studio 6 hrs. Capstone senior design studio that culminates in a comprehensive project that explores the relationship of architecture to society, technological change, and structural and environmental innovation. Extensive computer use required. Field trip required at a nominal fee. Fieldwork required. Students will use the city as a research laboratory with fieldwork on project sites. Additional scheduled field trips will be made to significant or historical architectural buildings as part of preliminary design research and analysis. Prerequisite(s): Average grade of C or better in both ARCH 465 and 466; ARCH 360 ARCH 372 and junior standing or approval of the department.

ARCH 466 Option Studio 6 hrs. Topic options studio that culminates B5 studio sequence exploring topics at the scale of residential building, city, and region dependent on interests of faculty. Extensive computer use required. Field trip required at a nominal fee. Fieldwork required. Students will use the city as a research laboratory with fieldwork on project sites. Additional scheduled field trips will be made to significant or historical architectural buildings as part of preliminary design research and analysis. Prerequisite(s): ARCH 465 and approval of the department.

ARCH 470 Structures I: Statics 4 hrs. Introduction to structural elements. Introduction to fundamental structural planning criteria and relevant concepts of tension, compression, and bending. Introduction to historical and contemporary structural precedents. Prerequisite(s): MATH 180 and PHYS 105 and PHYS 106.

ARCH 471 Structures II: Strength of Materials 3 hrs. Introduction to material properties; strength characteristics of building materials and material assemblies; stress and strain; rigidity and deformation; compatibility effects; torsion effects; combined loading of elements and systems. Prerequisite(s): ARCH 470 and approval of the school.

ARCH 486 Urban Ecologies and Infrastructures 4 hrs. 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(s): Graduate standing in the Master of Architecture program or, for students in the Bachelor of Arts in Architectural Studies program, consent of the instructor.

ARCH 494 Special Topics in Architecture 2 TO 4 hrs. Current topics. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. Prerequisite(s): 12 hours of history of architecture and art and graduate standing in the Master of Architecture program.

ARCH 499 Special Topics 3 OR 4 hrs. Special topics in theory, design, technology, or graphic skills and craft (manual or digital). 3 undergraduate hours; 4 graduate hours. May be repeated up to 3 times. Prerequisite(s): Senior standing or above.

ARCH 500 Best Practices: Space 3 hrs. Issues of planning and programming including context awareness and analytic site and facilities master planning; workload analysis, existing facility capacity analysis, and facilities programming. Prerequisite(s): Approval of the department.

ARCH 501 Best Practices: Type 3 hrs. An understanding of operations, activities, and functions associated with health settings, including facilities planning and design, departmental planning and design, space planning and design, and equipment planning. Prerequisite(s): Approval of the department.

ARCH 502 Best Practices: Process 3 hrs. Regulatory constraints on the design process are discussed: government and licensing agencies including review of building codes, zoning controls, Certificate of Need, licensing agencies, and other regulatory issues. Prerequisite(s): Approval of the department.

ARCH 503 Best Practices: Institution 3 hrs. An introduction to health delivery organizations including funding mechanisms and economies. Topics in the supply and demand for health services, the role of insurance, public policy issues of cost, and quality regulation. Prerequisite(s): Approval of the department.

ARCH 504 Ethics in Health Design 3 hrs. An understanding of the ethical foundations of health design, including multicultural definitions of health. Issues of sustainable design; universal design; health equity; global access to health; gender equality; and health as a human right. Prerequisite(s): Approval of the department.

ARCH 505 Introduction to Evidence Based Design 3 hrs. Evidence-based health design recognizes the need to be problem-oriented using, as needed, the theories and methods of related disciplines (e.g., psychology, sociology, anthropology, biology, and ecology). Prerequisite(s): Approval of the department.

ARCH 510 Advanced Architectural Design I 8 hrs. Design of multiple or complex building types with emphasis on varying topics related to architectural design. Prerequisite(s): ARCH 454 and ARCH 474 or approval of the school. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 511 Advanced Architectural Design II 8 hrs. Design of a comprehensive, single case study with emphasis on varying topics related to architectural design. Prerequisite(s): 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. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 512 Advanced Architectural Design I: Activist Practice 8 hrs. 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. Prerequisite(s): ARCH 430 and ARCH 454 and ARCH 464 and ARCH 474; or approval of the school. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 513 Advanced Architectural Design II: Activist Practice 8 hrs. 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(s): 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. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 515 Advanced Architectural Design I: Architectural Technologies 8 hrs. Design of multiple public buildings with an emphasis on the relationship of aesthetics and construction methods in the making of comprehensive architecture. Prerequisite(s): ARCH 454 and ARCH 464 and ARCH 474 or approval of the school. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 516 Advanced Architectural Design II: Architectural Technologies 8 hrs. Design of a single public building with an emphasis on the relationship of aesthetics and construction methods in the making of comprehensive architecture. Prerequisite(s): 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. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 517 Advanced Architectural Design I: Digital Media 8 hrs. 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. Prerequisite(s): 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. Restricted to students in the final year of study in the Master of Architecture program.
ARCH 518
Advanced Architectural Design I: Landscape Urbanism 8 hrs.
Design of urban landscapes and public spaces as informed by large-scale infrastructures, natural environments, and urban systems. Prerequisite(s): ARCH 454 or ARCH 469 and ARCH 474 or approval of the school. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 519
Advanced Architectural Design II: Landscape Urbanism 8 hrs.
Design of public building and/or space including surrounding urban landscape with emphasis on perceptual, phenomenal, and temporal aspects of design. Prerequisite(s): ARCH 510 or ARCH 512 or ARCH 514 or ARCH 516 or ARCH 518 or ARCH 551 or ARCH 554 or ARCH 596. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 520
Topics in Architectural Theory and History 4 hrs.
Seminar on a current topic in the criticism, theory, or history of architecture and urbanism. May be repeated to a maximum of 12 hours.

ARCH 521
Advanced Elective in Architectural Technologies 4 hrs.
Examination and analysis of influences on architecture relating to concepts, program, function, location, cost, systems, regulation, materials, assemblage, and environmental influences on the resulting building aesthetic. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 522
Topics in Architectural Technology 4 hrs.
Seminar on a current topic in technology, structures, or digital fabrication and new media. May be repeated to a maximum of 12 hours.

ARCH 523
Advanced Elective in Landscape Urbanism 4 hrs.
Examination of urban landscape projects from historical, theoretical, ecological, and infrastructural points of view. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 524
Advanced Elective: Special Topics 4 hrs.
Advanced study in varying topics related to architecture. Restricted to students in the final year of study in the Master of Architecture program.

ARCH 531
Architectural Theory and History I 4 hrs.
Discussion of a diversity of critical and generative approaches to twentieth-century architecture and theory, with an emphasis on how architects invent and institutionalize history. Corequisite(s): ARCH 551 and ARCH 561.

ARCH 532
Architectural Theory and History II 4 hrs.
The emergence of the metropolis beginning in the mid-19th century is examined through a survey of the forces that produced it, and the ideologies and practices that have attempted to organize, control, and simulate it.

ARCH 535
Quantitative Methods in Evidence-Based Design 4 hrs.
Basic experimental and survey design for health design research and associated methods for data analysis. The unit is intended to develop students’ capabilities in a range of exploratory and hypothesis-testing data analytic techniques. Prerequisite(s): Approval of the department.

ARCH 536
Critical Design Methodologies 4 hrs.
Introduction to current critical design methodologies in health design including integrated practice: building information modeling; GIS; and other advanced forms of visualization and imaging. Prerequisite(s): Approval of the department.

ARCH 544
Professional Practices 4 hrs.
An introduction to the law and business of architecture, with an emphasis on alternative models for contemporary professional practice. Prerequisite(s): Approval of the department.

ARCH 551
Architectural Design I 6 hrs.
Introduction to the architectural design discipline as an instigator of qualities and as a function of technique and geometry. Exercises address issues of scale, proportion, intracility, and formal organizing systems through analog and digital media. Previously listed as ARCH 451. Corequisite(s): ARCH 551 and ARCH 561.

ARCH 552
Architectural Design II 6 hrs.
Introduction to the architectural design discipline as an organizer of quantities and as a function of argument and scenario. Exercises confront issues of size, number, expediency, and activity through diagramming, modeling, and graphic techniques. Previously listed as ARCH 452. Prerequisite(s): ARCH 551.

ARCH 553
Architectural Design III 6 hrs.
Addresses contemporary collective space through the development of a large, mixed-use complex on an urban site, and the communication with diverse audiences by synthesizing information and identity from multiple programs and publics. Previously listed as ARCH 453. Prerequisite(s): ARCH 552 or advanced standing in the second year of the three-year Master of Architecture program.

ARCH 554
Architectural Design IV 6 hrs.
Comprehensive housing design studio using building codes, structural and mechanical systems, and material life cycles as generative design parameters to attain the scale of detail development and the level of construction documents. Previously listed as ARCH 454. Prerequisite(s): ARCH 553.

ARCH 556
Architectural Technology I 4 hrs.
Introduction to building construction processes, terminology, conventions, standards, principles of structural behavior, application of components and assemblies, and communication and specifications. Previously listed as ARCH 461. Corequisite(s): ARCH 531 and ARCH 551.

ARCH 557
Architectural Technology II 4 hrs.
Focuses on the relationship between architecture and the environment, including the high performance, material specification, adaptive behavior, and assembly systems at their primary interface, the building’s envelope. Previously listed as ARCH 462. Prerequisite(s): ARCH 561.

ARCH 558
Architectural Technology III 4 hrs.
Focuses on the relationship between architecture and its occupant, through an analysis and integration of building design and technologies: HVAC, electrical, plumbing, ADA and universal design, vertical transport, egress, and life safety systems. Previously listed as ARCH 463. Prerequisite(s): ARCH 562 or advanced standing in the second year of the three-year Master of Architecture program.

ARCH 559
Architectural Technology IV 4 hrs.
An advanced seminar/laboratory in architectural technologies, structures, new materials, and fabrication techniques; students choose by lottery into one of several sections with diverse content. Previously listed as ARCH 464. Prerequisite(s): ARCH 561 and credit or concurrent registration in ARCH 562 and ARCH 563; and credit or concurrent registration in ARCH 573 and ARCH 574. Students who are admitted advanced standing into the second year of the three-year Master of Architecture program have the option to take ARCH 562 or ARCH 573 concurrently with ARCH 564.

ARCH 565
Topic Studio 8 hrs.
Advanced studio that pursues specific design and research agendas of current significance; students choose by lottery from among several options that are offered by permanent and distinguished visiting faculty. Extensive computer use required. Fieldwork, field trips required at a nominal fee. Prerequisite(s): ARCH 554.

ARCH 566
Research Seminar 4 hrs.
The first part of a year-long design-research project, the seminar establishes the information base to be developed into publishable form in the subsequent research studio. Extensive computer use required. Fieldwork, field trips required at a nominal fee. Prerequisite(s): ARCH 554.

ARCH 567
Research Studio 8 hrs.
Collaborative and individual design research, in multiple genres, that addresses concerns at the edge of the contemporary discipline and results from a year-long course of study. Extensive computer use required. Fieldwork, field trips required at a nominal fee. Prerequisite(s): ARCH 556.

ARCH 568
Topics Studio in Regional Intervention 8 hrs.
Design of a complex project with emphasis on extra-large-scale intervention (e.g., transportation infrastructure) supported by the theoretical, technical, social, and economic considerations relating to the culture and production of architecture. Extensive computer use required. Fieldwork, field trips required at a nominal fee. Prerequisite(s): Approval of the department. Corequisite(s): ARCH 573; and credit or concurrent registration in ARCH 595.
ARCH 573 Architectural Structures I
Introduction to the analysis of elementary structures by quantitative and graphical means; introduction to historical and contemporary structural precedents. Previously listed as ARCH 473. Prerequisite(s): ARCH 561.

ARCH 574 Architectural Structures II
4 hrs.
Introduction to the design of structural elements and systems in steel, concrete, and wood including the application of computer-aided engineering software and approximate methods. Previously listed as ARCH 474. Prerequisite(s): ARCH 561 or advanced standing into the second year of the three-year Master of Architecture program.

ARCH 577 Health Design Preceptorship
1 TO 3 hrs.
Preceptor-guided field experience in health intended to promote evidence-based design problem-solving skills, and application of critical knowledge and skills in architecture practice. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 7 hours. Fieldwork required. Prerequisite(s): Approval of the department.

ARCH 579 Capstone Colloquium
4 hrs.
Intensive, advanced program of readings, documentation, presentations, and discussion that structures and supports research activity related to individual capstone projects. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Approval of the department.

ARCH 585 Architectural Theory and History III
4 hrs.
Focuses on ten contemporary practices through close attention to the distinct design concepts, theoretical and formal arguments, built production, critical reception, and legacies and genealogies that those practices have sponsored. Previously listed as ARCH 485.

ARCH 586 Architectural Theory and History IV
4 hrs.
An advanced seminar in architectural and urban criticism, theory, and history; students choose by lottery one of several sections with diverse content.
AD 415 Design Colloquium 4 OR 5 hrs.
Presentations, lectures, discussions conducted by faculty, design professionals, and individuals from design-related disciplines. Overview and contextual understanding of design theory, practice, process, and research. 4 undergraduate hours. 5 graduate hours. Prerequisite(s): Senior standing or above, and consent of the instructor. Senior students must be in their final semester and preparing to graduate at the end of that semester.

AD 418 Independent Study in Graphic Design 1 TO 5 hrs.
Supervised independent study in graphic design. 1 to 4 undergraduate hours. 5 graduate hours. Extensive computer use required. Prerequisite(s): Senior standing or above and consent of the instructor. Taken by faculty invitation only.

AD 420 Interdisciplinary Product Development I 0 TO 5 hrs.
Real-world simulation collaborating in teams with other disciplines gathering, assimilating, and synthesizing information for problem identification to investigation and solve problem. 4 undergraduate hours. 5 graduate hours. Extensive computer use required. Prerequisite(s): AD 321 and AD 326 and credit or concurrent registration in AD 421; and senior standing or above; and consent of the instructor.

AD 421 Interdisciplinary Product Development II 0 TO 5 hrs.
Real-world simulation collaborating in teams with other disciplines to assimilate and synthesize information into action plan, design development, and implementation within structured stage-gated product development process. 4 undergraduate hours. 5 graduate hours. Extensive computer use required. Prerequisite(s): AD 420 and AD 422 and credit or concurrent registration in AD 423; and senior standing or above; and consent of the instructor.

AD 422 Interactive Product Design II 0 TO 5 hrs.
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. 4 undergraduate hours. 5 graduate hours. Extensive computer use required. Prerequisite(s): AD 321 and AD 326 and credit or concurrent registration in AD 420; and senior standing or above; or consent of the instructor.

AD 423 Industrial Design Thesis 0 TO 5 hrs.
Capstone course that enables students to select and explore an area of industrial design research. 4 undergraduate hours. 5 graduate hours. Prerequisite(s): AD 420 and AD 422 and credit or concurrent registration in AD 421; and credit or concurrent registration in AD 415; and senior standing or above; and consent of the instructor.

AD 424 Industrial Design Independent Study 4 OR 5 hrs.
Supervised independent study in any area of industrial design activity not covered in the regular curriculum. 4 undergraduate hours. 5 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): AD 320 and AD 321 and senior standing or above; and consent of the instructor.

AD 425 Design Visualization 0 TO 5 hrs.
Advanced principles, methodologies, and tools for designing both mechanical and electronic interactive products using digital tools as well as analysis utilizing prototyping and user testing methods. Applications include interactive Web site design, 4 undergraduate hours, 5 graduate hours. May be repeated up to 1 time(s). Extensive computer use required. Prerequisite(s): AD 322 and senior standing or above; and consent of the instructor.

AD 462 Advanced Art/Studio Critique 6 hrs.
Critique/discussion for advanced art majors. Includes Studio Art 391 and senior standing or above; and consent of the instructor. Open only to Studio Art majors who have completed their major art requirements.

AD 463 Art/Studio Thesis 6 hrs.
Exhibition/thesis production and seminar culminating in an exhibition/final thesis show for graduating seniors. Prerequisite(s): AD 462 and senior standing or above; and consent of the instructor. Open only to Studio Art majors who have completed all requirements and are prepared to graduate.

AD 471 Advanced Film/Video/Animation 0 TO 5 hrs.
Investigation of contemporary concerns in various areas of film and/or video activity under the direction of an instructor. 4 undergraduate hours. 5 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): AD 272 or AD 474, and consent of the instructor.

AD 472 Independent Study in Film/Video/Interactive Visualization 4 TO 12 hrs.
Supervised independent study in any area of cinema, video production, or electronic visualization. May be repeated to a maximum of 12 hours. Students may register for more than one four-hour section per term, or repeat the course in four-hour sections in subsequent terms. Prerequisite(s): 12 hours in any film, video, and/or electronic visualization courses and consent of the instructor.

AD 482 Visual and Verbal Literacy in Art Education 4 hrs.
Explores relevance of critical theory, text-based contemporary art, cultural studies, and aesthetics to the school art curriculum. Strategies for incorporating reading and writing into arts education. May be repeated once if grade is lower than B. Fieldwork required. Prerequisite(s): Grade of B or better in AD 201; and credit or concurrent registration in AD 302; and junior standing or above; and approval of the school.

AD 484 Educational Practice with Seminar I 6 hrs.
The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Field experience plus lecture, demonstration, and discussion. May be repeated once if grade is lower than B. Graduate credit only with approval of the school. Prerequisite(s): Grade of B or better in AD 201; and senior standing or above; and consent of the instructor. Senior standing, a minimum cumulative grade point average of 3.00, and approval of the school.

AD 500 Art and Design Teaching Internship 0 TO 2 hrs.
Practical and theoretical aspects of teaching lecture/lab studio, and/or seminar courses in Art and Design. Satisfactory/Unsatisfactory grading only. May be repeated. No credit may be counted toward satisfying requirements for any art and design major. Prerequisite(s): Consent of the instructor and consent of director of graduate studies.

AD 502 Seminar in Contemporary Theory 6 hrs.
The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Field experience, plus lecture, demonstration, and discussion. May be repeated once if grade is lower than B. Graduate credit only with approval of the school. Prerequisite(s): Grade of B or better in AD 201; and senior standing or above; and consent of the instructor. Consent of the school, graduate faculty committee, and the student's advisor.
AD 507 Special Projects in Art and Design 0 TO 16 hrs. Student-initiated projects not covered in available curriculum. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the sponsoring instructor and the graduate faculty committee in the student's area of specialization.

AD 508 Advanced Electronic Visualization and Critique 4 hrs. Individualized graduate study; creative projects and research in electronic visualization through a consultive agreement with graduate advisor. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee.

AD 509 Advanced Electronic Visualization 5 hrs. Individualized graduate study; creative projects and research in electronic visualization through a consultive agreement with graduate advisor. May be repeated. Prerequisite(s): Consent of the school graduate faculty committee and the student's advisor.

AD 511 Advanced Graphic Design and Critique 5 hrs. Individualized graduate study; creative projects and research in graphic design by each student through consultive agreement with graduate faculty committee. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee.

AD 521 Advanced Industrial Design 5 hrs. Individualized graduate study; creative projects and research in industrial design by each student through consultive agreement with graduate faculty committee. May be repeated. Prerequisite(s): Consent of the school graduate faculty committee and the student's advisor.

AD 520 Advanced Industrial Design and Critique 4 hrs. Individualized graduate study; creative projects and research in industrial design by each student through consultive agreement with graduate faculty committee. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee.

AD 588 Computer Graphics II 4 hrs. State of the art in computer graphics and interactive techniques: three-dimensional surface and volumetric models. A laboratory is required. Same as CS 526. Prerequisite(s): CS 488.

AD 530 Advanced Studio Arts 4 hrs. Individualized graduate study; creative projects and research in studio arts by each student through consultive agreement with graduate faculty committee. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee.

AD 531 Advanced Studio Arts 5 hrs. Individualized graduate study; creative projects and research in studio arts by each student through consultive agreement with graduate advisor. May be repeated. Prerequisite(s): Consent of the school graduate faculty committee and the student's advisor.

AD 550 Advanced Photomontage and Critique 4 hrs. A forum for presenting and discussing individual work with all photography graduates and faculty participating. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee.

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

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

AD 567 Advanced Moving Image and Critique 4 hrs. Individualized graduate study; projects for creative research in film, video, and animation by each student through consultive agreement with graduate faculty committee. May involve supportive consultation in other areas. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee.

AD 571 Advanced Moving Image 5 hrs. 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. May be repeated. Prerequisite(s): Approval of the school graduate faculty committee and the student's advisor.

AD 594 Special Topics in Art and Design 1 TO 4 hrs. Specialized research topics in art and design directed and announced by the instructor. May be repeated. Students may register in any one section per term. Prerequisite(s): Consent of the instructor and the student's advisor.

AH 404 Topics in Architecture, Art, and Design 3 OR 4 hrs. Selected topics in the history of European and North American architecture, art, and design. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 times(s) if topics vary. Students may register in more than one section per term. Prerequisite(s): 3 hours of art history at the 200-level or consent of the instructor.

AH 420 History of Architecture I 4 hrs. Introduction to architecture, urbanism, and architectural theory worldwide from antiquity to 1450. Prerequisite(s): Graduate standing.

AH 421 History of Architecture II 4 hrs. Introduction to architecture, urbanism, and architectural theory worldwide from 1450 to the present. Prerequisite(s): Graduate standing and AH 420.

AH 422 Topics in the Literature of Architecture 3 OR 4 hrs. Discussion of selected readings in the theory and criticism of architecture. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours in the history of architecture or consent of the instructor.

AH 423 Topics in Modern and Contemporary Architecture 4 hrs. Selected topics in modern and contemporary architecture. May be repeated if topics vary. Prerequisite(s): Graduate standing, and four hours in the history of architecture or consent of the instructor.

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

AH 430 Contemporary Photography 3 OR 4 hrs. Developments in the history of photography since 1950. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours in the history of photography or consent of the instructor.

AH 432 Topics in Film and Video 3 OR 4 hrs. Selected studies in genres, schools, individual artists, critics, and theories of film and video. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): Graduate standing or 3 hours in the history of film or consent of the instructor.

AH 434 Women and Film 3 OR 4 hrs. Roles and representations of women in classical Hollywood, European art, and independent feminist cinema. Same as ENGL 472, and GWS 472. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 342 or ENGL 361 or ENGL 362 or ENGL 363; and senior standing or above; or consent of instructor.

AH 435 Topics in Modern and Contemporary Design 3 OR 4 hrs. Topics in modern and contemporary design. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours in the history of design or consent of the instructor.

AH 441 Topics in Medieval Art and Architecture 3 OR 4 hrs. Selected topics in European art and architecture of the Middle Ages. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours of medieval art and architecture or consent of the instructor.

AH 450 Topics in Renaissance Art 3 OR 4 hrs. Selected topics in Early Renaissance, High Renaissance, or mannerist art and architecture. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): 3 hours in art history at the 200- level or above, or consent of the instructor.
AH 460 Topics in Modern and Contemporary Art 3 OR 4 hrs.
Selected topics in nineteenth- and twentieth-century modern and contemporary art. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours of modern art and architecture or consent of the instructor.

AH 463 Topics in North American Art and Architecture 3 OR 4 hrs.
Selected topics in North American art and architecture from colonial times to 1945. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours of North American art and architecture or consent of the instructor.

AH 464 Topics on Art in Chicago 2 TO 4 hrs.
Topics on the survey of art in Chicago, from the nineteenth century to the present, with an emphasis on contemporary Chicago art expressions.

AH 465 Arts of the Black Atlantic 3 OR 4 hrs.
Interdisciplinary and discursive explorations of the visual and artistic expressions of artists of African descent in the New World. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary.

AH 470 Topics in Non-Western Art and Architecture 3 OR 4 hrs.
Selected topics in the art and architecture of Africa, Asia, Oceania, and the indigenous peoples of the Americas. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary.

AH 471 Topics in Asian Art and Architecture 3 OR 4 hrs.
Selected topics in the art and architecture of Asia. Same as ASST 471. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): 3 hours of Asian art and/or architecture or consent of the instructor.

AH 480 History of Collecting and Museology 3 OR 4 hrs.
The history of collecting and patronage: public and private collections, museums, and commercial art galleries, government funding and the arts. Exhibition planning, research, selection, and catalog preparation. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): AH 110 and AH 111 or consent of the instructor.

AH 481 Museum Practices 3 OR 4 hrs.
Administration of visual arts organizations, their budgets, staffing, structures, accreditation, and long-range planning. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): AH 480 or consent of the instructor.

AH 482 Museology Internship 6 OR 8 hrs.
Practical supervised experience in institutions serving the visual arts. Placements in museums, community art centers, colleges, commercial, or nontraditional galleries, and public agencies. Prerequisite(s): AH 481 or consent of the instructor.

AH 485 Introduction to Historic Preservation 3 OR 4 hrs.
Preservation planning, historic building restoration, and the political and economic factors affecting the conservation of historic resources. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of art history at the 200-level or consent of the instructor.

AH 490 Honors Thesis 3 hrs.
Individual study on a project selected with the approval of the advisor. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Open only to seniors.

AH 491 Study Abroad in Art History 0 TO 12 hrs.
Study abroad within an approved foreign exchange program or department-sponsored program. May be repeated with approval by the department. Prerequisite(s): Approval of the department.

AH 492 Readings in Art and Architecture History 3 OR 4 hrs.
Individually planned readings on selected topics under the supervision of a faculty member. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Students may register in more than one section per term. Prerequisite(s): Junior standing and 3 hours of art history above the 100-level and consent of the instructor. Enrollment priority will be given to majors and graduate students in Art History.

AH 500 Seminar in The History of Photography 4 hrs.
Selected topics in the history of photography with emphasis on primary source materials for research purposes. May be repeated if topics vary.

AH 511 Toward New Histories of the Visual Arts, 1650 to the Present 4 hrs.
Examines the transformation of art history, theory, and criticism since 1960 with regard to issues of gender, class, ethnicity, popular culture, postcolonialism, and contemporary aesthetics. Prerequisite(s): Graduate standing in Art History or consent of the instructor.

AH 512 Art History Teaching Seminar 0 hrs.
Theoretical and practical aspects of teaching in undergraduate courses in the history of the visual arts. Satisfactory/Unsatisfactory grading only. May be repeated up to 1 time(s). Prerequisite(s): Graduate standing in the Art History program and appointment as a teaching assistant in the department.

AH 513 PhD Proseminar 4 hrs.
Historical, theoretical, and critical issues in art history. May be repeated for credit.

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.

AH 530 Seminar in Non-Western Art and Architecture 4 hrs.
Selected topics in pre-Columbian, North American Indian, African, and Oceanic art.

AH 590 MA Paper Research 0 hrs.
Student will work with advisors on two qualifying papers. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

AH 592 Preliminary Examination Research 0 TO 16 hrs.
Supervised research and reading in preparation for the preliminary examinations. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. Prerequisite(s): Open only to PhD degree students. Only by consent of the director of graduate studies and after all other course work has been completed.

AH 596 Readings in Art and Architecture 1 TO 4 hrs.
Individually planned readings on selected topics under the supervision of a faculty member. Prerequisite(s): Consent of the instructor.

AH 598 Master’s Thesis Research 0 TO 8 hrs.
Individual research under faculty direction. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 8 hours. Prerequisite(s): Consent of the instructor.

AH 599 PhD Dissertation Research 0 TO 16 hrs.
Supervised research on the part of the student. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 24 hours. Prerequisite(s): Consent of the instructor and satisfactory completion of the preliminary examination.
Asian American Studies

ASAM 428 Asian/Asian American Women in the Global Economy 3 OR 4 hrs.

Examines the racialization and feminization of a global division of labor. Focuses primarily on Asian and Asian American women's participation and incorporation as workers and key actors in the development of the global economy.

Same as GWS 428 and SOC 428. 3 undergraduate hours; 4 graduate hours.

Prerequisite(s): ASAM 125 or ENGL 125 or SOC 125 or AAST 225 or LALS 225 or SOC 225 or ASAM 228 or ASST 228 or SOC 228 or ASAM 290 or two 200-level courses in either SOC, GWS, or ASAM, or a combination of these.

ASAM 441 Topics in Asian American Literature and Culture 3 OR 4 hrs.

An advanced seminar that examines various forms of cultural production by Asian American artists of diverse ethnic backgrounds. Topics vary. Same as ENGL 441. 3 undergraduate hours; 4 graduate hours. May be repeated up to 1 time(s).

Prerequisite(s): ENGL 327 or ENGL 359; and consent of the instructor.

ASAM 490 Advanced Topics in Asian American Studies 3 OR 4 hrs.

Study of a specific advanced topic within Asian American studies. May be repeated if content does not duplicate previous course work. May be repeated to a maximum of 12 hours.

Asst 471 Topics in Asian Art and Architecture 3 OR 4 hrs.

Selected topics in the art and architecture of Asia. Same as ASH 471, 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary.

Prerequisite(s): 3 hours of Asian art and/or architecture or consent of the instructor.

ASST 472 Issues and Events in Twentieth-Century China 3 OR 4 hrs.

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. Same as HIST 472. 3 undergraduate hours. 4 graduate hours. Recommended background: Previous course work in Chinese history at the 100- or 200-level.

ASST 473 Topics in East Asian History 3 OR 4 hrs.

Specific topics are announced each term. Same as HIST 473. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.

Prerequisite(s): 3 hours of East Asian history or consent of the instructor.

ASST 478 Women in Chinese History 3 OR 4 hrs.

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.

Same as GWS 478, and HIST 478. 3 undergraduate hours. 4 graduate hours. Recommended background: Previous course work in Chinese history or women's studies.

ASST 479 Culture and Colonialism in South Asia 3 OR 4 hrs.

Examines the emergence of colonial cultures of domination and resistance on the Indian subcontinent from the 18th century to 1947. Same as ANTH 479 and HIST 479. 3 undergraduate hours. 4 graduate hours.

AHS 495 Urban Health Multicultural Seminar 1 hour.

Students attend multicultural and urban health-related seminars, and participate in faculty-student discussion, academic presentations, and directed reading groups to integrate issues of cultural difference into students' professional development. Satisfactory/Unsatisfactory grading only. May be repeated. All academy seminars are pre-approved; other approved events will be announced to students. Any off-campus events must have prior approval. One academic year is allotted for completion of seminar. Students should register the semester they begin attending lectures; grades will be deferred until course is completed.

Prerequisite(s): Sophomore standing or above.

AHS 510 Research Methods in Allied Health 3 hrs.

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(s): Consent of the instructor.

AHS 594 Special Topics in Associated Health Sciences 1 TO 4 hrs.

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.

AHS 595 Seminar in Associated Health Sciences 1 hour.

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.

Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

AHS 596 Independent Study 1 TO 4 hrs.

For graduate students who wish to pursue independent study not related to their project/thesis research. May be repeated. Students may register in more than one section per term.

AHS 597 Project Research in Associated Health Sciences 1 TO 4 hrs.

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. Satisfactory/Unsatisfactory grading only.

Prerequisite(s): Consent of the instructor.

Biochemistry and Molecular Genetics

BCMG 411 Introduction to Biological Chemistry 4 hrs.

Includes chemistry of cellular constituents; enzymology; metabolism of sugars, proteins, lipids, and nucleic acids; and regulation of metabolism.

Prerequisite(s): Organic chemistry. Lecture course designed primarily for students in the College of Dentistry.

BCMG 501 Faculty Research Seminars 1 hour.

Faculty presentation of research areas within molecular genetics. Satisfactory/Unsatisfactory grading only. Should be taken in the first year in the PhD in Biochemistry and Molecular Genetics program.

Prerequisite(s): Graduate standing in the PhD in Biochemistry and Molecular Genetics program or consent of the instructor.

BCMG 502 Somatic Cell and Human Genetics 4 hrs.

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(s): GCLS 501 or consent of the instructor.

BCMG 503 Research Methods in Biochemistry and Molecular Genetics 5 hrs.

Laboratory course in experimental methods in biochemistry and molecular genetics. May be repeated to a maximum of 10 hours. Prerequisite(s): Consent of the instructor. Open only to students entering as PhD students in Biochemistry and Molecular Genetics.

BCMG 512 Experimental Design and Analysis in Molecular Genetics 4 hrs.

Methods and logic in the analysis of gene function, gene cloning, analysis of genetic changes, studies of gene expression, and design of experimental controls. Prerequisite(s): GCLS 501 or consent of the instructor.
BCMG 513 Structure of Biopolymers 3 hrs. 
Explores the relationship between structural stability, kinetic properties, and function of biopolymers, with particular emphasis on proteins and nucleic acids. Same as MIM 513, and PMPG 513. Prerequisite(s): GCLS 501 or consent of the instructor.

BCMG 514 Structure and Function of Nucleic Acids 4 hrs. 
Describes the structure and function of nucleic acids. Unravels the basic molecular mechanisms underlying heredity, including replication, transcription, and recombination. Prerequisite(s): Consent of the instructor.

BCMG 515 Journal Club 1 hour. 
Student presentation and critical analysis of recent journal articles and current topics in biochemistry and molecular genetics. May be repeated. Prerequisite(s): Consent of the instructor.

BCMG 522 Strategies for Effective Scientific Communication 1 hour. 
Development of critical skills for evaluation, development, and execution of forms of scientific communication, including research and grant proposals, manuscripts describing original research, and review summaries. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

BCMG 526 Molecular and Genetic Analysis of Development 3 hrs. 
Examines developmental mechanisms used in animal model systems. Same as BIOS 526. Prerequisite(s): Graduate standing or consent of the instructor.

BCMG 531 Medical Biochemistry I 3 hrs. 
Chemistry of biopolymers; enzymology; metabolism of carbohydrates, lipids, amino acids, and proteins; molecular biology. Prerequisite(s): Membership in the medical school class or consent of the instructor. Intended primarily for first-year medical students.

BCMG 532 Introduction to Molecular Medicine and Genetics 3 hrs. 
Introduction to the principles of molecular medicine and genetics, including molecular biology, bionanotaxis, gene therapy, mechanisms of mutation, pharmacogenomics, cancer genetics, and immunogenetics. Intended primarily for medical students. Prerequisite(s): BCMG 531 and membership in the medical school and consent of the course coordinator.

BCMG 533 Nutrition for Medical Students 2 hrs. 
Biochemical and nutritional basis of disease including heart disease, hypertension, obesity, malnutrition, and cancer. Prerequisite(s): BCMG 531 and BCMG 532 and membership in the medical school or consent of the instructor. Intended primarily for medical students.

BCMG 561 Biochemistry of Cellular Regulation 3 hrs. 
Membrane structure and function, transport, receptor and signal transduction mechanisms, and growth factors. Cytoskeleton and motility, cell-cell communication, enzyme cascades, and cellular control mechanisms.

BCMG 563 Principles of Molecular Medicine 3 hrs. 
A lecture/discussion/writing course that integrates biochemical and molecular biological concepts into a clinical context. Diseases will be described in terms of molecular mechanisms. Prerequisite(s): Consent of the instructor.

BCMG 575 Topics in Biochemistry and Molecular Genetics 3 hrs. 
Students will be exposed to, present, and discuss recent scientific literature in biochemistry and molecular genetics. Prerequisite(s): Completion of the first year of the program and consent of the instructor.

BCMG 594 Special Topics in Biochemistry and Molecular Genetics 1 TO 3 hrs. 
Topics of current interest in the field of biochemistry and molecular genetics, protein structure, membrane proteins and trafficking, development and gene regulation, signal transduction, and cancer biology. May be repeated to a maximum of 6 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BCMG 595 Student Research Seminars 1 hour. 
Research presentations by graduate students in the biochemistry and molecular genetics program. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BCMG 598 Masters Thesis Research 0 TO 16 hrs. 
Investigation carried out by MS candidate under the direction of a faculty member leading to the MS in Biochemistry and Molecular Genetics. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BCMG 599 PhD Thesis Research 0 TO 16 hrs. 
Independent dissertation research by the student, under the guidance of the advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Advanced standing in the PhD in Biochemistry and Molecular Genetics program.

Bioengineering

BIOE 402 Medical Technology Assessment 2 OR 3 hrs. 
Biopreneur course. Assessment of medical technology in the context of commercialization. Objectives, competition, market share, funding, pricing, manufacturing, growth, and intellectual property; many issues unique to biomedical products. 2 undergraduate hours. 3 graduate hours. Prerequisite(s): Consent of the instructor.

BIOE 405 Atomic and Molecular Nanotechnology 3 OR 4 hrs. 
Nanoscale structures and phenomena. Simulation methods for nanosystems, and molecular assemblies. Molecular building blocks, scanning probe and atomic force microscopy, and quantum mechanical phenomena. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above. Recommended background: Engineering or Physical Science major.

BIOE 406 Regulation and Manufacturing Practices in Medical Technology 2 OR 3 hrs. 
Biopreneur course. Product requirement definition, FDA, quality system regulation, community Europe, medical device directive, role of management, United States pharmacopoeia, toxicity testing, hazard analysis, risk assessment, and import/export. 2 undergraduate hours. 3 graduate hours. Prerequisite(s): Junior standing or above and consent of the instructor.

BIOE 407 Pattern Recognition I 3 OR 4 hrs. 
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. Same as ECE 407. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): MATH 220.

BIOE 408 Medical Product Development 2 OR 3 hrs. 
Biopreneur course. Major stages of medical product development (investigative, feasibility, development, commercialization, maturation, and growth), regulatory issues, product performance, failure mode and effect analysis, and hazard analysis. 2 undergraduate hours. 3 graduate hours. Prerequisite(s): Junior standing or above and consent of the instructor.

BIOE 415 Biomechanics 3 OR 4 hrs. 
Use of rigid and deformable body statics and rigid body dynamics to analyze various aspects of the human musculoskeletal system. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ECE 204 and ME 210; and either BIOS 442 or BIOS 443.

BIOE 420 Introduction to Field and Waves in Biological Tissues 3 OR 4 hrs. 
Principles of electromagnetic and ultrasonic interaction with biological systems; characterization of biological materials; diagnostic and therapeutic uses; and techniques of dosimetry and measurement. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ECE 310.

BIOE 421 Biomedical Imaging 3 OR 4 hrs. 
Introduction to engineering and scientific principles associated with X-ray, magnetic resonance, ultrasound, computed tomographic, and nuclear imaging, 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): MATH 210 and PHYS 142.

BIOE 430 Bioinstrumentation and Measurements I 3 OR 4 hrs. 
Theory and application of instrumentation used for physiological and medical measurements. Characteristics of physiological variables, signal conditioning devices and transducers, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ECE 210; and BIOS 100 or higher.
BIOE 431 Bioinformatics and Measurement Laboratory 2 hrs. Practical experience in the use of biomedical instrumentation for physiological measurements. Prerequisite(s): Credit or concurrent registration in BIOE 430.

BIOE 432 Bioinformatics and Measurements II 3 OR 4 hrs. Principles of biostatistics for the assessment of physiological function and therapeutic intervention. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): BIOE 430.

BIOE 433 Biostatistics II 4 hrs. Statistical treatment of data, model estimation, and inference are treated in a framework of biological experiments and attributes of data generated from such experiments. Credit is not given for BIOE 439 if the student has credit for BSTT 400. Extensive computer use required. Prerequisite(s): MATH 191 and CS 101; and consent of the instructor. Recommended background: Knowledge of MATLAB.

BIOE 440 Biophysical Analysis 3 OR 4 hrs. Analysis of signals of biological origin, including transient signals, stability analysis, control, probabilities, stochastic processes, and medical applications. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): MATH 210 and either BIOS 442 or BIOS 443.

BIOE 450 Molecular Biophysics of the Cell 4 hrs. Introduction to molecular length, time, force, energy scales; statistical thermodynamics of solutions; DNA, RNA, and protein structure and function; and experimental methods. Same as PHYS 450. Prerequisite(s): PHYS 245 or the equivalent.

BIOE 452 Biocontrol 3 OR 4 hrs. 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. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ECE 310; and either BIOS 442 or BIOS 443.

BIOE 455 Introduction to Cell and Tissue Engineering 3 OR 4 hrs. Foundation of cell and tissue engineering covering cell technology, construct technology, and cell-substrate interactions. Emphasis in emerging trends and technologies in tissue engineering. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): BIOS 100 and ECE 260 or the equivalent.

BIOE 456 Cell and Tissue Engineering Laboratory 2 hrs. Includes polymer scaffold fabrication, micromanipulation biomolecules, cellular adhesion and proliferation assays, and immunofluorescence tagging. Prerequisite(s): BIOE 455 or consent of the instructor.

BIOE 460 Material Bioengineering 3 OR 4 hrs. Analysis and design considerations of problems associated with prostheses and other implanted biomedical devices. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): Either BIOS 442 or BIOS 443.

BIOE 465 Metabolic Engineering 3 OR 4 hrs. Quantitative descriptions of biochemical networks; modeling, control, and design of metabolic pathways to achieve industrial and medical goals. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): BIOE 310 or ECE 310 or ME 312; or consent of the instructor.

BIOE 470 Bio-Optics 3 OR 4 hrs. Physical principles and instrumentation relevant to the use of light in biomedical research. Several current and developing clinical applications are explored. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): PHYS 142.

BIOE 472 Models of the Nervous System 3 OR 4 hrs. Mathematical models of neural excitation and nerve conduction, stochastic models and simulation of neuronal activity, and models of neuron pools and information processing, and models of specific neural networks. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ECE 310; and either BIOS 442 or BIOS 443.

BIOE 475 Neural Engineering I Introduction to Hybrid Neural Systems 3 OR 4 hrs. Modeling, design, and analysis of hybrid systems comprised of living neurons and artificial components; examples drawn from neural and neuromuscular prostheses, biosensors, and biopotential control of robotics. Same as BIOS 475. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): BIOS 442 and credit or concurrent registration in BIOE 472.

BIOE 476 Neural Engineering I Laboratory 2 hrs. Hands-on experience with computational and experimental models of engineered neural systems, with emphasis on neuroprostheses and biosensors. Animals used in instruction. Prerequisite(s): Credit or concurrent registration in BIOE 475.

BIOE 480 Introduction to Bioinformatics 3 OR 4 hrs. Computational analysis of genomic sequences and other high throughput data. Sequence alignment, dynamic programming, database search, protein motifs, cDNA expression array, and structural bioinformatics. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): BIOS 440 and your instructor.

BIOE 480 Bioinformatics Laboratory 2 hrs. How to use bioinformatics tools, including sequence alignment methods such as Blast, FastA, and Pfam, as well as structural bioinformatics tools, such as Rasmol and Casp. Extensive computer use required. Prerequisite(s): Credit or concurrent registration in BIOE 475; and senior standing or above; and consent of the instructor.

BIOE 481 Bioinformatics I Laboratory 2 hrs. Hands-on experience with computational and experimental models of engineered neural systems, with emphasis on neuroprostheses and biosensors. Animals used in instruction. Prerequisite(s): BIOS 440 and CS 201; or consent of the instructor.

BIOE 482 Introduction to Optimization Methods in Bioinformatics 3 OR 4 hrs. The objectives are to provide the students with a basis for understanding principles of the optimization methods and an insight on how these methods are used in bioinformatics. 3 undergraduate hours; 4 graduate hours. Extensive computer use required. Prerequisite(s): BIOS 100 and CS 201.

BIOE 483 Molecular Modeling in Bioinformatics 3 OR 4 hrs. Basic structural and dynamics tools in protein structure prediction, structure comparison, function prediction, Monte Carlo, and molecular dynamics simulations. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): Grade of B or better in BIOE 480.
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<td>BIOE 521</td>
<td>Imaging Systems for Biological Tissues</td>
<td>4 hrs. Examination of major imaging systems using ionizing and nonionizing energy for characterization of biological tissues and physiological lesions. Prerequisite(s): BIO 420.</td>
</tr>
<tr>
<td>BIOE 522</td>
<td>Principles of Polymeric Science and Engineering</td>
<td>3 hrs. Intermediate polymer science, thermodynamics of polymer solutions, phase separations, MW determination, crystallization, elasticity, kinetics, and processing. Same as BIOS 522. Prerequisite(s): MATH 220 or consent of the instructor.</td>
</tr>
<tr>
<td>BIOE 525</td>
<td>Physiological and Cellular Effects of Biomechanical Forces</td>
<td>4 hrs. Discusses how biomechanical forces are generated, the impact the forces have on cells and tissues, plus methods for studying them. Mechanisms by which cells may sense forces and transduce this information to the nucleus are also covered. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>BIOE 548</td>
<td>Micro and Nanotechnology for Biomedical Applications</td>
<td>4 hrs. This course covers selected topics in micro- and nano-technology underlying biomedical applications. Topics include: microfabrication and nanofabrication; microfluidic processes; neuroMEMS and nanoscale structures as functional bio-interfaces. Prerequisite(s): PHYS 244.</td>
</tr>
<tr>
<td>BIOE 550</td>
<td>Principles of Cell and Tissue Engineering</td>
<td>4 hrs. 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. Prerequisite(s): BIOS 442 or BIOS 443; and CEMM 200. Recommended background: A course in cell biology.</td>
</tr>
<tr>
<td>BIOE 552</td>
<td>Advanced Biocontrol</td>
<td>4 hrs. Modeling and analysis of physiological systems including such topics as adaptive control, statistical analysis, error signal processing, and the characterization of individual neural control elements. Prerequisite(s): BIOE 452.</td>
</tr>
<tr>
<td>BIOE 560</td>
<td>Processing and Properties of Structural Biomaterials</td>
<td>4 hrs. 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(s): CME 260. Recommended background: Credit in BIOE 460.</td>
</tr>
<tr>
<td>BIOE 575</td>
<td>Neural Engineering II —Neural Coding</td>
<td>4 hrs. Analytical techniques and models used to assess and predict neural activity. Emphasis on information coding in sensory systems. Prerequisite(s): Consent of the instructor. Recommended background: Working knowledge of MATLAB.</td>
</tr>
<tr>
<td>BIOE 576</td>
<td>Sensory Prostheses Engineering</td>
<td>4 hrs. Critical review of existing and emerging prosthetic devices for sensory systems damaged by trauma or disease. Technology and information flow in hybrid systems are emphasized. Prerequisite(s): BIOE 475 and BIOS 442; or consent of the instructor.</td>
</tr>
<tr>
<td>BIOE 579</td>
<td>Neural and Neuromuscular Prostheses</td>
<td>4 hrs. Neuromuscular electrical stimulation for ambulation by paraplegics, of upper limb in tetraplegics, of vocal cord and breathing functions, and stimulation of bladder, cochlea, retina, and visual cortex. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>BIOE 580</td>
<td>Principles of Bioinformatics</td>
<td>4 hrs. Bioinformatics analysis of sequence, phylogeny, and molecular structure. Focus on probabilistic models and algorithms, as well as structural analysis. Extensive computer use required. Prerequisite(s): BIOE 480; and graduate or professional standing; or consent of the instructor. Recommended background: Exposure to biochemistry, molecular biology, or evolution.</td>
</tr>
<tr>
<td>BIOE 582</td>
<td>Computational Functional Genomics</td>
<td>4 hrs. Modern statistical and computational methods relevant to functional genomics. Cell function, gene regulation and protein expression, Microarray technology and use; cluster analysis; and prediction of protein function. Prerequisite(s): BIOE 480. Recommended background: Basic knowledge of probability, statistics, vector algebra, calculus, and cell biology.</td>
</tr>
<tr>
<td>BIOE 590</td>
<td>Internship in Bioengineering</td>
<td>1 TO 4 hrs. Current clinical practice experience in a healthcare setting culminating in a written and oral report. Satisfactory/Unsatisfactory grading only. Prerequisite(s): BIOE 430 and BIOE 451 and BIOE 479.</td>
</tr>
<tr>
<td>BIOE 594</td>
<td>Advanced Special Topics in Bioengineering</td>
<td>1 TO 4 hrs. Systematic review of selected topics in bioengineering theory and practice. Subjects vary from year to year. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>BIOE 595</td>
<td>Seminar on Bioengineering</td>
<td>0 TO 1 hrs. Recent innovations in bioengineering theory and practice presented by invited speakers, faculty, and graduate students. Satisfactory/Unsatisfactory grading only. May be repeated. Students who are presenting seminars should register for 1 hour, others for 0 hour.</td>
</tr>
<tr>
<td>BIOE 596</td>
<td>Independent Study</td>
<td>1 TO 5 hrs. Research on special problems not included in thesis research. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>BIOE 598</td>
<td>Masters Thesis Research</td>
<td>0 TO 16 hrs. Research in MS thesis project. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.</td>
</tr>
<tr>
<td>BIOE 599</td>
<td>PhD Thesis Research</td>
<td>0 TO 16 hrs. Research in PhD thesis project. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.</td>
</tr>
<tr>
<td>BIOE 402</td>
<td>Educational Practice with Seminar I</td>
<td>6 hrs. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.</td>
</tr>
<tr>
<td>BIOS 403</td>
<td>Educational Practice with Seminar II</td>
<td>6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.</td>
</tr>
<tr>
<td>BIOS 416</td>
<td>Natural Products</td>
<td>3 OR 4 hrs. Biogenetic approach to secondary metabolites. General principles and selected studies of phenolic compounds, terpenes, alkaloids, and other interesting natural products. Same as CHEM 456. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): One year of organic chemistry.</td>
</tr>
<tr>
<td>BIOS 424</td>
<td>Mammalian Histology</td>
<td>4 hrs. The microscopic anatomy of tissues and organs in relation to their function. Prerequisite(s): BIOS 272 or BIOS 325.</td>
</tr>
<tr>
<td>BIOS 429</td>
<td>Laboratory in Electron Microscopy</td>
<td>3 hrs. Laboratory instruction in cell preparation and instrument operation in transmission and scanning electron microscopy. Satisfactory/Unsatisfactory grading only. Animals used in instruction. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>BIOS 430</td>
<td>Evolution</td>
<td>4 hrs. Mechanisms of genetic and phenotypic stability and change in populations and species; modes of speciation and macroevolution; and trends in evolution. Lecture and discussion. Prerequisite(s): BIOS 220.</td>
</tr>
<tr>
<td>BIOS 431</td>
<td>Plant and Animal Interactions</td>
<td>3 hrs. Ecology of nonsymbiotic relationships of plants and animals, including protection mutualisms, pollination, seed dispersal, animal herbivory, and plant defense. Prerequisite(s): BIOS 100 and BIOS 101 and any 200- or 300-level course in Biological Sciences.</td>
</tr>
<tr>
<td>BIOS 432</td>
<td>Restoration Ecology</td>
<td>3 hrs. Philosophical, historical, and ecological basis for ecological restoration, with emphasis on readings in the primary literature and writing. Prerequisite(s): BIOS 230 or the equivalent.</td>
</tr>
</tbody>
</table>

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**BIOS 100 and BIOS 101 and any 200- or 300-level course in Biological Sciences.**
BIOS 433 Animal Physiological Systems 4 hrs.
Basic function of renal, respiratory, and digestive systems. Integrative role of endocrine systems. Animals used in instruction. Prerequisite(s): BIOS 230.

BIOS 443 Advanced Microbiology 3 hrs.
Comprehensive analysis of a major group of bacteria and archaeobacteria. Prerequisite(s): BIOS 350.

BIOS 450 Introductory Neurobiology 4 hrs.
Overview of neural systems from vertebrates to invertebrates with a focus on the role of endocrine systems. Animals used in instruction. Prerequisite(s): Four courses in the Biological Sciences.

BIOS 452 Biochemistry I 4 hrs.
Chemistry of proteins, nucleic acids, carbohydrates, and lipids. Same as CHEM 452. Prerequisite(s): Credit or concurrent registration in CHEM 234.

BIOS 454 Biochemistry II 4 hrs.
Continues BIOS 452. Carbohydrate and lipid metabolism, electron transport; metabolism of amino acids, nucleic acids, and proteins; and biosynthesis of macromolecules and regulation of macromolecular synthesis. Same as CHEM 454. Prerequisite(s): BIOS 452 or CHEM 452.

BIOS 457 General Virology 4 hrs.
Nature of viruses, their morphology, chemical composition, assay, host-parasite interactions, and life cycles. Prerequisite(s): BIOS 220; and either BIOS 222 or BIOS 350.

BIOS 466 Principles of Paleontology 4 hrs.
Theory and methods of evolutionary paleobiology; includes paleoecology, functional morphology, and major features of organic evolution. Same as EAES 466. Prerequisite(s): EAES 360 or BIOS 360 or consent of the instructor.

BIOS 475 Neural Engineering I: Introduction to Hybrid Neural Systems 3 OR 4 hrs.
Modeling, design, and analysis of hybrid systems comprised of living neurons and artificial components; examples drawn from neural and neuromuscular prostheses, biosensors, and biopotential control of robotics. Same as BIOE 475. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): BIOS 442 and credit or concurrent registration in BIOE 472.

BIOS 483 Neuroanatomy 4 hrs.
Organization of the nervous system, with an emphasis on mammals. Same as PSCH 483 and NEUS 483. Animals used in instruction. Prerequisite(s): BIOS 272 or BIOS 286 or BIOS 325 or PSCH 262; or consent of the instructor.

BIOS 484 Neuroscience I 3 hrs.
Neuroscience as an integrative discipline. Neuroanatomy of vertebrates, neural development, cellular neurobiology, action potential mechanisms, synaptic transmission, and neuropharmacology. Same as PHIL 484 and PSCH 484. Prerequisite(s): BIOS 286 or PSCH 262.

BIOS 485 Neuroscience II 3 hrs.
Integrative neuroscience continuation of BIOS/PSCH/PHIL 484. Sensory and motor systems; learning, memory, and language. Pathology of nervous systems. Philosophical perspectives, and modeling. Same as PHIL 485 and PSCH 485. Prerequisite(s): BIOS 484.

BIOS 486 Animal Behavior and Neurobiology 4 hrs.
Neural and behavioral mechanisms of environmental information processing and interaction throughout the animal kingdom; emphasis on invertebrate and vertebrate systems. Laboratory emphasizing individual research projects with a final report, and occasional field trips required. Animals used in instruction. Prerequisite(s): One advanced course in zoology and animal physiology.

BIOS 488 Developmental Neurogenetics 3 hrs.
Classical and molecular genetic approaches to the study of the development of the nervous system, concentrating on studies in fruit flies, nematodes, and vertebrates. Prerequisite(s): BIOS 220 and either BIOS 225 or BIOS 420.
BIOS 552 Chemical Biology 4 hrs.
Major trends and recent developments in research at the interface of chemistry and biology. Same as CHEM 552.

BIOS 559 Special Topics in Biochemistry 3 TO 4 hrs.
Selected topics of current interest in biochemistry. Same as CHEM 559. May be repeated. Students may register in more than one section per term. Prerequisite(s): CHEM 454 or BIOS 454 or consent of the instructor.

BIOS 560 Topics in Paleontology 3 TO 4 hrs.
In-depth analysis of current problems and issues in paleontology, involving reading primary literature, student presentations, and critical discussions. Same as EAES 560. May be repeated if topics vary. Prerequisite(s): Consent of the instructor.

BIOS 562 Methods in Modern Neuroscience 2 hrs.
Underlying principles and applications of techniques used to analyze nervous system organization and function. Behavioral, electrophysiological, anatomical, and biochemical approaches are considered. Same as NEUS 562. Animals used in instruction.

BIOS 584 Foundations of Neuroscience I 3 hrs.
Provides a core understanding of modern neuroscience. Focuses on topics in cell and molecular neuroscience. Taught by faculty from multiple units. Same as NEUS 584. Animals used in instruction.

BIOS 585 Foundations of Neuroscience II 3 hrs.
A core understanding of modern neuroscience. Focus is on topics in systems, cognitive and behavioral neuroscience. Will be taught by faculty from multiple units. Continuation of NEUS 581. Recommended background: Credit or concurrent registration in GCLS 503.

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

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

BIOS 592 Research Seminar 1 TO 2 hrs.
Presentation of student research with an emphasis on problem-solving and theoretical implications. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BIOS 593 Introduction to Laboratory Research 2 TO 6 hrs.
A hands-on, in-depth introduction to selected research topics and laboratory techniques designed for the beginning graduate student. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BIOS 594 Special Topics in Biological Sciences 1 TO 2 hrs.
Selected aspects in biological sciences. Credit varies according to the seminar offered. May be repeated. Students may register in more than one section per term.

BIOS 595 Departmental Seminar 0 hrs.
Weekly seminar by staff and invited speakers. Required of graduate students every semester. Satisfactory/Unsatisfactory grading only. May be repeated.

BIOS 597 Project Research 2 TO 8 hrs.
Guided research projects on selected topics in specific fields of advanced modern biology. Not to be used for thesis research. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BIOS 598 Master's Thesis Research 0 TO 16 hrs.
Independent research in specialized projects under the direction of a faculty member with appropriate graduate standing, leading to completion of master's thesis. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BIOS 599 Doctoral Thesis Research 0 TO 16 hrs.
Independent research on specialized topics under the direction of a faculty member with appropriate graduate standing, leading to completion of PhD thesis. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Biomedical and Health Information Sciences

BHIS 405 Medical Sciences and Human Pathophysiology 0 TO 4 hrs.
Introduction of fundamental concepts in pathophysiology. Specific disorders of major organ systems including etiology, manifestations, diagnostic tests, treatment modalities, pharmacotherapy, and complications. Credit is not given for BHIS 405 if the student has credit for AHS 420 or HIM 313 or HIM 314. Students who require a medical terminology component register for 3 hours and participate in both laboratory and lecture-discussion; all others register for 3 hours and attend lecture-discussion only. Restricted to students who require this course for graduation. Students outside these restrictions may be admitted with consent of the instructor.

BHIS 410 Health Data Structures and Management 3 hrs.
Data structures in clinical information systems, including database design and management, networking, and organizational emphasis on “intrapreneurial” skills required to solve organizational information management problems. Prerequisite(s): BHIS 460 and BHIS 461 and BHIS 480.

BHIS 433 Principles of Evidence-Based Healthcare 2 hrs.
Qualitative and quantitative assessment of human subject clinical research: locating, evaluating, and comparing scientific papers as bases for healthcare education and practice. Same as MHPE 433.

BHIS 461 Introduction to Information Systems for Health Information Management 2 hrs.
Advanced topics in information technology and systems in a healthcare setting: collection, analysis, and management of healthcare data; special issues related to the role of health information administrators. Extensive computer use required. Prerequisite(s): IDS 200 and credit or concurrent registration in BHIS 460.

BHIS 480 Management and Business Practices 3 hrs.
Principles of management with emphasis on business functions, procedures, and organizational structure as applied to various healthcare settings, including private and institutional practice. Prerequisite(s): Advanced undergraduate or graduate standing in the Department of Biomedical and Health Information Sciences, or consent of the instructor.

BHIS 499 Information Sources in Biomedical & Health Information Sciences 1 hour.
Prepares students to locate, interpret, and evaluate pertinent research information sources. Includes discussion on writing literature reviews. Assignments must have an active UIC netid with valid password and access to a computer and the Internet. Prerequisite(s): Students should demonstrate basic computing skills including knowledge of an office productivity suite (MS Office or other), electronic mail, and Internet browsers. Recommended background: IDS 200 or the equivalent.

BHIS 500 Strategic Inquiry in BHIS 3 hrs.
An overview of research methods appropriate for BHIS, in order to better enable students to make research method decisions appropriate for their self-selected research project topics. Prerequisite(s): Consent of the instructor.
BHIS 503 Communication Skills in Health Informatics 2 hrs. An application course in which students assess and practice effective written and oral methods of communication skills necessary for health information professionals. Prerequisite(s): Consent of the instructor.

BHIS 504 Methods in Qualitative Inquiry 3 hrs. Qualitative research methods to account for systematic description of environments where quantitative methods are not sufficient. Prerequisite(s): BHIS 500 and BHIS 510, consent of the instructor.

BHIS 505 Ethics and Legal Issues in Health Informatics 3 hrs. Examination of the legal and ethical issues involved in computerized health information systems. Taught online only. A UIC netid is required. Prerequisite(s): Consent of the instructor.

BHIS 509 Informatics for the Clinical Investigator 3 hrs. This course provides the foundation of requisite knowledge of computer and health information sciences for the clinical investigator. Extensive computer use required. Taught only online. A UIC netid is required.

BHIS 510 Healthcare Information Systems 4 hrs. Examination, through case studies, group and class discussions, and problem-based learning, of the effective utilization of information technology applications currently in place and on the horizon in healthcare organizations. Same as HPA 531. Taught online only. A UIC netid is required. Prerequisite(s): BHIS 510 or HPA 510; and graduate standing and consent of the instructor.

BHIS 511 Application of Healthcare Information Systems 2 hrs. Experience with a variety of healthcare applications utilizing current information technology and systems implemented in healthcare provider organizations. Students are expected and required to attend computer training laboratory sessions in the UICMC, times to be arranged with training department personnel. Students will be working in UICMC and are required to comply with security, patient confidentiality, and HIPAA regulations. Prerequisite(s): BHIS 510 or consent of the instructor. Registration restriction(s): Certification of completion of NetLearning HIPAA training module is required for admission to this course.

BHIS 515 Management of Healthcare Communication Systems 4 hrs. Examination and management of data communications in and between healthcare facilities, including examination of issues, standards, technologies, and system configurations. Same as HPA 520. Taught online only. A UIC netid is required. Prerequisite(s): BHIS 510 or HPA 510; and graduate standing and consent of the instructor.

BHIS 517 Healthcare Information Security 3 TO 4 hrs. Health information security and methods to achieve it; stresses risk assessment and preemptive action; outlines important role of security policies and procedures; surveys security technology with focus on non-technical security approaches. Taught only online. A UIC netid is required. Prerequisite(s): BHIS 437 and BHIS 510, or consent of the instructor.

BHIS 520 Health Information Systems Analysis and Design 4 hrs. A project course applying systems analysis and design theory to healthcare systems evaluation, modeling, and implementation. Same as HPA 531. Taught online only. A UIC netid is required. Prerequisite(s): BHIS 510 or HPA 510; and graduate standing and consent of the instructor.

BHIS 525 Social and Organizational Issues in Health Informatics 4 hrs. Examines the impact of information systems on the healthcare organization and applies theory through case study analysis. Same as HPA 540. Taught only online. A UIC netid is required. Prerequisite(s): BHIS 510 or HPA 510; and BHIS 515 or BHIS 520 or BHIS 530 or HPA 520 or HPA 531 or HPA 550, or consent of the instructor.

BHIS 527 Knowledge Management in Healthcare Organizations 3 hrs. An examination, through readings, case studies, research publications, and discussion, of the current issues, concepts, and technologies of knowledge management in healthcare organizations. Extensive computer use required. May be offered online, using synchronous and asynchronous discussion, in conjunction with seminar format. Prerequisite(s): Grade of B or better in BHIS 510; and consent of the instructor.

BHIS 528 Consumer Health Informatics 3 hrs. Examines the developing area of consumer health informatics from both theoretical and practical knowledge management perspectives through class discussions. Prerequisite(s): BHIS 510 and BHIS 527 or consent of the instructor. Recommended background: BHIS 505.

BHIS 530 Topics in Health Informatics 4 hrs. Current theories and methods in health informatics. Same as HPA 550. Taught online only. A UIC netid is required. Prerequisite(s): BHIS 510 or HPA 510; and BHIS 515 or HPA 520, or BHIS 520 or HPA 531, or BHIS 525 or HPA 540; and graduate standing and consent of the instructor.

BHIS 535 Group Dynamics for HI Professionals 2 hrs. Team and negotiation skills as well as developing project management competencies unique to the health informatics profession. Prerequisite(s): Consent of the instructor.

BHIS 537 Healthcare IT Vendor Management 3 hrs. Examines the environment and activities necessary to plan, select, contract, and implement systems from suppliers in the healthcare IT industry. Prerequisite(s): BHIS 510 or consent of the instructor.

BHIS 538 Healthcare IT Administration 3 hrs. Examines organizational and management issues in healthcare IT. Prerequisite(s): BHIS 510 and BHIS 511 and BHIS 537 or consent of the instructor.

BHIS 546 Leadership Development in Health Informatics 3 hrs. Students will analyze, evaluate, and practice the competencies necessary for leadership unique to the health informatics profession. Prerequisite(s): Consent of the instructor.

BHIS 560 Practicum in Biomedical and Health Information Sciences 3 TO 12 hrs. 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. May be repeated. Prerequisite(s): Consent of the instructor.

BHIS 564 Special Topics in Biomedical and Health Information Sciences 1 TO 3 hrs. An in-depth study of a health informatics topic of importance selected by the faculty. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BHIS 595 Seminar in Biomedical and Health Information Sciences 1 hour. Provides students with an opportunity to present preliminary research for critique by peers and faculty. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): BHIS 499 and BHIS 500 or consent of the instructor.

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

BHIS 597 Project Research in Biomedical and Health Information Sciences 0 TO 5 hrs. Independent investigation that draws upon the professional experience and knowledge synthesis of the student. Students investigate a topic/problem in their field, write an article, and deliver an oral presentation. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): BHIS 499, 500, and 595; and consent of the instructor.

BHIS 598 Thesis Research in Biomedical and Health Information Sciences 0 TO 16 hrs. Independent research in one area of health informatics directed by a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): BHIS 499 and BHIS 500 and BHIS 595 and consent of the instructor.
Biomedical Visualization

**Biomedical Visualization**

**BVIS 400 Clinical Sciences for Biomedical Visualization**
2 hrs.
The application of neuroanatomy, genetics, immunology, imaging, and pharmacology to biomedical visualization. An introduction to visual information processing, visual perception, and related technology. Prerequisite(s): Graduate standing.

**BVIS 405 Anatomical Visualization**
3 hrs.
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(s): Graduate standing and consent of the instructor.

**BVIS 415 Computer Applications**
2 hrs.
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(s): Graduate standing and consent of the instructor.

**BVIS 420 Illustration Techniques**
3 hrs.
Introduction to line, continuous tone, and color-rendering techniques. Digital image creation and manipulation, color theory and design, print and electronic publication issues. Prerequisite(s): Graduate standing and BVIS 405 or consent of the instructor.

**BVIS 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. Prerequisite(s): Graduate standing and BVIS 405 or consent of the instructor.

**BVIS 440 Instructional Design**
2 hrs.
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(s): Graduate standing and consent of the instructor.

**BVIS 450 Graphic Design**
2 hrs.
Fundamentals of graphic design techniques and imagery production as applied to health science print media. Prerequisite(s): Graduate standing and one year of basic design courses.

**BVIS 460 3-D Model Design**
2 hrs.
Introduction to the biocommunicator's role in 3-D models, anatomical simulators, prosthetics, and healthcare exhibits. Exploration of materials and techniques for impression taking, sculpting, mold construction, and casting. Prerequisite(s): Graduate standing.

**BVIS 480 Business Practices**
2 hrs.
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(s): Graduate standing and consent of the instructor.

**BVIS 515 Advanced Graphic Design**
3 hrs.
Application of graphic design techniques to a simulated, multicomponent client project. Exploration of conceptualizing techniques and project management. Prerequisite(s): BVIS 450.

**BVIS 520 Advanced Imaging Applications**
3 hrs.
Instruction in advanced line imaging and visualization for patient education, editorial and product, and diagnostic image interpretation. Prerequisite(s): BVIS 420 or consent of the instructor.

**BVIS 525 Animation and Multimedia**
4 hrs.
Production experiences in selected biomedical communications specialties: electronic print media, multimedia, animation, and Web site design. Guest instructors with special expertise utilized wherever feasible. Prerequisite(s): BVIS 542 or consent of the instructor.

**BVIS 530 Surgical Illustration**
4 hrs.
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. Prerequisite(s): ANAT 441 and BVIS 420 and BVIS 430 and BVIS 440 and BVIS 450.

**BVIS 540 Computer Visualization**
4 hrs.
Construction of three-dimensional computer models of biological and anatomical structures using software models, 3-D input devices, and medical scans and data. Prerequisite(s): BVIS 415.

**BVIS 542 Computer Animation**
4 hrs.
Investigates principles of motion using computer animation techniques to solve contemporary problems in medical education and communication where motion can effectively be used. Involves production from concept to final presentation. Prerequisite(s): BVIS 415 and BVIS 540 and consent of instructor.

**BVIS 543 Computer Animation II**
4 hrs.
Builds on concepts introduced in BVIS 542. Further investigation of motion using computer animation techniques to solve contemporary problems in medical education and communication where motion can effectively be used. Prerequisite(s): BVIS 542 and consent of the instructor.

**BVIS 545 Computer-Based Multimedia**
4 hrs.
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 publications. Prerequisite(s): BVIS 415 and BVIS 440.

**BVIS 546 Virtual Reality and Stereography in Biomedical Visualization**
2 hrs.
Introduction to 3-D perception; digital 3-D model creation; 3-D presentation methods; computer configuration for 3-D display; virtual reality in medicine. Prerequisite(s): Consent of the instructor.

**BVIS 550 Simulators and Models**
2 hrs.
An extension of the principles learned in BVIS 460. Emphasis on materials research and problem solving strategies for complex 3-D projects. Prerequisite(s): BVIS 460.

**BVIS 554 Anaplastology Materials and Techniques**
2 hrs.
Hands-on experience with prosthetic materials and techniques. Emphasis on health and safety issues related to laboratory equipment and clinical procedures. Prerequisite(s): AHS 420 and ANAT 441 and BVIS 460.

**BVIS 555 Clinical Anaplastology**
4 hrs.
Concepts of prosthetic rehabilitation. Provision of facial/somatic prosthetic services in a multidisciplinary clinical setting requiring direct interaction with patients with disfigurements. Emphasis on prosthetic techniques and materials. Prerequisite(s): ANAT 441 and AHS 420 and BVIS 460 or consent of the instructor.

**BVIS 580 Practicum in Biomedical Visualization**
2 TO 12 hrs.
Field experience under supervision of a professional expert in a biomedical communication setting that is consistent with the student’s area of concentration and career goals. May be repeated. Prerequisite(s): Consent of the instructor.

**BVIS 594 Special Topics in Biomedical Visualization**
1 TO 4 hrs.
Selected topics in specialty areas of biomedical visualization, depending on sufficient student demand and faculty availability, such as pharmaceutical illustration and ocular prosthetic design. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

**BVIS 595 Seminar in Biomedical Visualization**
1 hour.
Topics of current interest in biomedical visualization. Includes discussion of current journal articles and important new developments in the field. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

**BVIS 596 Independent Study**
1 TO 4 hrs.
For students who wish to pursue independent study not related to their project research. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

**BVIS 597 Project Research**
0 TO 5 hrs.
Independent investigation that 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. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Foundation courses in research and statistics, or consent of instructor.

**BVIS 598 Research in Biomedical Visualization**
0 TO 16 hrs.
Independent research in biomedical visualization directed by a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Foundation courses in research and statistics, or consent of instructor.
## Biopharmaceutical Sciences

### BPS 423 Adverse Drug Reactions 2 hrs.
Attentive 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. Prerequisite(s): PHAR 403 and PHAR 404; or consent of the instructor.

### BPS 430 Principles of Toxicology 2 hrs.
Examines the toxic effects of drugs and chemicals on organism systems. Lectures emphasize basic principles, effects on specific organ systems, major classes of toxic chemicals, and specialized topics such as forensic and industrial toxicology. Same as PCOL 430. Credit is not given for BPS 430 if student has credit for EOHS 457.

### BPS 470 Clinical Pharmacology I 1 hour.
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. Open only to students with third-year professional standing in the Doctor of Pharmacy program or with graduate standing.

### BPS 471 Clinical Pharmacology II 1 hour.
Basic principles of clinical pharmacology applied to critical analysis of patient case histories in major disease states and FDA requirements. Prerequisite(s): BPS 470.

### BPS 480 Application of Science to the Law 4 hrs.
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. Same as CLJ 480. Prerequisite(s): CLJ 210 and CLJ 260; or graduate standing.

### BPS 494 Special Topics of Current Interest in Biopharmaceutical Sciences 1 TO 3 hrs.
Courses offered by faculty or a visiting lecturer on a current topic of selected interest. Topics are available on an experimental basis for one offering only. May be repeated to a maximum of 6 hours. Prerequisite(s): Consent of the instructor; good academic standing as defined by UIC policies.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPS 501 Biopharmaceutical Sciences I</td>
<td>First part of the fundamental didactic core courses in biopharmaceutical sciences, including fundamental principles of pharmacokinetics, pharmacodynamics, scientific ethics, and research design. Prerequisite(s): Graduate standing in the Biopharmaceutical Sciences program; or approval of the department.</td>
<td>4 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 502 Biopharmaceutical Sciences II</td>
<td>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. Prerequisite(s): BPS 501; and graduate standing in the Biopharmaceutical Sciences program; or approval of the department.</td>
<td>4 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 503 Laboratory Techniques in Biopharmaceutical Sciences</td>
<td>Laboratory-based core course in methods and techniques employed in biopharmaceutical sciences research. Credit is not given for BPS 503 if the student has credit for PMPD 500. Prerequisite(s): BPS 502; or consent of the instructor.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 506 Industrial Experience</td>
<td>Recommended to graduate students with no industrial experience. Students spend time working in the pharmaceutical, imaging, or cosmetic industry under academic supervision to obtain practical experience. Satisfactory/Unsatisfactory grading only.</td>
<td>4 TO 10 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 507 Drug Discovery, Design, and Development</td>
<td>Overview of drug development process from target identification and screening through clinical trials and FDA evaluation. Same as MDCH 507 and PMPG 507.</td>
<td>3 hrs.</td>
<td>MATH 320; or consent of the instructor.</td>
</tr>
<tr>
<td>BPS 510 Principles of Interfacial Phenomena</td>
<td>Quantitative and theoretical principles of physical and chemical sciences as applied to pharmacy. Thermodynamics, kinetics, and colloid and surface chemistry in evaluation of pharmaceutical formulations. Prerequisite(s): MATH 480.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 515 Dissolution and Bioavailability of Dosage Forms</td>
<td>First part of the fundamental didactic core courses in biopharmaceutical sciences, including fundamental principles of pharmacokinetics, pharmacodynamics, scientific ethics, and research design. Prerequisite(s): Graduate standing in the Biopharmaceutical Sciences program; or approval of the department.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 518 Controlled Drug Delivery</td>
<td>Controlled drug delivery systems utilizing polymers, synthesis of different types of devices, and the delivery expected from these devices, and mathematical modeling of delivery systems. Same as BIOE 518. Prerequisite(s): MATH 220 or approval of the department.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 520 Lipid-Based Drug Delivery Systems</td>
<td>The preparation, characterization, stability, pharmacological, cosmetic, and diagnostic applications of lipid-based drug delivery systems, including liposomes, micelles, and emulsions prepared with phospholipids. Prerequisite(s): Consent of the instructor.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 522 Principles of Polymer Science and Engineering</td>
<td>Intermediate polymer science, thermodynamics of polymer solutions, phase separations, MW determination, crystallization, elasticity, kinetics, and processing. Same as BIOE 522. Prerequisite(s): MATH 220 or consent of the instructor.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 529 Biopharmaceutical Sciences Research Rotation</td>
<td>Research rotation course in which first-year students from the BPS program will undertake projects in laboratories affiliated with this program. May be repeated to a maximum of 9 hours. Animals used in instruction. Prerequisite(s): Consent of the instructor.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 530 Principles of Interfacial Phenomena</td>
<td>Quantitative and theoretical principles of physical and chemical sciences as applied to pharmacy. Thermodynamics, kinetics, and colloid and surface chemistry in evaluation of pharmaceutical formulations. Prerequisite(s): MATH 480.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 539 Applied Biopharmaceutical Sciences Research</td>
<td>Research rotation course in which first-year students from the BPS program will undertake projects in laboratories affiliated with this program. May be repeated to a maximum of 9 hours. Animals used in instruction. Prerequisite(s): Consent of the instructor.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 540 Topics in Adverse Drug Reactions</td>
<td>Advanced treatment of current adverse drug reaction incidents, involving evaluation of the issues. Prerequisite(s): Consent of the instructor.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 541 Pharmacodynamics of Substance Abuse</td>
<td>Examines the mechanisms of action, responses, pharmacokinetics, and dependence factors of substance abuse. Emphasis will be placed on research strategies in studying the biological aspects of drug abuse. Prerequisite(s): Consent of the instructor and a course in basic pharmacology.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
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<tr>
<td>BPS 543 Psychopharmacology</td>
<td>The interactions between the immune system, the endocrine system, and the central nervous system, specifically as they relate to stress and immunity.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 544 Immunotoxicology</td>
<td>Basic mechanisms of toxicologic responses to drug and chemicals due to immediate and delayed hypersensitivity reactions. Emphasis on laboratory methods used in the study of immunotoxicology. Prerequisite(s): Consent of the instructor.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 545 Advanced Pharmacokinetics</td>
<td>Kinetics of absorption, distribution, metabolism, and excretion of drugs; factors affecting these kinetics and their relationship to pharmacodynamics. Prerequisite(s): Consent of the instructor.</td>
<td>3 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 551 Pharmacological Basis of Therapeutics I</td>
<td>Pharmacological basis of drugs for the treatment of diseases, including cancer and conditions, including inflammation, of the nervous and gastrointestinal systems. Prerequisite(s): Credit or concurrent registration in BCHE 460 and BPS 562; or approval of the department.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 552 Pharmacological Basis of Therapeutics II</td>
<td>Pharmacological basis of drugs for the treatment of diseases, including cancer and conditions, including inflammation, of the cardiovascular, renal, and endocrine systems. Prerequisite(s): BPS 551; or approval of the department.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
<tr>
<td>BPS 553 Cancer Biology and Therapeutics</td>
<td>Fundamentals of cancer biology with emphasis on biological, hormonal, and chemotherapeutic drug therapies currently used and in development. Specific treatment approaches to breast, ovarian, prostate, and colon cancers will be explored. Same as MDCH 553 and PMPG 553. Prerequisite(s): Consent of the instructor. Recommended background: Molecular and cellular biology.</td>
<td>2 hrs.</td>
<td>PHAR 323; or approval of the department.</td>
</tr>
</tbody>
</table>
BPS 555 Principles of Pharmacogenomics 2 hrs. Concept and application of pharmacogenomics in disease diagnosis, prevention, and treatment. Prerequisite(s): BPS 502 or consent of the instructor.

BPS 580 Forensic Science: Survey and Foundations 2 hrs. Survey course for forensic sciences with emphasis on criminalistics; unique characteristics, underlying philosophies; nature, analytical methods, significance of results with chemical, biological, trace, and pattern evidence. Same as CIJ 580. Prerequisite(s): Approval of the department.

BPS 581 Forensic Analysis of Biological Evidence 4 hrs. Forensic blood and physiological fluid identification; DNA typing of biological evidence; report writing; expert testimony. Prerequisite(s): Consent of the instructor.

BPS 582 Forensic Chemistry and Trace Evidence Analysis 4 hrs. Trace evidence: hair, fibers, glass, soil, paint, and miscellaneous; nature, chemical, instrumental, and microscopic methods of analysis; interpretation and significance of trace similarities; expert testimony. Prerequisite(s): Consent of the director of graduate studies.

BPS 583 Physical Pattern Evidence Analysis 4 hrs. Pattern evidence: individualization, reconstruction; fingerprint classification; questioned documents; handwriting comparison; firearms and toolmarks comparisons; scene patterns and reconstruction will be studied in-depth. Prerequisite(s): Consent of the instructor.

BPS 584 Forensic Drug Analysis and Toxicology 4 hrs. 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(s): Consent of the instructor.

BPS 586 Topics in Specialty Forensic Examinations 1 TO 4 hrs. 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. May be repeated if topics vary. Students must register in more than one section per term. Prerequisite(s): BPS 581 or BPS 582 or BPS 583 or BPS 584; and consent of the instructor. Students must have credit in the Forensic Science program core course that covers the specific topic.

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

BPS 589 Special Topics in Forensic Science 3 hrs. 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. Same as CIJ 589. May be repeated if topics vary. Prerequisite(s): Consent of the instructor.

BPS 590 Forensic Science Residency 1 TO 8 hrs. In-depth training for casework analysis in a specific forensic discipline (e.g., drug identification, DNA typing, fingerprints) in an approved forensic science laboratory. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 24 hours. Prerequisite(s): BPS 581 or BPS 582 or BPS 583 or BPS 584; and consent of the instructor. Students must have credit in the Forensic Science program core course that covers the specific topic.

BPS 591 Topics in Forensic Microscopy 1 TO 4 hrs. Topic may vary but will revolve around microscopic characterization of various materials, with emphasis on forensic laboratory methods and approaches, and interpretation of materials comparisons as evidence. May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): BPS 582 and consent of the instructor.

BPS 592 Forensic Science Internship 2 TO 4 hrs. 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. May be repeated to a maximum of 4 hours. Students may register in more than one section per term. Prerequisite(s): BPS 580; and consent of the instructor and a minimum of 15 hours of credit earned in the MS in Forensic Science program.

BPS 593 Research in Biopharmaceutical Sciences 0 TO 16 hrs. Research in biopharmaceutical sciences with the guidance of a faculty mentor. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BPS 594 Special Topics in Biopharmaceutical Sciences 1 TO 4 hrs. Content varies. Special topics in biopharmaceutical sciences not covered in regular core or elective offerings. May be repeated to a maximum of 4 hours if topics vary. Prerequisite(s): Consent of the instructor.

BPS 595 Departmental Seminar 1 TO 2 hrs. Weekly seminar series covering current and experimental techniques in biopharmaceutical sciences. Also consists of journal club at which students will present an article once a year. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BPS 596 Independent Study in Forensic Science 1 TO 8 hrs. Supervised projects may consist of extensive reading or laboratory work, or both, on topics not covered in regular course offerings. Research undertaken for this course may not duplicate that being done for BPS 597 or BPS 598. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

BPS 597 Forensic Science Project Research 3 hrs. Supervised research in forensic science; a research project to be designed and completed within one semester. Satisfactory/Unsatisfactory grading only. Prerequisite(s): BPS 580; 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 and consent of the instructor.

BPS 598 MS Thesis Research 0 TO 16 hrs. For students doing MS thesis research or thesis writing. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 10 hours. A minimum of 36 hours is required. Prerequisite(s): Consent of the instructor.

BPS 599 Dissertation Research 0 TO 16 hrs. PhD thesis research. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

BPS 586 Biostatistics 4 hrs. Descriptive statistics, basic probability concepts, one- and two-sample statistical inference, analysis of variance, and simple linear regression. Introduction to statistical data analysis software. Enrollment restricted to public health students and healthcare administration students; other graduate, professional, and advanced undergraduate students admitted by consent as space permits. To obtain consent, see the SPH registrars.

BPS 401 Biostatistics I 4 hrs. Simple and multiple linear regression, stepwise regression, multifactor analysis of variance and covariance, nonparametric methods, logistic regression, and analysis of categorical data; extensive use of computer software. Prerequisite(s): BSTT 400.

BPS 494 Introduction to Biostatistics 1 TO 4 hrs. Special topics in biostatistics. Content varies. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BSTT 505 Logistic Regression and Survival Analysis 2 hrs. Interpretation of logistic regression and survival analysis models. Running logistic and proportional hazards regression models and constructing life-tables using SAS. Previously listed as BSTT 402. Prerequisite(s): BSTT 400 and BSTT 401.

BSTT 506 Design of Clinical Trials 3 hrs. Rationale for clinical trials, blinding, ethical issues, methods of randomization, crossover trials, power and sample size calculations, data management, protocol development, data analysis, and interim analysis. Previously listed as BSTT 430. Prerequisite(s): BSTT 400 and BSTT 401.
BSTT 507 Sampling and Estimation Methods Applied to Public Health 3 hrs.
The purpose of this course is to provide a comprehensive overview of current methods and issues in survey sample design and associated estimation procedures. Previously listed as BSTT 440. Credit is not given for BSTT 507 if the student has credit in STAT 431. Restriction applies only to certification for students pursuing the Interdepartmental Graduate Concentration in Survey Methodology. Prerequisite(s): BSTT 401 or BSTT 523 or consent of the instructor.

BSTT 521 Applied Multivariate Analysis 3 hrs.
Analysis of vector of responses; MANOVA, data reduction methods; introduction to cluster analysis, discriminant analysis, and structural equation models. Prerequisite(s): BSTT 537 and consent of the instructor.

BSTT 523 Biostatistics Methods I 4 hrs.
Foundations for and introduction to statistical inference, including one- and two-sample problems; regression analysis, including multiple regression and indicator variables. Previously listed as BSTT 502. Prerequisite(s): College calculus, including multivariable calculus, concurrent registration in BSTT 524, and consent of the instructor.

BSTT 524 Biostatistics Laboratory 2 hrs.
Use of spreadsheets for statistical investigations; use of statistical software; matrix theory, including methods relevant in biostatistical analysis. Previously listed as BSTT 503. Prerequisite(s): Concurrent registration in BSTT 523 and consent of the instructor.

BSTT 525 Biostatistics Methods II 4 hrs.
Analysis of variance and multiple comparisons; model building and diagnostics; generalized linear models; logistic and Poisson regression; introduction to repeated measures and mixed models. Previously listed as BSTT 504. Prerequisite(s): Grade of B or better in BSTT 523 and Grade of B or better in BSTT 524, or consent of the instructor.

BSTT 535 Categorical Data Analysis 3 hrs.
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. Previously listed as BSTT 511. Prerequisite(s): Grade of B or better in BSTT 525; and STAT 411, or consent of the instructor.

BSTT 536 Survival Analysis 3 hrs.
Concepts of lifetime or survival distributions, especially censored data; nonparametric estimation of the survival function; rank tests; proportional hazards regression models; parametric models. Previously listed as BSTT 512. Prerequisite(s): Grade of B or better in BSTT 525 and grade of B or better in STAT 411, or consent of the instructor.

BSTT 537 Longitudinal Data Analysis 4 hrs.
Application and theory of models for longitudinal data analysis for both continuous and categorical response data, including use of statistical software for these methods. Previously listed as BSTT 513. Prerequisite(s): Grade of B or better in STAT 411 and Grade of B or better in BSTT 525, or consent of the instructor.

BSTT 538 Biostatistical Consulting 2 hrs.
Discussion of techniques required for successful biostatistical consultation; effective communication, problem formulation, data analysis, oral and written reports, supervised consulting experience. Previously listed as BSTT 514. Prerequisite(s): Grade of B or better in BSTT 525 and consent of the instructor. Restricted to students enrolled in the Biostatistics major.

BSTT 550 Biostatistical Investigations 4 hrs.
Analysis of several large data sets that will require integration of numerous biostatistical tools: written summarization and discussion of results. Previously listed as BSTT 522. Prerequisite(s): Grade of B or better in BSTT 535 and grade of B or better in BSTT 536 and grade of B or better in BSTT 537 and grade of B or better in BSTT 538 and grade of B or better in concurrent registration in BSTT 521.

BSTT 560 Large Sample Theory 2 hrs.
Deriving and applying large sample statistical theories. The primary focus will be in limit theorems and their applications in biostatistical problems. Meets eight weeks of the semester. Previously listed as BSTT 534. Prerequisite(s): Open only to PhD degree students; or consent of the instructor. Adequate training at the level of intermediate mathematical statistics. Master’s degree in Biostatistics or Mathematics.

BSTT 561 Advanced Statistical Inference 3 hrs.
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. Previously listed as BSTT 531. Prerequisite(s): Open only to PhD degree students; and consent of the instructor. Recommended background: MS degree in Biostatistics or the equivalent.

BSTT 562 Linear Models 4 hrs.
Generalized inverse matrices; distributions for quadratic forms; estimability and testable hypotheses; constrained linear model; applications to regression, ANOVA, ANCOVA models; variance component models. Previously listed as BSTT 533. Prerequisite(s): Open only to PhD degree students; or consent of the instructor. Recommended background: MS degree in Biostatistics or the equivalent.

BSTT 563 Generalized Linear Models 4 hrs.
Teaches students the components of generalized linear models and their extensions. Previously listed as BSTT 541. Prerequisite(s): BSTT 561 and concurrent registration in or prior completion of BSTT 560. Open only to PhD degree students; or consent of the instructor. Adequate training at level of intermediate mathematical statistics. Master’s degree in Biostatistics, Mathematical Statistics, or Mathematics.

BSTT 564 Missing Data 4 hrs.
Students will learn the statistical methods used for analyzing data with missing values. Previously listed as BSTT 542. Prerequisite(s): BSTT 561 and concurrent registration in or prior completion of BSTT 560. Open only to PhD degree students; or consent of the instructor. Adequate training at level of intermediate mathematical statistics. Master’s degree in Biostatistics, Mathematical Statistics, or Mathematics.

BSTT 565 Computational Statistics 4 hrs.
Developing a broad and thorough working knowledge of modern statistical computing and computational statistics on a practical, conceptual, philosophical, and mathematical level. Previously listed as BSTT 543. Extensive computer use required. Prerequisite(s): Concurrent registration in or prior completion of BSTT 560. Open only to PhD degree students; or consent of the instructor. Adequate training at level of intermediate mathematical statistics. Master’s degree in Biostatistics, Mathematical Statistics, or Mathematics.

BSTT 566 Bayesian Methods 4 hrs.
Developing a broad and thorough working knowledge of Bayesian applications on a practical, conceptual, philosophical, and mathematical level. Previously listed as BSTT 544. Prerequisite(s): Concurrent registration in or prior completion of BSTT 560. Open only to PhD degree students; or consent of the instructor. Adequate training at level of intermediate mathematical statistics. Master’s degree in Biostatistics, Mathematical Statistics, or Mathematics.

BSTT 567 Advanced Survival Analysis 4 hrs.
Methods of analysis for multivariate survival data, including transition models and shared frailty models. Theory behind existing methodology is covered as well as implementation. Prerequisite(s): Grade of B or better or concurrent registration in BSTT 536 and consent of the instructor. Recommended background: Intended for students in the Biostatistics PhD program.

BSTT 568 Biostatistics 1 TO 4 hrs.
Advanced special topics. Content varies. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BSTT 569 Biostatistics Research Seminar 1 hour.
Current developments in theory and application of biostatistics and epidemiology with presentations by faculty and visiting scientists. Satisfactory/Unsatisfactory grading only. May be repeated.
Business Administration

BA 495 Business Strategy 3 hrs.
Strategic management and business policy formulation and implementation. Students will utilize knowledge from all functional areas of business to formulate business strategy and implementation plans through case analysis (may include simulation). Extensive computer use required.
Prerequisite(s): ACCT 210 and ACCT 211 and BA 200 and ECON 218 and IDS 200 and IDS 270; and IDS 355 and FIN 300 and MGMT 340 and MGMT 350 and MKTG 360; and senior standing or above.

BA 589 Corporate Business Internship Program 0 TO 3 hrs.
Corporate business internship provides graduate students an opportunity to gain practical work experience in their field of study and to test their career choice. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 6 hours. No graduation credit for students in the following: MS in Accounting or MS in Management Information Systems.
Prerequisite(s): 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.

BA 594 Special Topics in Business Administration 1 TO 4 hrs.
An intensive study of a selected topic in business administration. Topics vary by section and by term. May be repeated to a maximum of 16 hours if topics vary. Students may register in more than one section per term.
Prerequisite(s): Consent of the graduate business program advisor.

Campus Courses

CC 400 Urbana Registration 0 TO 16 hrs.
Special course created to represent Urbana registration for upper-division undergraduate and graduate students pursuing a degree on the Chicago campus. Facilitates proper UIC assessment, application of financial aid awards, and registration. Satisfactory/Unsatisfactory grading only. May be repeated. No graduation credit.

CC 401 Springfield Registration 0 TO 16 hrs.
Special course created to represent Springfield registration for upper-division undergraduate and graduate students pursuing a degree on the Chicago campus. Facilitates proper UIC assessment, application of financial aid awards, and registration. Satisfactory/Unsatisfactory grading only. May be repeated. No graduation credit.

Chemical Engineering

CHE 410 Transport Phenomena 3 OR 4 hrs.
Continuum theory of momentum, energy, and mass transfer. Viscous behavior of fluids. Laminar and turbulent flow. Thermal conduction and convection, diffusion, and coupled operations. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): CHE 312 or consent of the instructor.

CHE 413 Introduction to Flow in Porous Media 3 OR 4 hrs.
Theoretical modeling of single- and multiphase flow in porous media. Darcy’s law and relative permeabilities. Oil production and hydrology. Capillary phenomena. Dispersion and miscible displacement. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): CHE 312 or consent of the instructor.

CHE 421 Combustion Engineering 3 OR 4 hrs.

CHE 422 Biochemical Engineering 3 OR 4 hrs.
Enzyme-catalyzed and microbially mediated processes. Free and immobilized enzymes. Batch and continuous cell cultures. Transport phenomena in microbial systems and fermentation processes. Design of biological reactors. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Consent of the instructor.

CHE 423 Catalytic Reaction Engineering 3 OR 4 hrs.
Catalytic reactions which occur under conditions for which heat and mass transfer cannot be neglected are considered. Includes porosity, surface area measurements, and catalytic deactivation. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): CHE 321 or consent of the instructor.

CHE 431 Numerical Methods in Chemical Engineering 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Graduate or advanced undergraduate standing.

CHE 438 Computational Molecular Modeling 3 OR 4 hrs.
Provides students with a fundamental understanding of the methods, capabilities, and limitations of molecular simulations. 3 undergraduate hours, 4 graduate hours. Extensive computer use required. Prerequisite(s): CHE 301. Recommended background: Engineering/science.

CHE 440 Non-Newtonian Fluids 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): CHE 410 or consent of the instructor.

CHE 441 Computer Applications in Chemical Engineering 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): CHE 301 or equivalent.

CHE 445 Mathematical Methods in Chemical Engineering 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): MATH 220 or the equivalent.

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

CHE 456 Fundamentals and Design of Microelectronics Processes 3 OR 4 hrs.
Design and practical aspects of the most advanced state of micro- and nanoelectronics processing with emphasis on lithography and etching with thermodynamics, kinetics, reactor design, and optimization. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Graduate standing or consent of the instructor. Recommended background: Engineering/science.

CHE 494 Selected Topics in Chemical Engineering 1 TO 4 hrs.
Systematic study of selected topics in chemical engineering theory and practice. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

CHE 501 Advanced Thermodynamics 4 hrs.

CHE 502 Fluid Phase Equilibria 4 hrs.
Application molecular theories of fluids to phase equilibrium systems. Intermolecular potentials, partition functions, correlation functions, chemical potentials, fugacity, and activity coefficient and their relationships. Prerequisite(s): CHE 301 or equivalent.

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

CHE 505 Advanced Statistical Thermodynamics 4 hrs.
CHE 510  Separation Processes  4 hrs.  Advanced coverage of equilibrium stage separation.  Multicomponent separation and distillation; unsteady state adsorption processes.  Separation efficiencies and energy requirements.  Prerequisite(s): CHE 410.


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

CHE 514  Biotransport  4 hrs.  Diffusion and flow in living systems.  Blood rheology and flow, microcirculation, oxygen transport, diffusive transport across membranes.  Membrane structure, water, ion flows, and active transport.  Same as BIOE 514.  Prerequisite(s): CHE 410 or consent of the instructor.

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


CHE 592  Specialized Problems  4 TO 8 hrs.  Special problems under faculty supervision.  Prerequisite(s): Consent of the instructor.

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

CHE 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(s): Same as CHE 575.  Prerequisite(s): CHE 410 and CHE 445 or consent of the instructor.

CHE 597  Project Research  0 TO 4 hrs.  A research design or reading project approved by the committee appointed by the director of graduate studies.  Satisfactory/ Unsatisfactory grading only.  May be repeated.  Prerequisite(s): Consent of the instructor.  Recommended background: Completed required classes in curriculum.

CHE 598  MS Thesis Preparation  0 TO 16 hrs.  Individual research in specialized problems under faculty supervision.  Satisfactory/ Unsatisfactory grading only.  May be repeated.  Prerequisite(s): Consent of the instructor.

CHE 599  PhD Thesis Preparation  0 TO 16 hrs.  Individual research in specialized problems under faculty supervision.  Satisfactory/ Unsatisfactory grading only.  May be repeated.  Prerequisite(s): Consent of the instructor.

CHEM 402  Chemical Information Systems  2 hrs.  Introduction to chemical information, including the use of databases for searching chemical information and the use of molecular modeling and related computational systems to determine calculated properties of chemical substances.  Previously listed as CHEM 302.  Prerequisite(s): Grade of C or better in CHEM 234 or consent of the instructor.

CHEM 414  Advanced Inorganic Chemistry  2 OR 3 hrs.  Introduction to the principles of inorganic chemistry.  Structural and descriptive chemistry of the main-group elements.  2 undergraduate hours; 3 graduate hours.  Prerequisite(s): Grade of C or better in CHEM 314; and grade of C or better in CHEM 340 or grade of C or better in CHEM 342; or consent of the instructor.

CHEM 415  Inorganic Chemistry Laboratory  0 TO 4 hrs.  Advanced inorganic chemistry laboratory.  Preparative methods.  Schlenk techniques, dry box, Fourier-transform infrared and UV-visible spectroscopy, crystal growth.  3 undergraduate hours; 4 graduate hours.  Prerequisite(s): Grade of C or better in CHEM 314.

CHEM 416  Inorganic Chemistry II  3 OR 4 hrs.  Structural and descriptive chemistry of the transition elements.  3 undergraduate hours; 4 graduate hours.  Prerequisite(s): CHEM 415.  Prerequisite(s): BIOS 452 or CHEM 452.

CHEM 421  Instrumental Analysis  4 hrs.  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.  Prerequisite(s): Grade of C or better in CHEM 222 and CHEM 242.

CHEM 432  Advanced Organic Chemistry  2 OR 3 hrs.  Rigorous treatment of the principles upon which modern organic chemistry is developed.  2 undergraduate hours; 3 graduate hours.  Prerequisite(s): Grade of C or better in CHEM 333; and grade of C or better in CHEM 340 or grade of C or better in CHEM 342.

CHEM 444  Advanced Physical Chemistry  2 OR 3 hrs.  Application of quantum mechanics to molecular spectroscopy, statistical mechanics, and activated complex theory.  2 undergraduate hours; 3 graduate hours.  Prerequisite(s): Grade of C or better in CHEM 346.

CHEM 448  Statistical Thermodynamics  3 OR 4 hrs.  Introduction to statistical mechanics, partition functions, chemical equilibrium, ensembles, fluctuations, real gases, Einstein and Debye models of solids, magnetic materials, electrolytes, and introduction to liquids.  3 undergraduate hours; 4 graduate hours.  Prerequisite(s): CHEM 346.

CHEM 452  Biochemistry I  4 hrs.  Chemistry of proteins, nucleic acids, carbohydrates, and lipids.  Same as BIOS 452.  Prerequisite(s): Credit or consent registration in CHEM 234.

CHEM 454  Biochemistry II  4 hrs.  Continues CHEM 452.  Carbohydrate and lipid metabolism, electron transport.  Metabolism of amino acids, nucleic acids, proteins.  Biosynthesis of macromolecules and regulation of macromolecular synthesis.  Same as BIOS 454.  Prerequisite(s): BIOS 452 or CHEM 452.

CHEM 455  Biochemistry Laboratory  3 hrs.  Introduction to modern biochemistry and molecular biology research.  Includes recombinant DNA techniques, protein purification, site-directed mutagenesis, polymerase chain reaction, enzyme kinetics, protein structure data analysis, and molecular graphics.  Prerequisite(s): CHEM 222 and CHEM 452.

CHEM 456  Natural Products  3 OR 4 hrs.  Biogenetic approach to secondary metabolites.  General principles and selected studies of phenolic compounds, terpenes, alkaloids, and other interesting natural products.  Same as BIOS 416.  3 undergraduate hours.  4 graduate hours.  Prerequisite(s): One year of organic chemistry.

CHEM 470  Educational Practice with Seminar I  6 hrs.  The first half of a two-semester sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve.  Graduate credit only with approval of the department.  Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.
CHEM 471 Educational Practice with Seminar II 6 hrs.
The second half of a two-semester sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.

CHEM 472 Teaching Methods in Chemistry 2 OR 3 hrs.
A course in the methods of teaching high school chemistry, including the integration of technology, 2 undergraduate hours, 3 graduate hours. Extensive computer use required. Prerequisite(s): 24 semester hours of undergraduate chemistry, including two semesters of laboratory chemistry. Recommended background: ED 218

CHEM 474 Teaching Chemistry in High Schools 1 hour.
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. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.

CHEM 488 Cooperative Chemistry Practice 1 hour.
Off-campus participation in a governmental or industrial training program. Credit is contingent on the submission of a final report. Satisfactory/Unsatisfactory grading only. May be repeated. A maximum of 6 hours of CHEM 488, CHEM 492, and CHEM 499 combined may be credited toward departmental undergraduate degree course requirements. Prerequisite(s): Concurrent registration in LAS 289 or consent of the instructor.

CHEM 492 Independent Study 1 TO 2 hrs.
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. Satisfactory/Unsatisfactory grading only. May be repeated. A maximum of 6 hours of CHEM 488, CHEM 492, and CHEM 499 combined may be credited toward departmental undergraduate degree course requirements. Prerequisite(s): 2.50 grade point average in science courses and consent of the instructor.

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

CHEM 499 Supervised Research 3 hrs.
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. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 6 hours. A maximum of 6 hours of CHEM 488, CHEM 492, and CHEM 499 combined may be credited toward departmental undergraduate degree course requirements. Prerequisite(s): Junior standing or above, approval of the department, consent of the instructor, and a grade point average of 2.50 in science courses; or graduate standing. Recommended background: Credit in CHEM 333 or CHEM 314.

CHEM 500 Faculty Research 1 hour.
Mandatory for first-year students. Faculty present their research interests to new graduate students. Satisfactory/Unsatisfactory grading only.

CHEM 510 Literature Seminar in Inorganic Chemistry 1 hour.
Discussion of inorganic research from the current literature. Emphasis on student presentations. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Graduate standing or consent of the instructor.

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

CHEM 516 Advanced Inorganic Chemistry II 4 hrs.
Structural and descriptive chemistry of the transition elements: spectroscopy and magnetism. Prerequisite(s): CHEM 416 or the equivalent.

CHEM 517 Organometallic Chemistry 4 hrs.
The fundamental and basic principles of the structure and reactivity of transition metal complexes towards organic molecules. Prerequisite(s): CHEM 452 or the equivalent, and credit or concurrent registration in CHEM 532.

CHEM 518 Advanced Inorganic Chemistry III 4 hrs.
Physical chemistry, structure, bonding, and properties of solid-state materials. Prerequisite(s): CHEM 416 or the equivalent or consent of the instructor.

CHEM 519 Special Topics in Inorganic Chemistry 3 TO 4 hrs.
Lectures on topics not represented in regularly scheduled courses. May be repeated. Prerequisite(s): Graduate standing or consent of instructor.

CHEM 520 Literature Seminar in Analytical Chemistry 1 hour.
Discussion of analytical chemical research from the current literature. Emphasis upon student presentations. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

CHEM 521 Spectroscopy in Analytical Chemistry 1 hour.
Introduction to advanced organic chemistry, drawing molecules and mechanisms, FMO theory, stereochemistry, conformational analysis, stereoelectronic effects, selected functional group interconversions. Some computer use will be required. Prerequisite(s): CHEM 234 or the equivalent.

CHEM 522 Techniques in Mass Spectrometry and Surface Analysis 4 hrs.
Various methods in mass spectrometry. Nonoptical applied surface analysis including X-ray photoelectron spectroscopy, Auger spectroscopy, and scanning probe microscopy. Instrumentation, applications, and data analysis. Prerequisite(s): CHEM 421 or the equivalent.

CHEM 524 Optical Spectroscopies in Analytical Chemistry 4 hrs.
Theory and experimental methods in infrared, ultraviolet, and visible spectroscopies, both absorption and emission. Prerequisite(s): CHEM 346 and CHEM 421; or consent of the instructor.

CHEM 526 NMR Spectroscopy in Analytical Chemistry 4 hrs.
Principles governing one- and multidimensional nuclear magnetic resonance (NMR) spectroscopy; applications of NMR to chemical analysis. Prerequisite(s): CHEM 346 and CHEM 421; or the equivalent or consent of the instructor.

CHEM 528 Chemical Separations 4 hrs.
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(s): CHEM 421; or approval of the department.

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

CHEM 530 Literature Seminar in Organic Chemistry 1 hour.
Discussion of organic chemical research from the current literature. Emphasis upon student presentations. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

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

CHEM 532 Advanced Organic Chemistry I 4 hrs.
Introduction to advanced organic chemistry, drawing molecules and mechanisms, FMO theory, stereochemistry, conformational analysis, stereoelectronic effects, selected functional group interconversions. Some computer use will be required. Prerequisite(s): CHEM 432 or the equivalent.

CHEM 533 Advanced Organic Chemistry II 4 hrs.
Continues CHEM 532. Chemical literature, chemical bonding, pericyclic reactions, physical organic chemistry, reactive intermediates, organic reaction mechanisms with an emphasis on physical principles. Prerequisite(s): CHEM 532 or the equivalent.

CHEM 534 Advanced Organic Chemistry III 4 hrs.
Continues CHEM 533. The major reactions in organic chemistry and their uses in organic synthesis. Prerequisite(s): CHEM 533 or the equivalent.

CHEM 535 Advanced Synthetic Chemistry 4 hrs.
Topics include: control of stereochemistry (cyclic and acyclic), synthesis of complex natural and unnatural products (such as alkaloids, terpenes), and new methodologies. Prerequisite(s): CHEM 533.
CHEM 536 Physical Organic Chemistry 4 hrs. Theoretical and experimental methods of studying reaction mechanisms, with an emphasis on kinetic methods and linear free energy correlations. Prerequisite(s): CHEM 533 or consent of the instructor.

CHEM 539 Special Topics in Organic Chemistry 3 TO 4 hrs. Discussion of topics of current interest. May be repeated. Students may register in more than one section per term. Prerequisite(s): CHEM 533.

CHEM 540 Current Problems in Physical Chemistry 1 hour. 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. Satisfactory/Unsatisfactory grading only.

CHEM 542 Quantum Mechanics 4 hrs. Exact solutions of the Schrödinger equation for simple systems; variational principle and perturbation theory; many-electron atoms and diatomic molecules and their electronic structures; angular momentum. Prerequisite(s): CHEM 436 or the equivalent.


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

CHEM 549 Special Topics in Physical Chemistry 3 TO 4 hrs. Lectures and readings in areas not normally treated in standard courses. Discussion of topics of current interest in physical chemistry. Prerequisite(s): Consent of the instructor.

CHEM 550 Literature Seminar in Biochemistry 1 hour. Presentation of student papers on current research topics in biochemistry. Satisfactory/Unsatisfactory grading only.

CHEM 551 Advanced Biochemistry I 4 hrs. Basic and current topics on proteins, including protein structure, protein stability, protein folding and misfolding, and proteomics. Prerequisite(s): CHEM 454, and CHEM 546 or CHEM 344.

CHEM 552 Chemical Biology 4 hrs. Major trends and recent developments in research at the interface of chemistry and biology. Same as BIOS 552.

CHEM 554 Bioorganic Chemistry 4 hrs. 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(s): CHEM 415 or CHEM 452.

CHEM 555 Advanced Biochemistry II 4 hrs. The structure of nucleic acids and the role and processing of nucleic acids in various aspects of genetic regulation. Prerequisite(s): CHEM 454.

CHEM 558 Biophysical Chemistry 4 hrs. The role of molecular interactions in determining the structure and function of complex biological systems, and the use of modern experimental techniques to study these interactions and systems. Prerequisite(s): CHEM 452 or consent of the instructor.

CHEM 559 Special Topics in Biochemistry 3 TO 4 hrs. Selected topics of current interest in biochemistry. Same as BIOS 559. May be repeated. Students may register in more than one section per term. Prerequisite(s): CHEM 454 or BIOS 454 or consent of the instructor.

CHEM 572 Teaching Methods in Chemistry 3 hrs. Special problems and techniques, including audio-visual methods, lecture demonstrations, the use of computers, and the design of experiments. May be repeated. A maximum of 3 hours may be credited toward departmental course requirements for the MS or Ph.D. in Chemistry. Prerequisite(s): Approval of the department.

CHEM 590 Current Problems in Chemical Research 2 hrs. In-depth discussion and analysis of selective aspects of contemporary research with particular emphasis on research carried out in the department. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of instructor.

CHEM 598 Master’s Thesis Research 0 TO 16 hrs. Master’s thesis work under the supervision of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.

CHEM 599 PhD Thesis Research 0 TO 16 hrs. PhD thesis work under the supervision of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.

Civil and Materials Engineering

CME 400 Advanced Design of Reinforced Concrete Structures 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 301 or the equivalent.

CME 401 Advanced Design of Metal Structures 3 OR 4 hrs. Plate girders; unsymmetrical bending; torsion of thin-walled structures; lateral-torsional instability; composite construction. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 301.

CME 402 Geometric Design of Highway Facilities 3 OR 4 hrs. Elements of geometric design. Driver, vehicle, and roadway system characteristics. Horizontal and vertical alignment design. Intersection design and operation. Capacity and level of service. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 302.

CME 403 Hydraulic Design 3 OR 4 hrs. Selected applications of hydraulics and hydrology; pipe, pipe network, and water distribution system design; unsteady pipe flow; open channel design; storm water engineering. 3 undergraduate hours. 4 graduate hours. CME 315.

CME 405 Foundation Analysis and Design 3 TO 4 hrs. Site characterization; analysis and design of shallow foundations, deep foundations and earth retaining structures; foundations on difficult soils; effects of construction; instrumentation and monitoring. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 315.

CME 406 Bridge Design 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 301 and CME 310.

CME 407 Soil and Site Improvement Methods 3 OR 4 hrs. Compaction, preloading, vertical drains, grouting, admixture stabilization, thermal stabilization, soil reinforcement, geosynthetics; construction of embankments on soft clay, embankments on mechanically stabilized earth walls, hydraulic barriers; case studies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 315.

CME 408 Traffic Engineering and Design 3 OR 4 hrs. Highway traffic control with an emphasis on highway capacity analysis and traffic signal design. Queuing theory, traffic flow theory, corridor management, and traffic safety. 3 undergraduate hours. 4 graduate hours. Excessive computer use required. Fieldwork required. Prerequisite(s): CME 302 or consent of the instructor.

CME 409 Structural Analysis II 3 OR 4 hrs. Approximate analysis of structures including trusses and multistory frames. Influence lines, cables, and arches. Principles of limit analysis for structures and structural elements. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 205 or consent of the instructor.

CME 410 Design of Prestressed Concrete Structures 3 OR 4 hrs. Principles of prestressed concrete. Analysis and design of statically determinate prestressed concrete members. Introduction to design and detailing of connections. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 310.

CME 411 Chemistry for Environmental Professionals 3 hrs. Introductory atmospheric chemistry, aspects of air pollution, chemistry related to natural water and water treatment; priority organic pollutants and heavy metals. Same as EOSH 440. Prerequisite(s): One year of college chemistry.
Course Descriptions

CME 415 Environmental Geotechnology 3 OR 4 hrs.
Environmental waste laws and regulations, sources and types of waste materials, waste materials in geotechnical engineering applications, geotechnical management of municipal, industrial, mine, and nuclear wastes. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 315.

CME 419 Air Quality Management I 3 hrs.
Sources, control, dispersion, and effects upon receptors of air pollutants: health and other adverse effects, meteorology and dispersion estimation, photochemistry, aerosol characterization. Same as EOH 431. Prerequisite(s): EOH 405 or CME 216 or consent of instructor.

CME 420 Water and Wastewater Analysis Laboratory 0 TO 4 hrs.
Laboratory class for environmental engineering. Analysis of water, wastewater, and soil for nutrients, pollutants, physical parameters, and biological parameters. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 216 or MATH 481 or the equivalents.

CME 421 Water Treatment Design 3 OR 4 hrs.
Water-quality control systems. Physical-chemical unit processes applied to systems designed for treatment of municipal and industrial waters. 3 undergraduate hours. 4 graduate hours. Field trip required at nominal fee. Prerequisite(s): CME 216.

CME 422 Wastewater Treatment Design 3 OR 4 hrs.
Processes involved in the biological treatment of wastewater. Aerobic and anaerobic treatment, sludge stabilization, and nutrient removal. 3 undergraduate hours. 4 graduate hours. Field trip required. Prerequisite(s): CME 216 or the equivalent.

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

CME 425 Environmental Remediation Engineering 3 OR 4 hrs.
Sources of contamination, regulations, site characterization, impact assessment, waste disposal and containment options, waste treatment options, case studies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 315.

CME 427 Engineering Hydrology 3 OR 4 hrs.
Processes, techniques, and concepts in hydrology of interest to the engineer: precipitation, interception, evaporation, groundwater, unit hydrographs, flood routing, and statistics. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 215.

CME 430 Theory of Elasticity I 3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 204 and MATH 481 or the equivalents.

CME 431 Introduction to Continuum Mechanics 3 OR 4 hrs.
Vectors and tensors, stress, principal stresses and principal axes, deformation, compatibility conditions, constitutive equations, isotropy, and mechanical properties of fluids and solids. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 203 and CME 211; or CME 203 and ME 211.

CME 432 Energy Methods in Mechanics 3 OR 4 hrs.
Variational theorems of elasticity. Applications to establish approximate systems and their solution. Beams, including shear deformation. Introduction to instability theory. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 205.

CME 433 Fracture Mechanics and Failure Analysis I 3 OR 4 hrs.

CME 434 Finite Element Analysis I 3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 205 or ME 401 and CS 108.

CME 435 Theory of Vibrations I 3 OR 4 hrs.
Analytical and numerical treatment of linear, discrete systems. Nonlinear discrete systems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 200 or the equivalent and MATH 220.

CME 450 Probability and Reliability in Structural Design 3 OR 4 hrs.
Maximum uncertainty principle and probability distributions of random variables. Distributions of extremes and their applications. Statistics of failure. The weakest-link theory. Time to failure. Structural reliability. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Consent of the instructor.

CME 453 Experimental Stress Analysis 0 TO 4 hrs.
Structural similarite and dimensional analysis. Strain measurement techniques. Introduction to photoelasticity: 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 430.

CME 454 Structural Analysis and Design of Tall Buildings 3 OR 4 hrs.
State-of-the-art introduction to structural analysis and design of tall buildings. Load impact on different structural systems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 401 or CME 409 or the equivalent, or consent of the instructor. Recommended background: Major structural analysis and design courses.

CME 457 Thermodynamics of Materials 0 TO 4 hrs.
Applications of chemical and thermodynamic principles to processing and characterization of materials. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 260.

CME 480 Welding Metallurgy 4 hrs.
Metallurgy of metals joining processes. Selection of processes and design of products manufactured by joining processes. Prerequisite(s): CME 260.

CME 493 Seminar 1 TO 3 hrs.
Topics of mutual interest to faculty and a group of students. Offered as announced in the Schedule of Classes.

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

CME 496 Special Problems 1 TO 4 hrs.
Special problems or reading by special arrangement with a faculty member. Prerequisite(s): Consent of the instructor.

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

CME 501 Urban Transportation 4 hrs.
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. Prerequisite(s): Grade of C or better or concurrent registration in CME 302; and MATH 210 and ECON 120. Recommended background: For Transportation and Urban Planning majors.

CME 502 Bridge Design II 4 hrs.
Theory and design procedures related to the analysis and design of modern bridges, using AASHTO code. Includes concrete and steel structures, construction practices and procedures. Prerequisite(s): CME 406.
CME 503 Advanced Transportation Demand Analysis 4 hrs. Advanced quantitative analysis and modeling of transportation demand for planning purposes. Disaggregate choice models, traveler behavior and values, activity-based and microsimulation approach to demand modeling. Extensive computer use required. Prerequisite(s): CME 508.

CME 505 Advanced Soil Mechanics 4 hrs. 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(s): CME 508.


CME 507 Sustainable Transportation Systems 4 hrs. Transportation network analysis, mobile source emission modeling, and life-cycle-based transportation energy modeling. Prerequisite(s): Credit or concurrent registration in CME 501; and credit or concurrent registration in CME 508. Recommended background: Transportation engineering, urban planning, and environmental engineering.

CME 508 Urban Travel Forecasting 4 hrs. Theory and method of forecasting travelers’ choices of route, mode, destination, departure time, trip frequency, and origin location in congested urban transportation networks. Prerequisite(s): CME 302 and MATH 210 and ECON 120.

CME 509 Transportation Networks 4 hrs. Application of constrained optimization methods to the analysis, planning, and design of urban transportation networks. Prerequisite(s): CME 503 and ECON 501 and MATH 484 and CME 508.

CME 510 Advanced Design of Prestressed Concrete Structures 4 hrs. Analysis and design of indeterminate prestressed concrete members. Composite beams, torsion, deflections, and design detailing of connections. Special topics such as anchorage zone design. Prerequisite(s): CME 410.

CME 516 Design of Landfills and Impoundments 4 hrs. 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(s): CME 315.

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

CME 520 Earthquake Engineering of Concrete Structures 4 hrs. 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(s): CME 310.

CME 521 Environmental Microbiology 4 hrs. Microbial cell structure and function; applications of molecular biology in microbial ecology, biogeochemical cycles. Prerequisite(s): Credit or concurrent registration in CME 422; or consent of the instructor. Recommended background: A basic understanding of biology.


CME 524 Water Chemistry 4 hrs. Chemical equilibria and kinetic principles as applied to processes occurring in natural and engineered water systems. Same as EOSH 542. Prerequisite(s): EOSH 440 or CME 411.

CME 525 Applied Environmental Biotechnology 4 hrs. Advanced biological treatment processes for environmental restoration. Stoichiometry of biological reactions, kinetics, biomediation, biochemical pathways for pollutant biodegradation, biological nutrient removal. Prerequisite(s): Credit or concurrent registration in CME 521; or consent of the instructor.

CME 526 Air Quality Management II 2 hrs. Air quality management: Integration of diverse aspects. Data interpretation; standards setting; policy implementation; equipment design; hazardous spill modeling; indoor air pollution; case studies. Same as EOS 532. Prerequisite(s): CME 419.


CME 531 Nonlinear Continuum Mechanics 4 hrs. Matrices and general tensors, isotropic tensor functions, representation theorem, kinematics, polar decompositions, Cauchy-Green tensors, Cauchy stress, Piola-Kirchoff stresses, constitutive laws, frame indifference, hyperelastic materials, and universal solutions. Prerequisite(s): CME 430 or CME 431.


CME 534 Finite Element Analysis II 4 hrs. 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. Same as ME 534. Prerequisite(s): CME 434.

CME 535 Theory of Vibrations II 4 hrs. Harmonic vibrations; vibrations of a string; vibrations of a beam; vibrations of a membrane; periodic systems; Floquet waves; and nonlinear vibrations. Same as ME 535. Prerequisite(s): CME 435 or ME 408 or the equivalent.

CME 536 Nondestructive Testing of Concrete Structures 4 hrs. Stress and durability of concrete structures by nondestructive evaluation of the material through acoustic, magnetic, thermal, electrical, and optical phenomena; nondestructive methodologies for evaluation of concrete structures. Prerequisite(s): CME 310.


CME 540 Interdisciplinary Approaches to the Study of Integrated Human/Natural Landscapes 3 hrs. Examination of ecological, biogeochemical, and evolutionary principles; techniques and philosophies of ecological remediation, restoration, and conservation; environmental regulation and policy; sustainability in theory and practice. Same as EAES 540 and BIOS 540. Prerequisite(s): Consent of the instructor.

CME 541 Mechanics of Composite Materials 4 hrs. Anisotropic elastic materials; stress analysis for isotropic materials; Stress formalism for anisotropic materials; singularities at free edges; stress analysis in composites; wave propagation in composites. Prerequisite(s): CME 430 or equivalent.

CME 544 Structural Dynamics 4 hrs. Formulation and solution methods for time-dependent systems. Pertinent numerical techniques and their application to seismic analysis, blast loading, and heat transfer problems. Prerequisite(s): CME 434.

CME 546 Research Methods for Landscape Ecological and Anthropogenic Processes 4 hrs. Students will develop the skills to choose and utilize relevant methods and tools used in the study and management of altered natural landscapes to achieve research and management objectives through hands-on interdisciplinary laboratory modules. Same as BIOS 546 and EAES 546. Prerequisite(s): Consent of the instructor.
### CME 547 Field Experiences in Landscape Ecological and Anthropogenic Processes 4 hrs.
- Evaluation of the issues and needs of various landscape restorations and related urban-impacted sites in the Chicago metropolitan area based upon selected readings, site visits, and presentations and discussions with the site manager/coordinators. Same as BIOS 547 and EAES 547. Prerequisite(s): Consent of the instructor.

### CME 549 Subsurface Flow and Contaminant Transport Modeling 4 hrs.
- Definitions, basic principles, fluid flow in vadose zone, groundwater flow, contaminant transport in vadose zone, contaminant transport in groundwater, numerical models and field implementation, case studies. Prerequisite(s): CME 415 or consent of the instructor.

### CME 550 Infrastructure Management 4 hrs.
- Integrated approach to the management of infrastructure systems: design, construction, operations, maintenance, and rehabilitation of facilities. Performance of facilities, approaches to management, and available tools and developing technologies. Same as UPP 569. Prerequisite(s): IE 201 or the equivalent or consent of instructor. Recommended background: Familiarity with computer spreadsheets.

### CME 581 Vadoze Zone Hydrology 4 hrs.
- Soil physics and biochemical processes. Flow and contaminants transport in vadose zone. Theory of soil water movement. Prerequisite(s): CME 531 and graduate standing or consent of the instructor.

### CME 582 Lake and Watershed Management 4 hrs.
- Lake and watershed processes influencing water quality, diffuse pollution, integrated management, and sustainable development of lotic and lentic water resources, watershed restoration. Prerequisite(s): CME 531 and graduate or professional standing or consent of the instructor.

### CME 594 Advanced Special Topics in Civil Engineering, Mechanics, and Materials 1 TO 4 hrs.
- Nucleation and growth kinetics, order of transformation, grain growth recovery, recrystallization, solidification, phase transformation in solids, precipitation hardening, spinodal decomposition, and martensitic transformations. Prerequisite(s): Consent of the instructor.

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

### CME 572 Advanced Thermodynamics of Materials 4 hrs.
- Treatment of multicomponent system thermodynamics with emphasis on metallurgical process applications. Development of relation between structure of metallic solutions, molten salts, and quasi-chemical models.

### CME 580 Advanced Thermodynamics of Materials 4 hrs.
- Specific topics are announced each term. Same as HIST 401. 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): 3 hours of history or classics.

### CL 401 Classics 3 OR 4 hrs.
- Specific topics are announced each term. Same as HIST 402. 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): 3 hours of history or classics.

### CL 402 Classics 3 OR 4 hrs.
- Specific topics are announced each term. Prerequisite(s): 3 hours of history or classics.

### CL 404 Roman Law and the Civil Law Tradition 3 OR 4 hrs.
- Roman law and its relationship to values and social structure; social analysis through law; continental legal tradition. Same as CLJ 404, and HIST 404. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CLJ 200 or CL 203 or HIST 203 or consent of the instructor.

### CL 405 Herodotus and His World 3 OR 4 hrs.
- Examines the Histories of Herodotus—both the text and the culture of Classical Greece compared to the Near East and Egypt. Same as HIST 405. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Sophomore standing or above.

### CL 498 Special Topics in Classical Civilization 3 OR 4 hrs.
- Advanced study of topics in classical civilization. Sample topic: Augustus and his image. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. All readings are in English. Prerequisite(s): Two classics courses at the 200-level.

### COMM 404 Discourse Analysis 3 OR 4 hrs.
- Nonverbal aspects of communication; rules of communication; speech acts; conversational coherences; acts and sequences in communication; marital communication patterns. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): COMM 304 or COMM 315 or COMM 416 or approval of the department.

### COMM 416 Conflict and Communication 3 OR 4 hrs.
- Students learn to manage and resolve conflict in business, governmental, and community settings. Practical analysis of interpersonal and group conflict cases. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): COMM 312 and COMM 313 and COMM 315; or approval of the department.

### COMM 423 Discourse and Rhetoric 3 OR 4 hrs.
- Exploration of interconnections between language and social practices with attention to multiple components of discursive situations: senders, receivers, context, code, media, and content. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): COMM 101 and COMM 102 and COMM 201; or approval of the department.

### COMM 430 Media, Information, and Society 3 OR 4 hrs.
- News as a distinct form of mass communication, involving social functions and significant questions about facts, truth, knowledge, and values. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): COMM 103 and COMM 200; or COMM 300; or approval of the department.
Prerequisite(s):

**COMM 434** Global Communication Systems 3 or 4 hrs.
Structure and flow of international communication. Media organization systems. International impact of new media and information technology. Impact of U.S. media reporting on foreign affairs. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Approval of the department.

**COMM 454** Cognitive Psychology of Language 3 hrs.
Provides students with a survey of methods, theory, and research in language and discourse processing. Same as LING 474 and PSCH 454. Prerequisite(s): Graduate standing or consent of the instructor.

**COMM 476** Topics in the History of Communications 3 or 4 hrs.
This course introduces students to major developments in the history of communications, with a focus on the political and cultural dimension of technologies. Same as HIST 456. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Consent of the instructor. Recommended background: At least one history course at the 100-level.

**COMM 458** Minorities and Communication 3 or 4 hrs.
Description and analysis of the processes through which ethnic and racial perceptions shape public discourse. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Two communication courses at the 300-level; or approval of the department.

**COMM 460** Visual Communication 3 or 4 hrs.
Exploration of processes through which meaning is derived from visual and verbal rules of media images in the cultural circuit. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Two communication courses at the 300-level; or approval of the department.

**COMM 457** Public Opinion and Political Communication 3 or 4 hrs.
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. Same as POLS 467. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): POLS 200 or the equivalent or consent of the instructor.

**COMM 473** Organizations and Their Publics 3 or 4 hrs.
Hypotheses and theoretical models; problem-solving: analyzing goals, identifying publics, setting objectives, designing messages, choosing channels, planning implementation (budgeting, staffing, timetables), evaluating effects. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): COMM 201 and COMM 306; or approval of the department.

**COMM 474** Internship 1 to 8 hrs.
Students work in an approved professional setting. Individual projects developed through conferences with a faculty member and a field supervisor. May be repeated. Students may register in more than one section per term. A maximum of three hours may be counted toward the undergraduate communication major requirements. Prerequisite(s): 12 hours of upper-division courses in communication, with a 3.00 grade point average in those courses; recommendation of two faculty members and approval of the department obtained in the semester prior to internship.

**COMM 490** Seminar in Culture and Communication 3 hrs.
Analysis of contrastive cultural paradigms (interethnic, gender, class) to develop student’s awareness of own socialization and cultural orientation. Prerequisite(s): COMM 301 plus any other 300-level communication course, or approval of department.

**COMM 491** Seminar in Media and Communication 3 hrs.
Analysis of contemporary or historical issues in mediated communication. Prerequisite(s): COMM 301 plus any other 300-level communication course, or approval of department.

**COMM 494** Special Topics in Communication 3 or 4 hrs.
Contemporary trends in the field of communication. 3 undergraduate hours, 4 graduate hours. May be repeated up to 2 times. Prerequisite(s): COMM 200 and COMM 201 and consent of the instructor; or approval of the department.

**COMM 498** Independent Study 1 to 4 hrs.
Individual investigation of special problems (student-initiated or related to faculty research). May be used for special projects, such as interdisciplinary seminars. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. A maximum of 3 hours of credit may be applied toward the major in Communication. Communication. Credit earned may not be applied toward the minimum Master of Arts in Communication degree requirements. Prerequisite(s): Senior standing and approval of the department.

**COMM 500** Introduction to Communication Research 4 hrs.
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(s): Consent of the instructor or graduate standing in Communication.

**COMM 501** Operationalizing Communication Research 4 hrs.
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(s): COMM 500.

**COMM 502** Seminar in Media Studies 4 hrs.
In-depth, intensive examination of theories, perspectives, and approaches to media studies. Prerequisite(s): COMM 500; or consent of the instructor.

**COMM 503** Seminar in Intercultural Communication 4 hrs.
Introduction to basic theoretical concepts and important issues in intercultural communication. Prerequisite(s): COMM 500; or consent of the instructor.

**COMM 504** Communication, Technology, and Society Proseminar 4 hrs.
Introduction to philosophy and history of communication technologies. The social impact of communication technologies. Prerequisite(s): COMM 500; or consent of the instructor.

**COMM 505** Organizational Communication 4 hrs.
Classic and current research. Models that examine organizational communication; assessment of organizational problems and conduct of problem-solving research. Prerequisite(s): COMM 306 and COMM 500; or consent of the instructor.

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

**COMM 508** New Media of Communication 4 hrs.
Theories, history, and philosophy of the new media of communication. Social diffusion and consequences of new media technologies. Assessment and evaluation of the social impact of new media. Prerequisite(s): COMM 504.

**COMM 525** Approaches to Rhetorical Criticism 4 hrs.
Contemporary approaches to rhetorical criticism. Each offering focuses upon the distinctive contributions of specified rhetoricians to the theory and practice of rhetorical criticism. May be repeated to a maximum of 12 hours. Prerequisite(s): COMM 410.

**COMM 534** Mass Communication Theory 4 hrs.
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.

**COMM 567** Topics in Political Communication 4 hrs.
Intensive study of selected aspects of organizational communication in public institutions, urban political communication patterns, communication elites. Independent research using a variety of community research techniques. Prerequisite(s): Consent of the instructor.

**COMM 570** Seminar in Philosophy of Technology 4 hrs.
Conceptual approaches to technology, with special emphasis on communication technologies. Emphasis on the application of values, beliefs, and thoughts related to the interplay of technology and society. Prerequisite(s): COMM 504.

**COMM 580** Qualitative Methods in Communication 4 hrs.
Qualitative methods course analyzing language and culture patterns. Same as LING 582. Prerequisite(s): COMM 501 or consent of the instructor.
COMM 591
Health Communication 4 hrs.
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(s): Consent of the instructor.

COMM 594
Advanced Special Topics in Communication 1 TO 4 hrs.
Student may register for more than one section per term. Advanced topics in communication theory and research. Subject matter varies. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

COMM 596
Independent Research 1 TO 4 hrs.
Department-approved research projects not included in thesis research. May be repeated. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the head of the department.

COMM 598
Thesis Research 0 TO 16 hrs.
Under guidance of an advisor and committee, the student conducts an original research project addressing a communication problem of a basic or applied nature. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): COMM 501.

COMM 599
Dissertation Research 0 TO 16 hrs.
Under guidance of an advisor and committee, the student conducts research on the topic of the doctoral dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Prerequisite(s): Consent of the instructor.

Community Health Sciences
CHSC 401
Behavioral Sciences in Public Health 3 hrs.
Prerequisites: Consent of instructor. An introduction to community assessment in health promotion. Concepts and models of community health and community social dynamics; community participation and capacity building; strategies for situating inquiry and use of existing indicators; ethical issues. Fieldwork required. Prerequisite(s): Consent of instructor. Recommended background: Credit in CHSC 400.

CHSC 403
The Future of Public Health 2 hrs.
Examines the critical issues facing the public health system in the United States by considering concepts, issues, and recommendations of public health practice experts. Recommended background: Completion of CHSC 400.

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

CHSC 411
Nutrition for Public Health Professionals 3 hrs.
Foundation course to introduce nutrition principles and their application to public health populations and problems. Prerequisite(s): CHSC 400; and graduate or professional standing; or consent of the instructor.

CHSC 419
Public Health Aspects of Sexuality and Women's Health 3 hrs.
An overview of human sexuality from a public health view with special emphasis on family planning, sexuality, and behavior effects on women's health. Same as GWS 419. Prerequisite(s): Graduate standing; or junior standing or above with consent of the instructor.

CHSC 425
Public Health and Aging 3 hrs.
Gerontological public health issues are examined through the psychosocial and physical dimensions of the aging process and interactions between the elderly and the healthcare system.

CHSC 431
Community Assessment in Public Health 3 hrs.
An introduction to community assessment in health promotion. Concepts and models of community health and community social dynamics; community participation and capacity building; strategies for situating inquiry and use of existing indicators; ethical issues. Fieldwork required. Prerequisite(s): Consent of the instructor. Recommended background: Credit in CHSC 400.

CHSC 432
Analytic Methods in Public Health 3 hrs.
Provides analytic and computer skills needed for assessment and planning in public health and for maximizing the acquisition and use of public health data. Prerequisite(s): Consent of the instructor.

CHSC 433
Public Health Planning and Evaluation 3 hrs.
Planning and evaluation for community health programs, including proposal development and evaluation; considerations for community/consumer involvement in planning. Prerequisite(s): Consent of the instructor.

CHSC 434
Introduction to Qualitative Methods in Public Health 3 hrs.
Introduction to 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.

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

CHSC 446
Research Methods in Community Health 3 hrs.
Introduction to principles and techniques for scientific investigation of problems in public health research and practice. Prerequisite(s): BSTT 400 or the equivalent. Restricted to graduate or professional standing, or consent of the instructor.

CHSC 447
Survey Planning and Design 3 hrs.
Theory and applications of sample survey planning and design for conducting research in health sciences and related fields. Addresses three major topics: survey design, sampling, and data collection procedures. Recommended background: Consent of the instructor.

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

CHSC 456
Women's Health: A Primary Healthcare Approach 3 hrs.
Examines the development, theoretical bases, and assessments of mass media interventions, and the intended and unintended effects of the mass media in society.

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

CHSC 480
Health Education and Health Promotion 3 hrs.
Theories of health education and health promotion for public health professionals; approaches for individual, group, and community-level behavior change.

CHSC 485
Communications, Media, and Public Health 3 hrs.
Examines the development, theoretical bases, and assessments of mass media interventions, and the intended and unintended effects of the mass media in society.
CHSC 494 Special Topics in Community Health Sciences 1 to 4 hrs. Study of topics in maternal and child health, gerontology, behavioral science of health and illness, international health, community health, and public health practice. May be repeated. Students may register in more than one section per term. Topics vary by semester. Prerequisite(s): Consent of the instructor. Restricted to graduate or professional standing, or consent of the instructor.

CHSC 500 Proseminar in Community Health Sciences 3 hrs. Analysis of current key literature from behavioral sciences, maternal and child health, gerontology, general and miscellaneous fields of community health sciences. Prerequisite(s): CHSC 400 and 8 semester hours in student's major field.

CHSC 510 Women's, Children's, and Family Health: Outcomes and Measurement 3 hrs. Introduces key theoretical frameworks, measurement tools, and relevant datasets needed to understand and describe the health status of women, children, and families at the individual and population/community level. Prerequisite(s): Consent of the instructor. Recommended background: Enrollment in the Master of Public Health or other graduate program.

CHSC 511 MCH Delivery Systems: Services, Programs, and Policies 3 hrs. Structure, funding, and evidence base for MCH service delivery systems at the federal, state, and local levels. Prerequisite(s): CHSC 400 and CHSC 510: or consent of the instructor. Recommended background: Enrollment in the Master of Public Health or other graduate program.

CHSC 514 Nutritional Epidemiology 3 hrs. Examination of nutritional epidemiological techniques to the design of population-based nutrition research. Students complete research proposal using nutritional assessment, epidemiology and research skills. Prerequisite(s): CHSC 411 or EPID 403: or consent of the instructor.

CHSC 518 The Epidemiology of Pediatric Diseases 3 hrs. 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. Same as EPID 518. Prerequisite(s): EPID 400 or EPID 403; EPID 404 and BSTT 400: or consent of the instructor.

CHSC 526 Family Perspectives on Disability 3 hrs. Examines trends, theories and research methods, policies, and family-centered intervention approaches for families of persons with disabilities. Same as DHD 526 and DIS 526. Prerequisite(s): Consent of the instructor.

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

CHSC 528 Societal Analysis of Aging, Health, and Healthcare 3 hrs. Analysis of aging, health, and healthcare issues mainly from sociological and public health perspectives. Review and application of appropriate concepts, theories, and methods. Same as SOC 528. Prerequisite(s): CHSC 425: or consent of instructor.

CHSC 529 Gerontological Health/illness Behavior 3 hrs. Perceptions and behaviors of older adults are examined in reference to illness perception, health promotion, and reactions to acute and chronic illness. Priority enrollment is given to students in the gerontology track of the division of Community Health Sciences within the School of Public Health; or consent of the instructor.

CHSC 534 Management and Analysis of Qualitative Data 3 hrs. A hands-on course that teaches conceptual and technical skills for organizing and analyzing qualitative (verbal) data from focus groups, in-depth interviews, and other sources, using specialized text-analysis computer software. Extensive computer use required. Prerequisite(s): CHSC 434: or consent of the instructor.

CHSC 542 Advanced Maternal and Child Health Applied Programs 3 hrs. Interventions and services in healthcare 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(s): CHSC 441.

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

CHSC 544 Public Health Aspects of Adolescent Health 3 hrs. Overview of critical health/developmental issues in adolescence; youth participation in health initiatives. Cross-cutting perspectives of social identity, gender, culture, and social class will be essential to any topic discussion/assignment. Same as SOCW 544. Prerequisite(s): CHSC 446 or consent of the instructor. Recommended background: Research, policy, and/or practice and interest in adolescence and in community development and intervention studies; ethnic/minority studies; education; health and social/human service professions.

CHSC 545 Reproductive and Perinatal Health 3 hrs. Focuses on the epidemiology of key reproductive and perinatal health outcomes and relevant health services and health policies. Same as EPID 545. Prerequisite(s): BSTT 400: and EPID 400: or EPID 403: or consent of the instructor.

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

CHSC 548 Readings in Reproductive and Perinatal Epidemiology 2 hrs. Advanced seminar in reproductive/perinatal epidemiology with particular emphasis on methodologic issues. Same as EPID 548. Prerequisite(s): CHSC 441 and EPID 404: or consent of the instructor. Recommended background: Maternal and child health and epidemiology.

CHSC 549 Advanced Applied Methods in MCH Epidemiology 3 hrs. Gives conceptual and technical understanding of statistical and epidemiological methods, builds skills/proficiency in applying these. Attention is given to data handling tasks and to statistical/epidemiologic strategies for analysis and presentation. Same as EPID 549. Prerequisite(s): CHSC 400 or EPID 402: or EPID 404; and BSTT 401 and EPID 406: or consent of the instructor. Recommended background: Credit or concurrent registration in EPID 501.

CHSC 550 Advanced Concepts in Community Health Sciences 3 hrs. Critical review of landmark publications in community health, with analysis of current literature for developing community health science and practice. Prerequisite(s): CHSC 400 or the equivalent.

CHSC 551 Foundations of Public Health Inquiry 3 hrs. 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(s): Open only to PhD degree students.

CHSC 554 International Women's Health: Current and Emerging Issues 3 hrs. Enhance students' understanding of, and sensitivity to, current and emerging international women's health issues. The focus will include studying social and cultural factors affecting women's physical as well as psychosocial health. Prerequisite(s): CHSC 400: or consent of the instructor.

CHSC 564 Community Integration in Developmental Disabilities 3 hrs. Historical and contemporary issues pertaining to the empowerment and integration of persons with developmental disabilities into community settings. Same as DHD 564
CHSC 577
Survey Questionnaire Design 3 hrs. Concepts and strategies for developing survey questionnaires for various modes of survey data collection. Students develop and present questionnaires related to their individual interests. Same as PA 577. Prerequisite(s): CHSC 446 or CHSC 447; or consent of the instructor.

CHSC 584
Community Organizing for Health 3 hrs. Focus on the bases of facilitating community-organizing processes in health promotion, including theories, fieldwork tools, feminist and international perspectives. Fieldwork required. Prerequisite(s): CHSC 480 or consent of the instructor.

CHSC 586
Health Behavior Interventions 3 hrs. Addresses advanced concepts and strategies for the development, implementation, and evaluation of public health interventions to change health behaviors. Prerequisite(s): CHSC 446 and CHSC 480.

CHSC 594
Advanced Special Topics in Community Health Sciences 1 TO 4 hrs. Advanced study of topics in maternal and child health, gerontology, behavioral science of health and illness, international health, community health, and public health practice. May be repeated. Students may register in more than one section per term. Topics vary by semester. Prerequisite(s): BSTT 400 and CHSC 400 and EPID 400 or equivalent and consent of the instructor. Recommended background: Advanced placement in graduate program.

CHSC 595
Seminar in Community Health Sciences 1 TO 3 hrs. Analysis of current theory and research in community health sciences. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Topics vary by seminar. Prerequisite(s): Consent of the instructor. Recommended background: Advanced placement in graduate program.

Computer Science

CS 401
Computer Algorithms I 3 OR 4 hrs. Design and analysis of computer algorithms. Divide-and-conquer, dynamic programming, greedy method, backtracking. Algorithms for sorting, searching, graph computations, pattern matching, NP-complete problems. Same as MCS 401. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MCS 360; or grade of C or better in CS 202.

CS 411
Artificial Intelligence I 3 OR 4 hrs. Problem representation; rule-based problem-solving methods; heuristic search techniques. Application to expert systems, theorem proving, language understanding. Individual projects. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 484. Prerequisite(s): CS 202.

CS 415
Computer Vision I 3 OR 4 hrs. Computer vision system design. Segmentation and representation of regions and boundaries; image filtering; object recognition; advanced topics (examples: texture, stereo, color); applications. Programming assignments. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 487. Prerequisite(s): CS 202 or MCS 360; or consent of the instructor.

CS 421
Natural Language Processing 3 OR 4 hrs. Design of natural language processing systems: part-of-speech tagging, statistical and symbolic parsing; semantic interpretation; discourse and dialogue processing; natural language generation; applications. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 301 or MCS 441.

CS 422
User Interface Design and Programming 3 OR 4 hrs. User interface design, implementation, and evaluation; user-centered design methodologies, windowing systems, IO devices and techniques, event-loop programming, user studies. Programming projects. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 301 or MCS 441.

CS 426
Video Game Design and Development 3 OR 4 hrs. Theory and practice of video game design and programming. Students will form interdisciplinary teams, to design, build, and demonstrate video games or related interactive simulation environments. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 107 and CS 201 and CS 488; or consent of the instructor.

CS 440
Software Engineering I 3 OR 4 hrs. Software life-cycle model, requirement specification techniques, large-scale software design techniques and tools, implementation issues, testing and debugging techniques, software maintenance. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 470. Prerequisite(s): CS 340.

CS 441
Distributed Object Programming Using Middleware 3 OR 4 hrs. Design and implementation of distributed object programs using middleware such as CORBA. Interface definition languages and programming language mappings: static and dynamic object communication mechanisms. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): CS 340 and CS 345.

CS 442
Software Engineering II 3 OR 4 hrs. Advanced concepts in software development: requirements engineering, cost estimation, risk analysis, extreme programming, regression test case selection, and design patterns. Software lab assignments required. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): CS 440.

CS 450
Introduction to Networking 3 OR 4 hrs. Network protocols, algorithms, and software issues. Topics include the Open Systems Interconnect model, data link, network and transport layers, TCP/IP, ATM, and mobile networks. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 453. Credit is not given for CS 450 if the student has credit for EECS 433. Prerequisite(s): CS 202 and CS 385; and STAT 381 or STAT 401 or IE 342.

CS 455
Design and Implementation of Network Protocols 3 OR 4 hrs. Network protocols and their software, examines OS network interface through network layers. Topics include routing, congestion control, fault tolerance, security, name servers, multicast, and performance. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 340 and CS 450.

CS 469
Computer Systems Design 3 OR 4 hrs. Analysis and modeling of digital systems; computer description languages; CAD tools for simulation, synthesis, and verification of computer systems. Project: a simple processor design. 3 undergraduate hours. 4 graduate hours. Same as ECE 469. Prerequisite(s): CS 366; or ECE 366 and ECE 368.

CS 475
Compiler Design 3 OR 4 hrs. Language translation: lexical analysis, parsing schemes, symbol table management, syntax and semantic error detection, and code generation. Development of fully functional compiler. Same as MCS 411. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in CS 301 or grade of C or better in MCS 441; and grade of C or better in CS 202 or grade of C or better in MCS 360; and grade of C or better in CS 266.

CS 477
Object-Oriented Programming 3 OR 4 hrs. Object-oriented languages and environments. Data abstraction, classes and objects, messages and methods, polymorphism and dynamic binding, inheritance. Object-oriented design. Pure and hybrid object-oriented languages. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 474. Prerequisite(s): CS 340.

CS 478
Object-Oriented Programming II 3 OR 4 hrs. OOP paradigm; classes, messages, methods, variables, inheritance, polymorphism; the C++ and Java languages; programming labs required. 3 undergraduate hours. 4 graduate hours. Credit is not given for CS 475 if the student has credit for CS 340 or CS 474. Extensive computer use required. Prerequisite(s): CS 202; and consent of the instructor.

CS 476
Programming Language Design 3 OR 4 hrs. Analysis and design of high-performance uniprocessors. Topics include arithmetic; multiplication, division, shifting; processor: pipelining, multiple function units, instruction set, memory: caches, modules; virtual machines. Same as ECE 466. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ECE 366 or CS 366.

CS 480
Database Systems 3 OR 4 hrs. Database design, physical design, relational databases, recovery, concurrency control, Normalization. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 480. Prerequisite(s): CS 202.

200
CS 485 Networked Operating Systems 4 OR 5 hrs.

Design and Analysis of Efficient Algorithms in Computational Molecular Biology 4 hrs.

Artificial Intelligence II 4 hrs.

Computer Animation 4 hrs.

Computer Vision 4 hrs.

Course Descriptions
CS 559  Neural Networks  4 hrs.  Artificial neural networks, and perception, backpropagation, Kohonen nets, statistical methods, Hopfield nets, associative memories, large memory networks, and cognition.  Same as ECE 559.  Previously listed as EECS 559.  Prerequisite(s): Consent of the instructor.

CS 560  Fuzzy Logic  4 hrs.  Crisp and fuzzy sets; membership functions; fuzzy operations; fuzzy relations and their solution; approximate reasoning; fuzzy modeling and programming; applications; project.  Previously listed as EEC 560.  Prerequisite(s): Consent of the instructor.

CS 565  Physical Design Automation  4 hrs.  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.  Same as ECE 565.  Prerequisite(s): CS 401; and CS 466 or ECE 465.

CS 566  Parallel Processing  4 hrs.  Parallel processing from the computer science perspective.  Includes architecture (bus-based, lockstep, SIMD), programming languages (functional, traditional, and extensions), compilers, interconnection networks, and algorithms.  Same as ECE 566.  Prerequisite(s): CS 466 or ECE 466; and CS 401.

CS 569  High-Performance Processors and Systems  4 hrs.  Instruction-level parallelism, multiple-instruction issue, branch prediction, instruction and data prefetching, novel cache and DRAM organization, high-performance interconnect, compilation issues, and case studies.  Same as ECE 569.  Prerequisite(s): CS 466 or ECE 466; and graduate standing.

CS 577  Object Stores  4 hrs.  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.  Previously listed as EECS 577.  Prerequisite(s): CS 385 and CS 480; and knowledge of C++, or consent of the instructor.

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

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

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

CS 583  Data Mining and Text Mining  4 hrs.  Provide students with a sound knowledge in data and text mining tasks and techniques, as well as ensure students’ ability to use this technology.  Prerequisite(s): CS 401.  Recommended background: Algorithm probability.

CS 586  Data and Web Semantics  4 hrs.  Data modeling and semantics; knowledge representation, querying, and reasoning for the semantic web; metadata; data integration and interoperability; Web services: applications.  Extensive computer use required.  Prerequisite(s): CS 480 or equivalent.

CS 587  Computer Systems Security  4 hrs.  Security policies; security properties; protection mechanisms for single systems, networked systems, and distributed computing; trust; attacks on computer systems.  Extensive computer use required.  Prerequisite(s): CS 485 or CS 450; or consent of the instructor.

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

CS 595  Departmental Seminar  0 hrs.  Seminar by faculty and invited speakers.  Satisfactory/Unsatisfactory grading only.  May be repeated.  Previously listed as EECS 595.

CS 596  Individual Study  1 TO 4 hrs.  Individual study or research under close supervision of a faculty member.  May be repeated.  Students may register in more than one section per term.  No graduation credit for students in the following: MS in Computer Science or PhD in Computer Science.  Previously listed as EECS 596.  Prerequisite(s): Consent of the instructor.  For Computer Science majors only.

CS 597  Project Research  0 TO 9 hrs.  A research design or reading project approved by the committee appointed by the director of graduate studies.  Satisfactory/Unsatisfactory grading only.  May be repeated.  Students may register in more than one section per term.  Previously listed as EECS 597.  Prerequisite(s): Consent of the instructor.  For CS majors only.

CS 598  MS Thesis Research  0 TO 16 hrs.  MS thesis work under the supervision of a graduate advisor.  Satisfactory/Unsatisfactory grading only.  May be repeated.  Students may register in more than one section per term.  Previously listed as EECS 598.  Prerequisite(s): Consent of the instructor.  For CS majors only.

CS 599  PhD Thesis Research  0 TO 16 hrs.  PhD thesis work under supervision of a graduate advisor.  Satisfactory/Unsatisfactory grading only.  May be repeated.  Students may register in more than one section per term.  Previously listed as EECS 599.  Prerequisite(s): Consent of the instructor.  For CS students only.

CLJ 402  Trial Interaction  3 OR 4 hrs.  Language use, culture, and law in the trial process.  Analysis of qualitative methods applied to legal processes and change.  Same as LING 402; 3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 261 and CLJ 350; or consent of the instructor.

CLJ 404  Roman Law and the Civil Tradition  3 OR 4 hrs.  Roman law and its relationship to values and social structure; social analysis through law; continental law tradition.  Same as CL 404 and HIST 404; 3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 200 or CLJ 203 or HIST 203 or consent of the instructor.

CLJ 405  The Problem of Justice  3 OR 4 hrs.  Premodern and modern views of justice and their practical utility in analyzing legislative, executive, and judicial programs for enhancing or restricting justice.  Same as POLS 405.  3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 101, plus two 200-level courses in criminology, law, and justice or two 200-level courses in political science.

CLJ 421  Youth, Crime, Law, and Justice in Society  3 OR 4 hrs.  Theories of juvenile delinquency and rule-breaking; juvenile rights; organization and administration of the juvenile justice system in the U.S.; 3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 210 and CLJ 226.

CLJ 422  Victimization  3 OR 4 hrs.  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.  3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 101 and two 200-level criminology, law, and justice courses.

CLJ 423  Violence  3 OR 4 hrs.  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 silence.  Same as ANTH 424; 3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 210 and CLJ 200.

CLJ 424  Gender, Crime, and Justice  3 OR 4 hrs.  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.  Same as GWS 424; 3 undergraduate hours.  4 graduate hours.  Prerequisite(s): CLJ 101 and CLJ 220; or consent of the instructor.

CLJ 435  Organized and White-Collar Crime in the United States  3 OR 4 hrs.  Analysis and evaluation of organized crime, including its public perception; sociological, political, and economic impacts as well as past and present enforcement strategies.  3 undergraduate hours.  4 graduate hours.  Prerequisite(s): Two 200-level criminology, law, and justice courses.
CLJ 442 Comparative Criminal Justice Institutions 3 OR 4 hrs. Comparative study of law, jurisprudence, enforcement, and punishment in Western and non-Western societies, including civil law, common law, and Islamic systems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Two 200-level criminology, law, and justice courses.

CLJ 456 Community Corrections 3 OR 4 hrs. History, processes, and functions of programs organized for sanctioning offenders in criminal justice systems; such as probation, parole, halfway houses, restitution, community service, and home confinement. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CLJ 350 or CLJ 355; plus one 200-level criminology, law, and justice course.

CLJ 480 Application of Science to the Law 4 hrs. 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. Same as BPS 480. Prerequisite(s): CLJ 210 and CLJ 260; or graduate standing.

CLJ 491 Topics in Rule Breaking 3 OR 4 hrs. Content of course varies, addressing major issues. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Students may register in more than one section per term. Prerequisite(s): Six 200- or 500-level criminology, law, and justice courses.

CLJ 492 Topics in Rule Application 3 OR 4 hrs. Content of course varies, addressing major issues. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Students may register in more than one section per term. Prerequisite(s): Six 200- or 500-level criminology, law, and justice courses.

CLJ 500 Law and Society 4 hrs. 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.

CLJ 520 Criminological Theory 4 hrs. Critical examination of the major traditions in criminological theories; emphasis on critical, positivist, interpretivist, and postmodern.

CLJ 539 Seminar in Rule-Breaking 4 hrs. Study of a specific area of rule-breaking such as larceny, criminal violence, corporate crime, political crime, public order criminality, or occupational crime. Content limited to 4 credit hours when repeated to a maximum of 8 hours. Prerequisite(s): Consent of the instructor.

CLJ 540 Criminal Justice: Process and Institutions 4 hrs. 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.

CLJ 541 The Dynamics and Behavior in Criminal Justice Agencies 4 hrs. 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.

CLJ 546 Violence and Victimization 4 hrs. The field of victimology and victimization theories are introduced including characteristics of victims, crime and post-crime victimization effects, and victims’ criminal justice system experiences.

CLJ 547 Race, Class, and Gender Dimensions of Crime and Justice 4 hrs. Theories addressing the intersections of race, class, gender, crime, and justice. Students examine criminological theories, social construction of race, class, and gender, legal decision making, and implications for justice in our society. Same as GWS 547.

CLJ 548 Legal Discourse and Culture in Law and Society 4 hrs. Discourse, power, and culture in legal settings and analysis of power and resistance in the construction of law as a social fact.

CLJ 555 Corrections: Institutions and Field Operations 4 hrs. 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.

CLJ 560 Quantitative Methods and Design 4 hrs. Fundamentals of scientific inquiry, logic of causal inference, and quantitative methods. Development of perspective and identification of weaknesses in research design. Development of skills in proposal development and data collection unique to criminology, law, and justice. Prerequisite(s): CLJ 262 or consent of the instructor.

CLJ 561 Qualitative Methods and Design 4 hrs. Theories and techniques of qualitative research methods, particularly fieldwork and in-depth interviews. Criminology, law, and justice problems amenable to these techniques and methods and interrelationship between the researcher role and substantive findings. Prerequisite(s): CLJ 262 or consent of the instructor.

CLJ 562 Statistical Applications in Criminology, Law, and Justice I 4 hrs. Basic descriptive and inferential statistics, their applications in data analysis, and assumptions underlying use of these procedures in criminology, law, and justice research. Prerequisite(s): CLJ 262 or equivalent.

CLJ 563 Evaluation Research in Criminology, Law, and Justice 4 hrs. 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. Prerequisite(s): One graduate-level course in research methods and consent of the instructor.

CLJ 564 Statistical Applications in Criminology, Law, and Justice II 4 hrs. Introduction to multivariate statistics with emphasis on multiple regression in criminology, law, and justice research. Analysis and interpretation of regression output, coding of variables, and path analysis. Prerequisite(s): CLJ 562.

CLJ 570 Advanced Methods in Criminology, Law, and Justice 4 hrs. Methodological problems in criminology, law, and justice measurement including the identification problem in estimating deterrence and the limitations of survival analysis in estimating recidivism. Prerequisite(s): CLJ 560 and CRJ 561 or equivalent.

CLJ 580 Forensic Science: Survey and Foundations 2 hrs. Survey course for forensic sciences with emphasis on criministics; unique characteristics, underlying philosophies, nature, analytical methods, significance of results with chemical, biological, trace, and pattern evidence. Same as BFS 580. Prerequisite(s): Approval of the department.

CLJ 589 Special Topics in Forensic Science 3 hrs. 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 non-criminalistics fields. Same as BFS 589. May be repeated if topics vary. Prerequisite(s): Consent of the instructor.

CLJ 592 Internship in Criminal Law, Law, and Justice 2 TO 4 hrs. Placement in a criminal justice agency or setting under the supervision of a faculty member with an accepted research project proposal and paper. May be repeated to a maximum of 4 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

CLJ 594 Selected Issues in Criminology, Law, and Justice 4 hrs. Current issues and advanced problem areas related to deviance, crime, etiology, labeling, criminal careers, organized crime, and victimology. May be repeated to a maximum of 12 hours. Students may register in more than one section per term.

CLJ 596 Independent Study or Research 2 TO 8 hrs. Research undertaken for this course may not duplicate that being done for CLJ 598. Supervised projects, which may consist of extensive readings in criminology, law, and justice, research on special problems not included in the regular course offering. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of instructor and approval of the director of graduate studies.

CLJ 597 Project Research 0 TO 8 hrs. Independent research project under the supervision of a faculty member. Satisfactory/ Unsatisfactory grading only. May be repeated to a maximum of 8 hours. Prerequisite(s): Graduate standing in the MA in Criminology, Law, and Justice program and consent of the instructor.
Prerequisite(s): Consent of the student's advisor; and acceptance of the thesis topic and preliminary thesis outline by the thesis committee.

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CI 507  
Teaching and Learning Mathematics in the Elementary School 4 hrs.  
Integrating mathematics content with teaching and learning issues, including adapting and developing curriculum, planning, classroom interactions, and assessment in K-9 classrooms. Prerequisite(s): CI 411 and CI 412.

CI 508  
Teaching and Learning Science in the Elementary School 4 hrs.  
To help prospective teachers develop multiple frameworks for facilitating the learning of science in students of various abilities, cultures, and backgrounds. Prerequisite(s): CI 411 and CI 412.

CI 509  
Reading and Writing with Young Children 4 hrs.  
The early writing and reading behaviors of children and how these develop during the primary grades. Observation, teaching, and assessing are emphasized. Prerequisite(s): ED 422; and consent of the instructor.

CI 511  
Student Teaching in the Elementary Grades I 6 hrs.  
Culminating course in graduate elementary teacher education. Meets Illinois State Board of Education requirements for certification. Prerequisite(s): Completion of all professional education courses and program requirements. Must enroll concurrently in CI 512.

CI 512  
Student Teaching in the Elementary Grades II 6 hrs.  
The culminating course in the graduate elementary teacher education sequence. Meets Illinois State Board of Education requirements for certification. Prerequisite(s): CI 501 and CI 502. Must enroll concurrently in CI 511.

CI 515  
Urban Youth Program Evaluation 3 hrs.  
Analysis of the impact of social trends and problems on urban youth. Evaluation of urban youth programs with emphasis on affective and moral dimensions.

CI 520  
The K-12 Mathematics Curriculum: Theory, Politics, and Reform 4 hrs.  
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(s): Consent of the instructor.

CI 521  
Learning and Teaching Mathematics with Technology 4 hrs.  
Can technology support conceptually based learning of mathematics? Issues of learning, teaching, and equity related to technology in the K-12 mathematics classroom. Prerequisite(s): Consent of the instructor.

CI 522  
Social Context of Mathematics Education 4 hrs.  
Examination of contextual, social, and linguistic factors which influence the learning of mathematics; emphasis on sociohistorical and activity theories; and equity in schooling. Prerequisite(s): Graduate standing in the College of Education or consent of the instructor.

CI 525  
Assessment and Instruction for Struggling Readers, K-12, Part 1 4 hrs.  
Theoretical and practical issues concerning the etiology of reading problems and clinical diagnostic techniques. Children with reading problems are diagnosed and taught in the practicum component. Prerequisite(s): CI 450; and CI 503 or CI 504; and consent of the instructor.

CI 526  
Assessment and Instruction for Struggling Readers, K-12, Part 2 4 hrs.  
Continued study of theoretical and practical issues concerning the etiology of literacy problems and clinical diagnostic and instructional techniques. Practicum involves tutoring clients in the UIC Reading Clinic. Prerequisite(s): CI 525.

CI 527  
Reading Specialists as Literacy Leaders 4 hrs.  
Theory and practices related to the role of the reading specialist, including management and evaluation of support systems, programs, personnel, and professional development in literacy. Prerequisite(s): CI 450 and CI 503 and CI 504.

CI 528  
Assessing Literacy in Classrooms 4 hrs.  
Introduction to and practicum in K-12 classroom literacy assessment and its relation to literacy instruction. Addresses purposes of and techniques for conducting/interpreting specific literacy assessments. Extensive computer use required word processing on writing; search engines for examining literacy curriculum, professional organizations, e-mail networks, use of PowerPoint, Excel and SPSS. Prerequisite(s): CI 450 and CI 503 and CI 504 and consent of the instructor. Open only to master's degree students. Recommended background: admission to MEd in Instructional Leadership; Literacy, Language, and Culture.

CI 532  
Staff Development and School Improvement 4 hrs.  
Analysis of issues of school improvement and teacher professional development. Emphasis on processes of and alternative approaches to individual and organizational change. Prerequisite(s): CI 574 or ED 430 or ED 431 or ED 543; and consent of the instructor.

CI 535  
Studies in Literacy Research and Teacher Inquiry 4 hrs.  
Analysis of methodologies and topics of reading research; decision-making processes for effective literacy instruction based on research; skills and strategies in designing teacher inquiry. Extensive computer use required: word processing on writing; search engines for identifying research studies, including teacher researcher Web sites. Prerequisite(s): CI 450 or CI 503 or CI 504; and consent of the instructor. Admission to the MEd in Instructional Leadership; Language, Literacy, and Culture program or consent of the instructor.

CI 536  
Colloquium on Literacy 1 hour.  
Various areas of reading, writing, and literacy including research on learning, instruction, and use. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. Prerequisite(s): Enrollment in a graduate specialization in reading, and consent of the instructor.

CI 539  
Internship in Instructional Leadership 4 hrs.  
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). May be repeated to a maximum of 8 hours. Prerequisite(s): CI 532.

CI 540  
Linguistics for Teachers 4 hrs.  
Introduction to linguistic concepts as they apply to teaching in monolingual and bilingual classrooms. Relation of linguistic theory to theories of language and cognition.

CI 541  
Oral Language: Its Development and Role in the Classroom 4 hrs.  
Analysis of oral language development and children's varying patterns of language use; analysis of talk in classroom settings and instructional decision-making processes to assess and optimize student learning. Extensive computer use required. Fieldwork required. Prerequisite(s): CI 450 and either CI 503 or CI 504. Restricted to graduate students in Education, Psychology, or English.

CI 542  
Improving School/District Literacy Achievement 4 hrs.  
Review of research on school/program factors implicated in improvement of literacy achievement. Role of empirical evidence (best practices, scientifically based research, research synthesis, what-the-odds studies) in school decision making and policy. Prerequisite(s): CI 450 and CI 503 and CI 504.

CI 543  
Using Multimedia Environments to Support Literacy and Learning 4 hrs.  
Introduction to ways changes in technologies of communication transform environments for teaching and learning. Analyzing technologies, linear, and nonlinear reading environments and designing instructional strategies to enhance multiple literacies. Extensive computer use required. Prerequisite(s): One social science course or one computing course focused on the human use of computing.

CI 544  
Foundations of Writing 4 hrs.  
Introduction to K-8 writing research, theory, and practice, including writing development, processes, text pedagogy, and assessment. Combination of academic study of writing with guided inquiry. Computer use required: word processing on writing; search engines for examining literacy curriculum, professional organizations, e-mail networks, use of PowerPoint and Web page composers. Prerequisite(s): CI 450. Recommended background: Admission to the MEd in Instructional Leadership; Literacy, Language, and Culture.
CI 545 Educational Evaluation 4 hrs. Examination of theoretical and operational assumptions of alternative evaluation models; analysis and critique of evaluation case studies. Prerequisite(s): Admission to PhD in Education program.

CI 546 Children’s and Adolescent Literature 4 hrs. Overview of trade books written for children from preschool through adolescence. Emphasizes critically reading, selecting, and evaluating books appropriate for developmental stages, curricular connections, and students in our multicultural society. Prerequisite(s): CI 450 and CI 503 and CI 504; and consent of the instructor.

CI 547 Integrating Literacy Instruction 4 hrs. Engaging in professional experiences (e.g., teacher inquiry, teacher book clubs) that support the design and adaptation of frameworks and units that emphasize meaningful instructional connections among reading, writing, and talk in the classroom. Extensive computer use required. Prerequisite(s): CI 450 and either CI 503 or CI 504. Restricted to graduate students in Education, Psychology, or English.

CI 548 Leadership for Literacy Instruction 4 hrs. School and system leadership practices for promoting effective literacy instruction in urban elementary and secondary schools. Assessment and improvement of literacy curriculum, pedagogy, and evaluation. Same as EDPS 548. Prerequisite(s): Consent of the instructor; admission to a degree program in the College of Education. Students admitted to the EdD in Urban Education Leadership, prerequisites also include EDPS 550 and EDPS 552.

CI 549 Teaching for Social Justice 4 hrs. Examine theory and practice of social justice teaching in schools, including: history, literacy, curriculum, pedagogy, and critical perspectives. Prerequisite(s): Consent of the instructor.

CI 550 Conflicts in Curriculum 4 hrs. Analysis of theoretical models for curriculum development, special attention to alternative and often-conflicting viewpoints about the particulars of the development process. Prerequisite(s): Admission to a graduate program in education.

CI 552 Curriculum and Cultural Context 4 hrs. Influence of cultural, political, sociological, and economic factors on curriculum, at the instructional, institutional, societal, and ideological levels. Prerequisite(s): CI 574 or consent of instructor.

CI 553 History of Curriculum Thought 4 hrs. Analysis of selected documents on curriculum theory and policy from antiquity to present; secondary treatments and primary sources; interaction of theory and practice. Prerequisite(s): CI 574 or consent of the instructor.

CI 555 Proseminar in Literacy, Language, and Culture 4 hrs. Socialization of students into the field through intensive introduction to literacy, its relationship to language and culture, using the collective knowledge and research experience of faculty. Emphasizes on developing student inquiry in urban contexts. Restricted to first-year doctoral students with a specialization in Literacy, Language, and Culture.

CI 556 Proseminar in Literacy, Language, and Culture 4 hrs. Socialization of students into the field through intensive introduction to literacy, its relationship to language and culture, using the collective knowledge and research experience of faculty. Emphasizes on developing student inquiry in urban contexts. Restricted to first-year doctoral students with a specialization in Literacy, Language, and Culture.

CI 557 The Historical and Philosophical Bases of Literacy and Literacy Instruction 4 hrs. Critical examination of historical and philosophical bases of current literacy and literacy instruction from social, cultural, and psychological perspectives. Emphasizes on historical patterns of reading and writing instruction in the U.S. Prerequisite(s): Consent of the instructor.

CI 558 The Social and Cultural Contexts of Literacy and Literacy Instruction 4 hrs. Critical examination of theoretical and methodological orientations that inform the study of sociocultural influences on the definition and practices of literacy in classrooms, at school level, and in out-of-school contexts.

CI 559 Critical Issues in Science Education 4 hrs. 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(s): Admission to a graduate program in the College of Education or consent of the instructor.

CI 561 Curriculum and Instruction 4 hrs. Prerequisite(s): Consent of the instructor.

CI 562 Design and Conduct of Literacy Research 4 hrs. Design principles for the study of literacy development and education. Emphasis is on examining lines of literacy research from multiple design perspectives; relationship between research design, theory, and epistemology. Fieldwork required. Prerequisite(s): Consent of the instructor.

CI 563 Analysis of Research in Literacy 4 hrs. Critical analyses of literacy-related research methods, their implications for interpreting research, the forms in which research is published; manuscript review process, and ethical considerations that inform all of the above. Prerequisite(s): CI 581 or CI 586 and consent of the instructor.

CI 564 Design and Conduct of Literacy Research 4 hrs. Introduction to design principles informing the study of literacy development and education. Emphasis on conducting literacy research from multiple design perspectives; and the relationship between epistemology, theory, and research design. Prerequisite(s): ED 502 and ED 503 and CI 563. Priority in enrollment will be given to students admitted into Literacy, Language, and Culture doctoral program.

CI 565 Research in Children’s and Adolescent Literature 4 hrs. Prerequisite(s): Admission to a graduate program in the College of Education or consent of the instructor.

CI 566 Introducing to design principles informing the study of literacy development and education. Emphasis on conducting literacy research from multiple design perspectives; and the relationship between epistemology, theory, and research design. Prerequisite(s): ED 502 and ED 503 and CI 563. Priority in enrollment will be given to students admitted into Literacy, Language, and Culture doctoral program.

CI 567 Literacy In and Out of Schools 4 hrs. Examination of research on the specific area of children’s or adolescent literature such as multicultural literature, picture books, nonfiction texts, or the development of literacy understanding in children’s and adolescents. May be repeated to a maximum of 8 hours. Prerequisite(s): Consent of the instructor and an undergraduate or master's level survey course on children’s/adolescent literature.

CI 568 Foundations of Curriculum Studies 4 hrs. Curriculum as area of inquiry; historical, philosophical, cultural, and related foundations; variations on curriculum theory and practice; alternative paradigms of curriculum inquiry. Prerequisite(s): CI 581 or consent of the instructor.

CI 569 Critical Issues in Science Education 4 hrs. 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(s): Admission to a graduate program in the College of Education or consent of the instructor.

CI 570 Integrating Mathematics, Science, and ESL 4 hrs. Curriculum and instructional issues and practice related to the integration of mathematics, science, and English as a second language development. Prerequisite(s): CI 481 or consent of the instructor.

CI 571 Assessment in Science and Math Education 4 hrs. 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(s): Admission to graduate study in education or consent of the instructor.

CI 572 Foundations of Curriculum Studies 4 hrs. Curriculum as area of inquiry; historical, philosophical, cultural, and related foundations; variations on curriculum theory and practice; alternative paradigms of curriculum inquiry. Prerequisite(s): ED 430 or admission to the PhD in Education program or the PhD in Public Policy Analysis program.

CI 573 Seminar in Research Issues with English Language Learners 4 hrs. Selected topics on research in the education of language minority students for advanced MEd and PhD students. Topics vary each semester. May be repeated to a maximum of 12 hours. Prerequisite(s): Consent of the instructor.

CI 574 Possibilities for Teaching and Schooling 4 hrs. Philosophical and conceptual analysis of teaching and schooling and the impact of those conceptions on the conduct of educational practice. Prerequisite(s): CI 574 or consent of the instructor.

CI 575 Literacy and Out of School 4 hrs. Analysis of literacy practices in formal and informal contexts. Focus on community and family contributions to literacy learning; emphasis on consequences of cultural congruity and discontinuity between in- and out-of-school literacy practices. Prerequisite(s): Consent of the instructor.

CI 576 Advanced Studies in Qualitative Research Methods 4 hrs. The dynamics of data collection and analysis, the use of theory and interdisciplinary frameworks, and writing up and presenting original research. Prerequisite(s): ED 502.
CI 579 Bi-Literacy: Theory, Research, and Practice 4 hrs. Theoretical foundations, research paradigms, and issues focusing on bilingual and bi-literacy practices in and between home, school, and community contexts. Prerequisite(s): Consent of the instructor.

CI 581 Perspectives on Reading: Theory, Research, and Practice 4 hrs. Introduction of doctoral students to perspectives underlying theory, research, and practices related to understanding reading and reading instruction. Study of how research and practice is framed, shaped, and constrained by theoretical perspectives. Prerequisite(s): Priority will be given to students admitted into the Literacy, Language, and Culture doctoral program.

CI 582 Research Perspectives on Literacy in the Disciplines 4 hrs. Literacy is an integral part of expertise in the major fields of study. This course reviews the research in literacy and its related constructs in the disciplines of mathematics, science, history, and English. Prerequisite(s): Consent of the instructor.

CI 583 Early Literacy: Theory, Research, and Practice 4 hrs. Analysis of theories and research focusing on the initial phases of young children's acquisition of reading and writing, with emphasis on issues related to instruction. Prerequisite(s): CI 503 and consent of the instructor.

CI 584 Semiotics, Literacy, and Learning 4 hrs. Theory and research focusing on language and literacy as they relate to other embodied forms of meaning-making; how these varied meanings are socially and culturally mediated, the ways in which they enable and constrain processes of learning. Prerequisite(s): Consent of the instructor.

CI 585 Seminar in Literacy Studies 4 hrs. Selected topics in literacy theory, research and practice for advanced PhD students. Topics vary each semester. May be repeated to a maximum of 12 hours. Prerequisite(s): CI 563 or the equivalent or consent of instructor.

CI 586 Perspectives on Writing Instruction: Theory, Research, and Practice 4 hrs. An examination of research and theoretical perspectives on writing and multimodal text construction, including critical reflection on perspectives that have contributed to changes in the ways we view texts, writing, writers, and instruction. Prerequisite(s): CI 544; consent of the instructor. Priority in enrollment will be given to students admitted into Literacy, Language, and Culture doctoral program.

CI 587 Literacy Assessment: Theory, Research, and Practice 4 hrs. Theory and practice in literacy assessment. Measurement issues unique to literacy assessment, including word recognition, vocabulary, comprehension and writing. Critical consideration of how assessment both enables and constrains instruction. Prerequisite(s): CI 503 and consent of the instructor.

CI 588 Design Research in the Study of Literacy 4 hrs. Emphasis on understanding the conceptual frameworks that inform design research, integrating literacy theory into the design of teaching and learning environments; the use of design research in the study of literacy in various instructional settings. Individual and group participation (including participation on course listserv). Prerequisite(s): Consent of the instructor.

CI 589 Literacy and Learning Technologies: Theory, Research, and Practice 4 hrs. Critical analyses of how technologically based multimedia transform instruction with a focus on the design of strategies to enhance student, visual, and oral literacies using linear and nonlinear software and online environments. Prerequisite(s): Consent of the instructor.

CI 590 Alternative Paradigms of Qualitative Research in Education 4 hrs. Methodology, cases, and rationale for action research, educational criticism, critical ethnography, historiography, and phenomenological hermeneutics as alternatives in qualitative research in education. Prerequisite(s): CI 578 or consent of instructor; and admission to PhD in Education program or PhD in Public Policy Analysis program.

CI 592 Apprenticeship in Teacher Education 1 TO 4 hrs. Faculty guidance and supervision of doctoral students' teaching experience related to curriculum and instruction. Variable credit (1–4 hours) given based upon scope of students' teaching responsibilities, and proposed reflection on them. Prerequisite(s): Consent of the instructor and program coordinator.

CI 593 PhD Research Project 1 TO 8 hrs. Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. May be repeated to a maximum of 8 hours. Prerequisite(s): Admission to the PhD in Education program.

CI 594 Special Topics in Curriculum and Instruction 2 TO 4 hrs. Seminar on a preannounced topic focusing on methodology, research, and educational implications of recent models of learning, problem solving, and thinking. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Consent of instructor.

CI 596 Independent Study 1 TO 4 hrs. Students design, implement, and analyze the results of a research problem in this area of specialization. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Consent of study advisor.

CI 599 Thesis Research 0 TO 16 hrs. Research on the topic of the student's dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the dissertation advisor.

DHD 401 Foundations of Disability and Human Development 3 hrs. A critical review of key concepts and issues in disability. Students will develop a framework for understanding disability as a multifaceted entity, including the impact of disability at personal, social, and societal levels. Prerequisite(s): Enrollment in the MS in Disability and Human Development program or consent of the instructor.

DHD 430 Introduction to Disability Policy and Organization 3 hrs. 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(s): DHD 401 or consent of the instructor.

DHD 440 Introduction to Assistive Technology: Principles and Practice 3 hrs. 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. Prerequisite(s): Graduate standing or consent of the instructor. Recommended background: Undergraduate enrolled in Health Sciences, Education, or Engineering and working professionals seeking to develop assistive technology as an area of concentration.

DHD 441 Adaptive Equipment Design and Fabrication 3 hrs. Examination of the interaction between design and disability, through comparison of appropriate design theories, materials, and work on consumer-based issues. Prerequisite(s): Graduate standing or DHD 440 and consent of the instructor. Recommended background: Undergraduate enrolled in Health Sciences, Education, or Engineering, or working professionals seeking to develop assistive technology as an area of concentration.

DHD 444 Assistive Technology for Literacy, Learning, and Participation in Pre-K through High School 3 hrs. Use of communication systems, computers, adapted equipment and strategies to foster participation and inclusion of students with disabilities through high school. Same as SPED 444.

DHD 445 Topics in Disability Studies 3 OR 4 hrs. This course will focus on topics structured around particular aspects of disability studies and its practical, cultural, and theoretical implications. Same as ENGL 445. 3 undergraduate hours, 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 363 or ENGL 364; and senior standing or above; or consent of the instructor.
DHD 460 Fundamentals of Behavior Analysis 3 hrs. Introduction to the principles, concepts, and applications of behavioral principles. Content includes philosophic origins, historic and current practices of experimental and applied behavior analysis. Prerequisite(s): Credit or concurrent registration in DHD 401 or the equivalent.

DHD 464 Survey of Developmental Disabilities 3 hrs. Survey of the developmental disabilities field, including basic definitions, history of DD services, relevant public policies and legislation, service delivery systems, and research. Same as CHSC 464. Prerequisite(s): Graduate standing or consent of the instructor.

DHD 494 Special Topics in Disability and Human Development 1 TO 4 hrs. Systematic study of selected topics in disability and human development. May be repeated. Students may register in more than one section per term. Prerequisite(s): Graduate standing or consent of the instructor.

DHD 501 Disability Studies I 4 hrs. Provides analysis of contemporary classification and diagnosis systems for disability as well as the conceptual foundations for disability studies as a content area. Previously listed as DIS 501.

DHD 502 Disability Studies II 4 hrs. 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. Previously listed as DIS 502. Prerequisite(s): DHD 501.

DHD 510 Concepts in Interdisciplinary Research on Disability 3 hrs. Core concepts and methodologies of the major research traditions used in disability research.

DHD 514 Ethical Issues in Disability 3 hrs. 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.

DHD 515 Statistical Methods in Disability Studies 3 hrs. Examination of parametric and nonparametric statistical methods commonly used in disability research with microcomputer applications to supplement text and lecture materials. Prerequisite(s): An introductory course in statistics.

DHD 517 Ethics and Disability: Contemporary Problems 3 hrs. Ethical theories and ethical decision-making are examined from an interdisciplinary disability studies perspective in relation to people with disabilities. Topics include assisted suicide, de-institutionalization, and genetic discrimination. Prerequisite(s): DHD 514 or consent of the instructor.

DHD 520 Disability and Physical Activity 3 hrs. 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. Same as MVSC 520.

DHD 525 Technology to Promote Physical Activity Among Persons with Disabilities 3 hrs. Applications of new and emerging technologies to promote participation in and adherence to healthful physical activity by people with disabilities. Consideration of ways of redesigning physical, social, and attitudinal environments to achieve these outcomes. Same as CHSC 525. Prerequisite(s): Consent of the instructor.

DHD 526 Family Perspectives on Disability 3 hrs. Examines trends, theories, research methods, policies, and family-centered intervention approaches for families of persons with disabilities. Same as CHSC 526. Prerequisite(s): Consent of the instructor.

DHD 552 Community Intervention 3 hrs. Theory, research, and practice of community interventions in public, nonprofit, and voluntary settings, such as disability organizations; intervention types and effectiveness; role of community intervent. Same as PSCH 532. Prerequisite(s): Consent of the instructor.

DHD 554 Augmentative Communication Assessment 3 hrs. Augmentative communication assessment strategies and evaluation of materials development. Utilizes case examples for discussion of specific approaches for different ages, disabilities, and settings. Prerequisite(s): DHD 440. Recommended background: Speech-Language Pathology, Occupational Therapy, Special Education.

DHD 560 Behavioral Assessment and Functional Analysis 3 hrs. Concepts and principles for use of behavioral assessment and functional analysis. Prerequisite(s): DHD 460 or consent of the instructor.

DHD 563 Exploring the Promise of the Americans with Disabilities Act of 1990 3 hrs. Examination of the history and implementation of the American with Disabilities Act. Analyzes and evaluates the effectiveness of the legislation in promoting and protecting the civil rights of people with disabilities.

DHD 564 Community Integration in Developmental Disabilities 3 hrs. Historical and contemporary issues pertaining to the empowerment and integration of persons with developmental disabilities into community settings. Same as CHSC 564. Provides an analysis of the historical and current approaches to the treatment of persons with disabilities within institutions and the natural community. It provides an important perspective for the understanding of current research issues, services systems, public policies, legislation, and litigation pertaining to disability. It is relevant to all specializations in the Disability and Human Development and Disability Studies programs.

DHD 565 Research Methodology and Outcomes Measures in Rehabilitation Technology 3 hrs. Analyzes the research process in rehabilitation technology and assistive technology and how such analysis leads to the development of a research proposal. Outcome measures related to assistive technology will be evaluated for their applicability. Same as OT 565. Recommended background: Engineering, Occupational Therapy, Physical Therapy, Special Education, and Speech and Language Pathology.
DHD 570 Disability and Culture 3 hrs. 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(s): DHD 401 or consent of the instructor.

DHD 571 Eugenics in America, 1848–1945 4 hrs. Critical examination of the philosophy and practice of eugenics toward people with disabilities during the period from mid-nineteenth to mid-twentieth centuries.

DHD 572 A Representational History of Disability 4 hrs. 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.” Prerequisite(s): Graduate or professional standing.

DHD 575 History of Human Differences: Disability Minorities in America 3 hrs. 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(s): DHD 401 or consent of the instructor.

DHD 576 Visualizing the Body 4 hrs. 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. Prerequisite(s): Graduate or professional standing.

DHD 579 Current Research in Disability Studies 1 hour. A review of the current primary-source literature in the area of disability research. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 10 hours. Prerequisite(s): DHD 577 or consent of the instructor.

DHD 589 Field Experience in Disability and Human Development 0 TO 12 hrs. 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. May be repeated to a maximum of 12 hours. Prerequisite(s): DHD 401 and DHD 415; or consent of the instructor.

DHD 592 Interdisciplinary Seminar in Disability Studies 1 hour. Students, faculty, and guest speakers present topics addressing current issues in research in the area of disability studies. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): DHD 579 or consent of the instructor.

DHD 593 Independent Research 1 TO 8 hrs. Advanced study and analysis of a topic selected by a student under the supervision of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the faculty advisor.

DHD 594 Advanced Special Topics in Disability and Human Development 1 TO 4 hrs. Systematic study of advanced selected topics in disability and human development. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

DHD 595 Seminar in Disability and Human Development 1 TO 4 hrs. Identifies and analyzes a broad range of issues related to disability and human development. Topics vary according to student interests and instructor availability. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

DHD 596 Independent Study 1 TO 4 hrs. Advanced study and analysis of a topic under guidance of a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

DHD 597 Project Research 0 TO 16 hrs. Independent research project under the supervision of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Graduate standing in the MS in Disability and Human Development program and consent of the instructor.

DHD 598 Master’s Thesis Research 0 TO 16 hrs. Thesis research to fulfill master’s degree requirements. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Graduate standing in the MS in Disability and Human Development program and consent of the instructor.

DHD 599 PhD Thesis Research 0 TO 16 hrs. Independent research in one area of disability studies. Satisfactory/Unsatisfactory grading only. May be repeated. Previously listed as DIS 599. Prerequisite(s): Graduate standing in the PhD in Disability Studies program and consent of the instructor.

Earth and Environmental Sciences

EAES 400 Field Experience in Earth Sciences 6 hrs. 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. Prerequisite(s): EAES 330 and EAES 440, or consent of the instructor.

EAES 410 Geochemistry 4 hrs. Origin of elements. Principles of the distribution of elements in the earth’s crust. Element partitioning between coexisting minerals. Thermodynamic considerations of mineral equilibria. Geochemistry of continental waters, ocean geochemistry. Prerequisite(s): EAES 114 or consent of the instructor.

EAES 415 Environmental Geochemistry 4 hrs. Chemical reactions in natural environments; surface chemistry of metals and organic compounds. Clay minerals in soils and sediments. Chemistry of contaminant remediation. Prerequisite(s): EAES 310 or consent of the instructor.

EAES 416 Organic Geochemistry 4 hrs. Global carbon cycle, chemical composition of biogenic matter, sedimentology and diagenesis of organic matter, molecular fossils, geopoymers, fossil fuels, anthropogenic organic compounds, and carbon isotope geochemistry. Prerequisite(s): CHEM 114 or CHEM 136, and EAES 350; or consent of the instructor.

EAES 422 Crystal Chemistry of Rock-Forming Minerals 4 hrs. Crystal chemistry, chemistry, phase equilibria, and properties of materials and minerals. Prerequisite(s): EAES 220 or consent of the instructor.

EAES 424 X-Ray Crystallography 4 hrs. Introduction to the use of diffraction techniques for the identification and characterization of materials. Prerequisite(s): Consent of the instructor.

EAES 430 Igneous Petrology 4 hrs. Discussion of petrogenesis, application of thermodynamic principles to the crystallization of rocks. Prerequisite(s): CHEM 114 and EAES 330.

EAES 440 Structural Geology and Tectonics 4 hrs. Elementary stress and strain relations; folds, fabrics, and faults; deformation mechanisms; basic plate tectonic concepts with regional geological examples. Required weekend field trip at a nominal fee. Prerequisite(s): EAES 102.

EAES 444 Geophysics 4 hrs. Introduction to basic principles of geophysics applicable for environmental problems and the solid earth, including magnetics, electric, seismic gravity, geophysical well logging, radioactivity, and heat flow. Prerequisite(s): EAES 102. Recommended background: Completion of introductory courses in physics and calculus.

EAES 448 Plate Tectonics 4 hrs. Basic concepts and recent developments, including plate kinematics, marine magnetics and paleomagnetics, evolution of oceanic lithosphere, subduction zones, and passive margins. Prerequisite(s): MATH 180; and PHYS 102 or PHYS 142; or consent of the instructor.

EAES 455 Clastic Sedimentology and Sequence Stratigraphy 4 hrs. Processes, facies, and sedimentary architecture in fluvial, deltaic, coastal, and offshore marine clastic depositional environments. Relative sea-level change and its controls on the stratigraphic record. Basin and reservoir modeling. Field trips required at nominal fee. Prerequisite(s): EAES 350 or consent of the instructor.

EAES 466 Principles of Paleontology 4 hrs. Theory and methods of evolutionary paleobiology; includes paleoecology, functional morphology, and major features of organic evolution. Same as BIOS 466. Prerequisite(s): EAES 360 or BIOS 360 or consent of the instructor.

EAES 470 Surficial Processes 4 hrs. Quantitative analysis of the mechanics, rates, and distribution of physical processes that modify Earth’s and other planets’ surfaces. Introduction to field, theoretical, and modelling approaches. Prerequisite(s): EAES 101 and MATH 181.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAES 475</td>
<td>Hydrology/ Hydrogeology</td>
<td>4 hrs.</td>
<td>The occurrence, storage, movement, and quality of water above, on, and below the Earth's surface. Topics progress through atmospheric water vapor processes, Earth surface hydrology, and groundwater hydrology. Field trip required at nominal fee. Prerequisite(s): EAES 101 or EAES 107; and MATH 181; or consent of the instructor.</td>
</tr>
<tr>
<td>EAES 480</td>
<td>Statistical Methods in Earth and Environmental Sciences</td>
<td>4 hrs.</td>
<td>Techniques of probability and data analysis as applied to problems in environmental sciences. Sampling, statistical inference, descriptive statistics, multivariate methods, and time series analysis. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 488</td>
<td>Instrumental Analysis</td>
<td>3 hrs.</td>
<td>Selected topics: generation and properties of magmas, formation of metamorphic rocks, and reaction rates in metamorphic processes. May be repeated if topics vary. Prerequisite(s): Credit in EAES 410.</td>
</tr>
<tr>
<td>EAES 492</td>
<td>Internship in the Earth and Environmental Sciences</td>
<td>1 hour</td>
<td>Off-campus participation in governmental or private-sector training program. Credit is contingent on submission of a final report. Satisfactory/Unsatisfactory grading only. May be repeated with approval. Prerequisite(s): EAES 101 or EAES 396 may be applied toward the degree. Approval of the department.</td>
</tr>
<tr>
<td>EAES 494</td>
<td>Current Topics in Earth and Environmental Sciences</td>
<td>4 hrs.</td>
<td>Discussion of current research topics in earth and environmental sciences. Prerequisite(s): Consent of the instructor. Recommended background: Junior standing and 12 hours of advanced courses in Earth and Environmental Sciences.</td>
</tr>
<tr>
<td>EAES 510</td>
<td>Advanced Geochemistry</td>
<td>3 TO 4 hrs.</td>
<td>Advanced topics in one of the following categories: isotope geochemistry and geochronology, distribution of elements in the earth's crust, mineral systems with and without volatile components, low-temperature mineral systems. Lectures and seminars. May be repeated if topics vary. Prerequisite(s): Consent of the instructor. Recommended background: Credit in EAES 410.</td>
</tr>
<tr>
<td>EAES 511</td>
<td>Principles of Aqueous Geochemistry</td>
<td>4 hrs.</td>
<td>Theory and application of thermodynamics and kinetics to processes controlling the compositions of natural waters, including solid and gas solubility, dissolution and precipitation, sorption, oxidation-reduction, and acid-base equilibria. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 512</td>
<td>Solid-Water Interface Chemistry</td>
<td>4 hrs.</td>
<td>Description, theory, and characterization of molecular-scale chemical processes at the solid-water interface. Major emphasis on oxide minerals with minor emphasis on metals, salts, and organics. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 513</td>
<td>Stable Isotopes Geochemistry and Biogeochemistry</td>
<td>4 hrs.</td>
<td>Lectures and readings will cover nucleosynthesis, physical basis of isotopic fractionation, isotopic distributions in nature, and applications of stable isotope ratio measurements in studies of geologic, hydrologic, atmospheric, and biological processes. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 514</td>
<td>Environmental Radioactivity</td>
<td>4 hrs.</td>
<td>Covers the origins and distribution of radioactivity in the natural environment, along with applications of radioactivity measurements to studies of geologic, hydrologic, atmospheric, and biological processes. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 516</td>
<td>Advanced Organic Geochemistry/ Biogeochemistry</td>
<td>4 hrs.</td>
<td>Carbon biogeochemical cycle, carbon fixation and carbon isotope fractionation, compound specific isotope analysis, biomarker geochemistry, and paleoenvironment. Prerequisite(s): EAES 416 or consent of the instructor.</td>
</tr>
<tr>
<td>EAES 520</td>
<td>Advanced Mineralogy</td>
<td>4 hrs.</td>
<td>Various topics in one of the following categories: structural determination, advanced diffraction techniques, crystal chemistry, and structural mineralogy. Lectures, seminars, and laboratory. May be repeated if topics vary. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 530</td>
<td>Advanced Petrology</td>
<td>3 TO 4 hrs.</td>
<td>Selected topics: generation and properties of magmas, formation of metamorphic rocks, and reaction rates in metamorphic rocks. May be repeated if topics vary. Prerequisite(s): Consent of the instructor. Recommended background: Credit in EAES 430.</td>
</tr>
<tr>
<td>EAES 540</td>
<td>Interdisciplinary Approaches to the Study of Integrated Humans' Natural Landscapes</td>
<td>3 hrs.</td>
<td>Examination of ecological, biogeochemical, and evolutionary principles; techniques and philosophies of ecological remediation, restoration, and conservation; environmental regulation and policy; sustainability in theory and practice. Same as BIOS 540 and CME 540. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 541</td>
<td>Seismology</td>
<td>4 hrs.</td>
<td>Elastic wave propagation theory, instrumentation, seismic source mechanisms, body and surface waves, free oscillations, Earth's interior, focal mechanisms, and earthquakes and plate tectonics. Prerequisite(s): EAES 444 or consent of the instructor.</td>
</tr>
<tr>
<td>EAES 543</td>
<td>Advanced Geophysics and Plate Tectonics</td>
<td>4 hrs.</td>
<td>Advanced topics in geophysics and plate tectonics, including subjects such as mantle convection, driving forces of plate tectonics, and evolution of rifted continental margins. May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): EAES 444 or EAES 448.</td>
</tr>
<tr>
<td>EAES 545</td>
<td>Spatial and Temporal Analysis and Modeling</td>
<td>4 hrs.</td>
<td>Methods for the analysis and modeling of spatial and temporal patterns in the earth and environmental sciences. Data acquisition. Prerequisite(s): Graduate standing; and consent of the instructor.</td>
</tr>
<tr>
<td>EAES 546</td>
<td>Research Methods for Landscape Ecological and Anthropogenic Processes</td>
<td>4 hrs.</td>
<td>Students will develop the skills to choose and utilize relevant methods and tools used in the study and management of altered natural landscapes to achieve research and management objectives through hands-on interdisciplinary laboratory modules. Same as BIOS 546 and CME 546. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 547</td>
<td>Field Experiences in Landscape Ecological and Anthropogenic Processes</td>
<td>4 hrs.</td>
<td>Evaluation of the issues and needs of various landscape restorations and related urban-impacted sites in the Chicago metropolitan area based upon selected readings, site visits, and presentations and discussions with the site manager/ coordinators. Same as BIOS 547 and CME 547. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>EAES 550</td>
<td>Advanced Sedimentary Geology</td>
<td>3 hrs.</td>
<td>Advanced topics in theoretical, empirical, and applied aspects of hillside processes, sediment transport mechanics, river mechanics, weathering and soil development, or drainage basin development. May be repeated if topics vary. Prerequisite(s): EAES 470.</td>
</tr>
<tr>
<td>EAES 555</td>
<td>Advanced Surficial Processes</td>
<td>4 hrs.</td>
<td>Advanced topics in theoretical, empirical, and applied aspects of surficial processes such as mantle convection, driving forces of plate tectonics, and evolution of rifted continental margins. May be repeated if topics vary. Prerequisite(s): EAES 470.</td>
</tr>
<tr>
<td>EAES 556</td>
<td>Quaternary Environmental Systems</td>
<td>3 hrs.</td>
<td>Interrelationships between oceanic, lacustrine, marine, coastal, and glacial environments for the past 1.8 million years; geochronologic and isotopic methods; stratigraphic and geomorphic approaches. Prerequisite(s): EAES 470.</td>
</tr>
<tr>
<td>EAES 557</td>
<td>Advanced Hydrology</td>
<td>3 hrs.</td>
<td>Selective topics: mechanics of near-surface groundwater, flow in fractured rocks, groundwater contamination, unsaturated-saturated flow, surface-groundwater interactions. May be repeated if topics vary. Prerequisite(s): EAES 475.</td>
</tr>
<tr>
<td>EAES 558</td>
<td>Paleoclimatology</td>
<td>3 hrs.</td>
<td>Principles of climatology and paleoclimatology; mechanisms and causes of climate change for the past 63 million years; geologic records of climate and modelling. Prerequisite(s): EAES 470.</td>
</tr>
<tr>
<td>EAES 560</td>
<td>Aquatic Science</td>
<td>3 hrs.</td>
<td>Addresses environmental issues related to lakes, rivers, estuaries, and coastal zones. Topics will cover sampling techniques, impact of humans, and global change. Field trip required at nominal fee. Prerequisite(s): EAES 475; or consent of the instructor.</td>
</tr>
<tr>
<td>EAES 595</td>
<td>Departmental Seminar</td>
<td>1 hour</td>
<td>Special one-hour seminar, every Thursday, by invited speakers from other earth and environmental sciences departments, governmental agencies, and industry. Satisfactory/Unsatisfactory grading only.</td>
</tr>
</tbody>
</table>
ECON 442 Topics in Economic Education 1 TO 4 hrs. Topic varies. Course content is announced prior to each term in which it is given. May be repeated for credit. Students may register for more than one section per term. Credit for this course may not be applied to satisfy the minimum number of Economics credit hours needed for the BA, BS, MA, or PhD in Economics. It may be used as general elective credit for these degree programs or as the Economics Education course requirement for the Certificate in the Teaching of Economics. Prerequisite(s): Consent of the instructor. Prerequisites may vary according to topic.

ECON 450 Business Forecasting Using Time Series Methods 3 OR 4 hrs. Autoregressive, moving average, and seasonal models for time series analysis and business forecasting. Forecasting using multivariable transfer function models. Same as IDS 476. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): IDS 371 or ECON 346 or consent of the instructor.

ECON 472 Real Estate Finance 3 OR 4 hrs. 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. Same as FIN 472. 3 undergraduate hours, 4 graduate hours. May not be used to satisfy the Economics credit requirement for the MA in Economics and PhD in Economics. Elective credit only will be applied toward these degrees. Prerequisite(s): ECON 218 or ECON 220; and either ECON 345 or MATH 165 or MATH 180.

ECON 475 Real Estate Markets and Valuation 3 OR 4 hrs. Real estate market analysis. Sales comparison, cost, and income approaches for estimating residential and commercial property values. Statistical procedures for real estate analysis. 3 undergraduate hours, 4 graduate hours. Course may not be applied toward the minimum required courses in Economics for the MA or PhD in Economics. Prerequisite(s): ECON 218 or ECON 220; and ECON 270 or IDS 270; or consent of the instructor.

ECON 495 Competitive Strategy 4 hrs. 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(s): Senior standing in the College of Business Administration and completion of all other CBA core courses, or consent of the instructor.

ECON 499 Independent Study in Economics 1 TO 3 hrs. Independent study of a topic not covered in a graduate-level course. Prerequisite(s): Graduate standing and consent of the director of graduate studies and the instructor.

ECON 500 Managerial Economics 4 hrs. Economic analysis applied to business operations; demand theory; production cost analysis; capital theory; pricing policies; capital budgeting. Prerequisite(s): ECON 501 or ECON 520.

ECON 501 Microeconomics I 4 hrs. Theories of consumer and producer behavior and determination of market price. Systematic treatment of the core of microeconomic theory. Prerequisite(s): ECON 220 and MATH 165.

ECON 502 Microeconomics II 4 hrs. Advanced microeconomic theory. Theories of consumer behavior, uncertainty, general equilibrium, and welfare economics. Prerequisite(s): ECON 501.

ECON 504 The Economics of Organization of Business Enterprises 4 hrs. The economic reasons for the existence of firms, the determinants of firm size, and the theory of organizational structure. Prerequisite(s): ECON 501 or ECON 520.

ECON 511 Macroeconomics I 4 hrs. 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(s): ECON 221.

ECON 512 Macroeconomics II 4 hrs. Neoclassical and modern market-clearing models of real and monetary influences on economic growth, inflation, and business cycles. Prerequisite(s): ECON 511.

ECON 513 Special Topics in Macroeconomics and International Economics 4 hrs. Intensive study of selected research topics in macroeconomics and international economics. Topics may vary. Prerequisite(s): ECON 512.

ECON 514 International Trade Policy 4 hrs. Theoretical models on the causes and consequences of international trade and their empirical validation. Effects of tariff and nontariff trade policies and preferential trade agreements. Prerequisite(s): ECON 501; or ECON 520 and ECON 521.

ECON 515 Monetary Policy 4 hrs. 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(s): ECON 511 or ECON 521.

ECON 516 Economic Development in an Interdependent World 4 hrs. 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(s): ECON 501 or ECON 520 or consent of the instructor.

ECON 519 International Economics for Business 4 hrs. Comparative advantage. Trade policy. Custom unions and free-trade areas. Balance of payments and foreign-exchange markets. Capital mobility and other globalization issues. Stabilization policy. Monetary integration. Credit for Econ 519 may not be used to satisfy Economics credit requirements for the MA or PhD in Economics or for the PhD in Business Administration (Concentration in Economics). Credit is not given for ECON 519 if the student has credit for ECON 333, ECON 415, or ECON 515. Prerequisite(s): ECON 520.

ECON 520 Microeconomics for Business Decisions 4 hrs. 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 versus equity, and social welfare. Credit is not given for ECON 520 if the student has credit in ECON 501 or ECON 540. Prerequisite(s): MATH 165 or MATH 181 or the equivalent.

ECON 521 Macro and International Economics for Business 4 hrs. Impact of the macroeconomy and international economics on business decisions. Determination of economic activity, inflation, interest rates and exchange rates. Role of monetary and fiscal policy. Credit is not given for ECON 521 if the student has credit in ECON 511.
ECON 531 Labor Economics I 4 hrs.
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(s): ECON 501 or ECON 520.

ECON 532 Labor Economics II 4 hrs.
Impact of training, legislation, institutional constraints, and discrimination on the labor market. Focus on demographic groups (race, nativity, ethnicity, gender). Prerequisite(s): ECON 501 or ECON 520.

ECON 533 Economic Development and Human Resources 4 hrs.
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(s): ECON 501 or ECON 520.

ECON 534 Econometrics I 4 hrs.
Detailed treatment of the multivariate linear regression model using matrix algebra. Emphasis on formulating and testing static and dynamic econometric models. Prerequisite(s): ECON 346; or consent of the instructor.

ECON 535 Econometrics II 4 hrs.
Detailed treatment of simultaneous equations estimation; evaluation of alternative estimators; problems of estimation including probit, logit, tobit, and error component models. Prerequisite(s): ECON 534.

ECON 536 Advanced Mathematical Economics 4 hrs.
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(s): MATH 181.

ECON 537 Business Research and Forecasting I 4 hrs.
The role of research in business; forecasting methods and techniques, including multivariate time series models and their applications. Same as IDS 583. Prerequisite(s): IDS 476 or IDS 582 or ECON 537.

ECON 539 Microeconomics 4 hrs.
Application of econometric techniques to empirical problems in microeconomics with emphasis on identification and causality; and the selection, implementation, and testing of statistical models. Prerequisite(s): ECON 501 and ECON 535.

ECON 540 Economics for the Non-Economists 4 hrs.
Basic introduction to economics for graduate and professional school students. Supply/demand, opportunity cost, economic behavior of consumers/business firms, macroeconomy, inflation, and business cycles. Credit is not given for ECON 540 if the student has credit in ECON 501 or ECON 520. No graduation credit given to students enrolled in MBA, MA, or PhD in Economics, or PhD in Business Administration.

ECON 551 Economics of Education 4 hrs.
Basic concepts and tools of economics applied to education. Economic implications of educational outcomes for the economy, and for socioeconomic structure (e.g., income distribution, fertility patterns, ethnic group differences). Prerequisite(s): ECON 501 or ECON 520.

ECON 552 Economic Demography 4 hrs.
Economic analysis of fertility (number and timing of children), mortality, marriage and divorce, population age structure, and the relationship between population growth and economic development. Prerequisite(s): ECON 501 or ECON 520.

ECON 553 Economics of Religion 4 hrs.
The economic determinants of participation in religious activities; the effects of religion on economic and demographic behavior, health, and well-being. Prerequisite(s): ECON 501 or ECON 520.

ECON 555 Health Economics I 4 hrs.
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(s): ECON 501 or ECON 520; or consent of the instructor.

ECON 556 Health Economics II 4 hrs.
Economics of health-related behaviors, prevention and health promotion, health disparities, health and development, evaluation of health-related interests. Prerequisite(s): ECON 501 or ECON 520; or consent of the instructor.

ECON 560 Industrial Organization 4 hrs.
Analysis of industry structure, behavior and performance; firms in imperfect competition; concentration measurement; oligopoly; theory; cartels; price discrimination; vertical and horizontal integration. Prerequisite(s): ECON 501 or ECON 520 or consent of the instructor.

ECON 562 Environmental and Natural Resource Economics 4 hrs.
Analytical methods for evaluating the impacts and control costs of pollution externalities and natural resource changes. Consequent implications for public and business policy. Prerequisite(s): ECON 501 or ECON 520.

ECON 571 Urban Real Estate and Land Economics 4 hrs.
Economic analysis of urban real estate and land. Real estate appraisal. Demand for urban land; supply of land and improvements. Prerequisite(s): ECON 501 or ECON 520.

ECON 572 Urban Economics 4 hrs.
Urban economic models and economic analysis of urban problems. Firm location, housing, transportation, local public finance. Prerequisite(s): ECON 501 or ECON 520.

ECON 573 Economic Analysis of Public Expenditures 4 hrs.
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(s): ECON 501 or ECON 520.

ECON 574 Microeconomics 4 hrs.
Advanced microeconomic theory and applications, including calculus and linear algebra, to microeconomic theory and its applications. Prerequisite(s): ECON 501 or ECON 520.

ECON 575 Economic Analysis of Public Expenditures 4 hrs.
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(s): ECON 501 or ECON 520.

ECON 576 Economics of Taxation 4 hrs.
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(s): ECON 501 or ECON 520.

ECON 578 Business Research and Forecasting II 4 hrs.
The role of research in business; forecasting methods and techniques, including multivariate time series models and their applications. Same as IDS 583. Prerequisite(s): IDS 476 or IDS 582 or ECON 537.

ECON 579 Microeconomics 4 hrs.
Application of econometric techniques to empirical problems in microeconomics with emphasis on issues of identification and causality; and the selection, implementation, and testing of statistical models. Prerequisite(s): ECON 501 and ECON 535.

ECON 580 Industrial Organization 4 hrs.
Analysis of industry structure, behavior and performance; firms in imperfect competition; concentration measurement; oligopoly; theory; cartels; price discrimination; vertical and horizontal integration. Prerequisite(s): ECON 501 or ECON 520 or consent of the instructor.

ECON 586 Environmental and Natural Resource Economics 4 hrs.
Analytical methods for evaluating the impacts and control costs of pollution externalities and natural resource changes. Consequent implications for public and business policy. Prerequisite(s): ECON 501 or ECON 520.

ECON 580 Industrial Organization 4 hrs.
Analysis of industry structure, behavior and performance; firms in imperfect competition; concentration measurement; oligopoly; theory; cartels; price discrimination; vertical and horizontal integration. Prerequisite(s): ECON 501 or ECON 520 or consent of the instructor.

ECON 587 Environmental and Natural Resource Economics 4 hrs.
Analytical methods for evaluating the impacts and control costs of pollution externalities and natural resource changes. Consequent implications for public and business policy. Prerequisite(s): ECON 501 or ECON 520.

ECON 589 Industrial Organization 4 hrs.
Analysis of industry structure, behavior and performance; firms in imperfect competition; concentration measurement; oligopoly; theory; cartels; price discrimination; vertical and horizontal integration. Prerequisite(s): ECON 501 or ECON 520 or consent of the instructor.

ECON 590 Industrial Organization 4 hrs.
Analysis of industry structure, behavior and performance; firms in imperfect competition; concentration measurement; oligopoly; theory; cartels; price discrimination; vertical and horizontal integration. Prerequisite(s): ECON 501 or ECON 520 or consent of the instructor.
ED 422 Advanced Developmental Psychology and Educational Processes 3 hrs. Focuses on cognitive and social development from birth to adolescence. Examines relations between development, learning, and educational processes. Same as PSCH 422. Prerequisite(s): PSCH 100 and any one from ED 210, PSCH 259, PSCH 320; or graduate standing and consent of the instructor.

ED 429 Practicum in Middle and High School Classrooms 2 hrs. Students will observe secondary classrooms, tutor individuals, and teach small groups. Discussions explore curriculum, instruction, and assessment practices within content areas and cultural contexts. Prerequisite(s): Admission into a secondary teacher education program and graduate standing. Must enroll concurrently in ED 430.

ED 430 Curriculum and Teaching 3 hrs. Introduction to curriculum and teaching as areas of inquiry: implications of these areas of inquiry for educational practice; related contemporary problems and issues. Prerequisite(s): Admission to graduate study in Education, or consent of the instructor.

ED 431 Improving Learning Environments 3 hrs. Analysis of structural, normative, and social dimensions of learning environments and their relationships to student learning. Exploration of change processes to improve those environments. Prerequisite(s): Graduate standing or consent of the instructor.

ED 432 Instruction and Evaluation in Secondary Education 5 hrs. Instructional planning and curriculum design; strategies for instruction and classroom management; forms of formative and summative evaluation; and professional development issues. Fieldwork required. Prerequisite(s): Completion of education core courses in undergraduate teacher certification program: ED 200 and ED 210 or, in graduate teacher certification program: ED 402 or ED 403 or PS 401; and ED 421 or ED 422 or ED 445.

ED 445 Adolescence and the Schools 3 hrs. Physiological, intellectual, and social development of adolescence. Relations between aspects of adolescent development and the academic and social demands of secondary schools. Prerequisite(s): ED 210 or the equivalent, or graduate standing.

ED 450 Composing a Teaching Life I 15 hrs. Begins the capstone experience of the program, full-time student teaching in an elementary classroom. It is accompanied with a weekly seminar to discuss experiences, reason about learning, and reflect on students’ own learning. Prerequisite(s): Senior standing or above and admission to the Bachelor of Arts in Elementary Education program.

ED 451 Composing a Teaching Life II/Senior Reflective Seminar 5 hrs. Provides the capstone experience for students, with a weekly senior reflective seminar in which students reflect upon their teaching through the lenses of the five program curricular strands. Fieldwork required. Prerequisite(s): Admission to the Bachelor of Arts in Elementary Education program and standing and successful completion of ED 450.

ED 461 Political and Sociocultural Perspectives on Special Education 3 hrs. Students will examine issues of access and equity through legislation, litigation, and sociocultural perspectives and be introduced to major theoretical frameworks that influence special education programs. Same as SPED 461. Fieldwork required.

ED 467 Educational Practice with Seminar I 6 hrs. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the college. Prerequisite(s): 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.

ED 471 Educational Practice with Seminar II 6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the college. Prerequisite(s): 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.

ED 472 Promoting Academic and Prosocial Behavior I 3 hrs. The importance of school-wide and classroom structure and climate in the educational process. Strategies to promote academic success and desired social behavior. Same as SPED 472. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

ED 473 Teaching Math and Science with Adaptations 3 hrs. Provides prospective teachers with assessment strategies and a range of adaptations, modifications, and interventions in math and science for students with disabilities. Same as SPED 473. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

ED 500 Philosophical Foundations of Educational Inquiry 4 hrs. Philosophical foundations of various forms of educational inquiry. Epistemological and ethical dimensions of different research approaches. Prerequisite(s): Admission to the PhD in Education program or consent of the instructor.

ED 501 Data and Interpretation in Educational Inquiry 4 hrs. Data, interpretation, reliability, validity, accuracy, stability, and generalizability from different methodological perspectives; research design, data collection, and interpretation vary with different philosophical approaches. Prerequisite(s): Admission to the PhD in Education program or consent of the instructor.

ED 502 Essentials of Qualitative Inquiry in Education 4 hrs. Hands-on introduction to qualitative research methods, including foundations, practices, and ethics in qualitative research. Prerequisite(s): Admission to the PhD in Education program or consent of the instructor.
EDPS 449 Early Childhood / Early Childhood Special Ed: Perspectives, Policies, and History 3 hrs.

EDPS 453 Topics in Educational Policy Studies 3 OR 4 hrs.
Topics are announced at the time the class is scheduled. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours.

EDPS 500 City Schools: Education in the Urban Environment 4 hrs.
Cross-disciplinary, critical analysis of relationships between public schools and school districts and their urban environments, with attention to implications for school improvement. Prerequisite(s): Consent of the instructor.

EDPS 501 Education Finance and Budgeting 4 hrs.
Role of government, school boards, and community in funding education. Principles of school and district financial planning, management, and analysis. Equity issues in school finance. Prerequisite(s): Consent of the instructor.

EDPS 510 Introduction to Doctoral Education in Policy Studies 4 hrs.
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 change. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Admission to the PhD in Policy Studies in Urban Education program or consent of the instructor.

EDPS 512 Data and Interpretation in Educational Policy Studies 4 hrs.
Methodology course providing students with basic understanding and skills in assessing, interpreting and representing quantitative and qualitative evidence in educational policy studies research. Students learn research design and critique. Prerequisite(s): ED 500 and enrollment in the PhD in Policy Studies in Urban Education program or consent of the instructor.

EDPS 544 Research Design in Educational Policy Studies 4 hrs.
Alternative research design models and evaluation methodologies; quantitative and qualitative approaches; ethnography; historiography; experimentation and quasi-experimentation; institutional and practitioner research designs and methods. May be repeated. Prerequisite(s): Admission to the PhD in Policy Studies in Urban Education (Educational Organization and Leadership Concentration) or the EdD in Urban School Leadership program and consent of the instructor.

EDPS 548 Leadership for Literacy Instruction 4 hrs.
School and system leadership practices for promoting effective literacy instruction in urban elementary and secondary schools. Assessment and improvement of literacy curriculum, pedagogy, and evaluation. Same as CI 548. Prerequisite(s): Consent of the instructor; admission to a degree program in the College of Education. Students admitted to the EdD in Urban Education Leadership, prerequisites also include EDPS 590 and EDPS 552.

EDPS 549 Teaching for Social Justice 4 hrs.
Examine theory and practice of social justice teaching in schools, including: history, literate pedagogies, culturally relevant and critical pedagogies, funds of knowledge, critical multiculturalism and antiracist pedagogy, critical race theory. Same as CI 549. Prerequisite(s): Consent of the instructor.

EDPS 550 Organizational Change in Education 4 hrs.
Introduction to models and theories of organizational change in education. Overview of mechanisms, resources, and contexts of effective school improvement. Prerequisite(s): Consent of the instructor.

EDPS 552 The Urban School Principal 4 hrs.
Leadership and management responsibilities of principals in urban schools. Theory and research on principal leadership, case study analysis, and field experience with working principals. Prerequisite(s): Admission to the Doctor of Education in Urban School Leadership program or consent of the instructor.

EDPS 553 System Leadership in Urban Schools 4 hrs.
Leadership and management responsibilities of system-level administrators in urban school districts. Theory and research on system level leadership using case study analysis and fieldwork with system administrators. Prerequisite(s): Consent of the instructor.

EDPS 555 Political Economy of Urban Education 4 hrs.
Politics of urban school policy and practice. Interest groups, school boards, educators, citizens, and governments as political actors. Educational leadership in political context. Prerequisite(s): Consent of the instructor.

EDPS 556 Instructional Leadership 4 hrs.
Instructional improvement role of educational leaders of urban schools. Human resource development, parent/community support, supportive organizational contexts. Strategic planning, implementation, and evaluation. Prerequisite(s): Consent of the instructor.

EDPS 559 Internship in Educational Leadership 4 hrs.
Field experience in approved educational leadership positions and sites to perform authentic leadership tasks. Supervision by site-based mentor and university instructor. Different sections will focus on school-level and system-level administration. May be repeated. 4 hours required for the Illinois Type 75 certificate. Additional hours may be needed for students to satisfy local school system administrator certification requirements (such as Chicago Public Schools’ 1019 requirement). Prerequisite(s): Admission to the EdD in Urban School Leadership program and to the Type 75 General Administrative Certificate program, and consent of the instructor. Requires concurrent registration in EDPS 573.

EDPS 566 Cultural Studies in Education 4 hrs.
Examines origins, evolution, and current frameworks of cultural studies with a focus on educational policy and practice. Prerequisite(s): Consent of the instructor.

EDPS 567 Economics of Education 4 hrs.
Introduction to the economics of education. Relates education and income, studies, and conditions for efficient production of education, and teacher markets and school finance. Prerequisite(s): Consent of the instructor.

EDPS 568 Education and the Law 4 hrs.
Legal rights, responsibilities, and authority of students, parents, teachers, administrators, boards, and government units in relation to schools. Legal issues in education policy and practice. Prerequisite(s): Consent of the instructor.

EDPS 570 Historical and Philosophical Analysis of Educational Practice 4 hrs.
Historical and philosophical research methodology in the study of educational policy. Prerequisite(s): Consent of the instructor.

EDPS 571 The Education Policy Process 4 hrs.
Examination of forces that influence the processes of educational policy making, adoption, and implementation, with a focus on the roles of legislatures, courts, government agencies, and interest groups. Prerequisite(s): Admission to the PhD in Policy Studies in Urban Education or the EdD in Urban School Leadership or consent of the instructor.

EDPS 572 Sociology of Education 4 hrs.
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. Same as SOC 572. Prerequisite(s): Consent of the instructor.

EDPS 573 Seminar in Education Leadership Practice 4 hrs.
Budget and finance, strategic planning and decision making, communication, use of data and technology, parent/community relations, student support services. Different sections will focus on school-level and system-level administration. May be repeated. 4 hours is required for the Illinois Type 75 certificate. Additional hours may be needed for students to satisfy local school system administrator certification requirements (such as Chicago Public Schools’ 1019 requirement). Prerequisite(s): Admission to the EdD in Urban Educational Leadership program and consent of the instructor. Requires concurrent registration in EDPS 573.

EDPS 589 Field Experience in Urban Schools 4 hrs.
Field experience in approved educational leadership positions and sites to perform authentic leadership tasks. Supervision by site-based mentor and university instructor. Different sections will focus on school-level and system-level administration. May be repeated. 4 hours required for the Illinois Type 75 certificate. Additional hours may be needed for students to satisfy local school system administrator certification requirements (such as Chicago Public Schools’ 1019 requirement). Prerequisite(s): Admission to the EdD in Urban Educational Leadership program and to the Type 75 General Administrative Certificate program, and consent of the instructor.

EDPS 590 Leadership Practice 4 hrs.
Field experience in approved educational leadership positions and sites to perform authentic leadership tasks. Supervision by site-based mentor and university instructor. Different sections will focus on school-level and system-level administration. May be repeated. 4 hours required for the Illinois Type 75 certificate. Additional hours may be needed for students to satisfy local school system administrator certification requirements (such as Chicago Public Schools’ 1019 requirement). Prerequisite(s): Admission to the EdD in Urban Educational Leadership program and to the Type 75 General Administrative Certificate program, and consent of the instructor. Requires concurrent registration in EDPS 573.

EDPS 595 Qualitative Research in Educational Policy Studies 4 hrs.
Methods of qualitative research in educational policy studies with a focus on emerging methodologies. Prerequisite(s): ED 544, EDPS 555, and consent of the instructor.
EDPS 576 History of Higher Education 4 hrs. Focus on key historical events that have had enduring implications for colleges and universities. Emphasis on social, political, economic, intellectual, and legal forces shaping American higher education. Prerequisite(s): Consent of the instructor.

EDPS 577 American Academic Profession 4 hrs. Foundations of the academic profession. Emphasis on institutional and disciplinary variation in the performance, evaluation, and reward of faculty activities. Prerequisite(s): Consent of the instructor.

EDPS 578 Political Theory and Education Policy 4 hrs. Theoretical perspectives on the role of politics in the development of educational policy at the federal, state, and local levels. Prerequisite(s): Consent of the instructor.

EDPS 579 Organization Theory in Education 4 hrs. Theories of decision making, organizational effectiveness, and organizational improvement in education. Multidisciplinary and historical perspectives and their application to understanding the nature and function of educational organizations. Prerequisite(s): Admission to the PhD in Policy Studies in Urban Education program or the EdD in Urban School Leadership program or consent of the instructor.

EDPS 581 Collective Bargaining in Education 4 hrs. Role of collective bargaining in governance, function, and improvement of school systems. Models and processes of negotiation, engagement, and conflict resolution. Prerequisite(s): Consent of the instructor.

EDPS 582 Cultural Pluralism and Education Policy 4 hrs. Social philosophical analysis of the theory of cultural pluralism, its relation to the liberal-experimentalist tradition in educational thought; selected equal educational opportunity policies; recent federal and state legislation on multicultural education. Prerequisite(s): Consent of the instructor.

EDPS 583 Women in Education 4 hrs. An overview of girls’ 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. Same as GWS 583. Prerequisite(s): Consent of the instructor or enrollment in the PhD in Policy Studies in Urban Education program.

EDPS 586 Methods of Institutional and Practitioner Research 4 hrs. Methods of institutional and practitioner research for practicing educators in school and school system settings. Relationship of this form of inquiry to educational leadership and improvement. Prerequisite(s): Consent of the instructor.

EDPS 587 Methods of Case Study Research 4 hrs. Study and practice in documentary and field research methods of collecting, organizing, and integrating educational data for case study. Includes attention to interviewing, observation, ethnography, and historiography. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

EDPS 588 Critical Race Theory: Race and Racism in Education 4 hrs. Examines theories of race and racism in education within the interdisciplinary construct of critical race theory. Prerequisite(s): Consent of the instructor.

EDPS 589 Administrative and Leadership Theory in Education 4 hrs. Overview of administrative theory, including theory-practice interface; administrative theory history; and relationships of administrative theory to educational administration and organizations. Prerequisite(s): Admission to the PhD in Policy Studies in Urban Education program or the EdD in Urban School Leadership program or consent of the instructor.

EDPS 592 Professional Career Training in Education Policy Studies 4 hrs. Faculty-supervised training through university teaching, research, or internship. Presentation relating experience to theory. May be repeated to a maximum of 16 hours. Prerequisite(s): Approval of the department chairperson.

EDPS 593 Doctoral Research Project 1 TO 8 hrs. Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. May be repeated to a maximum of 8 hours. Prerequisite(s): Consent of the instructor.

EDPS 594 Special Topics in Educational Policy 4 hrs. Exploration of an area not covered in existing course offerings. Topics vary. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

EDPS 596 Independent Study in Educational Policy Studies 1 TO 4 hrs. Students carry out independent study in educational policy studies under the direction of a faculty member. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the advisor and the department chairperson.

EDPS 599 Dissertation and Thesis Research in Educational Policy Studies 0 TO 16 hrs. Research on the topic of the student’s dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the dissertation advisor.

EDPS 415 Urban Youth Fieldwork 3 hrs. Experience in planning, teaching in, and evaluating innovative physical activity-based urban youth programs. Accompanying seminar to examine related literature and explore the interface between theory and practice. May be repeated to a maximum of 6 hours. Previously listed as CIE 415. Fieldwork required. Prerequisite(s): Junior standing or above; and consent of the instructor. Requires interview and placement.

EDPS 420 Social Development of Urban Children 3 OR 4 hrs. General principles of social development and socialization during childhood and the factors common to urban children that illustrate and modify these principles. Same as PSCH 420. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Admission to a graduate program in Education or Psychology, or consent of the instructor.
Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.
EPSY 476 Social and Emotional Development and Disabilities 3 hrs. 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. Same as SPED 467. Fieldwork required.
Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.
EPSY 494 Topics in Educational Psychology 1 TO 4 hrs. Seminar on a pre-announced topic focusing on methodology, research, and educational implications of recent models of learning, problem solving, and thinking. May be repeated to a maximum of 12 hours. Prerequisite(s): Consent of the instructor.
EPSY 496 Independent Study 1 TO 4 hrs. Students carry out independent study under the direction of an Educational Psychology faculty member. Prerequisite(s): Junior standing or above; and consent of the instructor.
EPSY 500 Proseminar in Educational Psychology 2 hrs. Interdisciplinary colloquia on selected topics in educational psychology. Serves as introduction to faculty research foci. Same as PSCH 550. Satisfactory/unsatisfactory grading only. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program, or consent of the instructor.
EPSY 501 Cognition and Instruction 4 hrs. Current research on relations among cognitive processes, learning, and instruction. Same as PSCH 551. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program, or consent of the instructor.
EPSY 502 Social Psychology of Education 4 hrs. Social psychological factors influencing academic and social outcomes in schools. Achievement motivation, peer relations, and social values in relation to student characteristics and school practice. Same as PSCH 517. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program; or consent of the instructor.
EPSY 503 Essentials of Quantitative Inquiry in Education 4 hrs. Introduces theory and assumptions behind parametric statistics. Also provides hands-on experience in conducting basic quantitative research (t-test, correlation, regression, analysis of variance). Same as ED 503. Prerequisite(s): Admission to the PhD in Education program or consent of the instructor.
EPSY 504 Rating Scale and Questionnaire Design and Analysis 4 hrs. Development and administration of rating scales and questionnaires, analysis of data, and reporting of results. The focus is on rating scales. Same as PSCH 504. Previously listed as EPSY 550. Prerequisite(s): ED 501, and ED 503 or EPSY 503 or the equivalents or consent of the instructor.
EPSY 505 Advanced Analysis of Variance and Multiple Regression 4 hrs. Detailed coverage of the principles of ANOVA models, multiple correlation, and multiple regression techniques as tools for the analysis and interpretations of educational and behavioral science data. Extensive computer use required. Prerequisite(s): EPSY 503; or consent of the instructor.
EPSY 506 Item Response Theory/Rasch Measurement 4 hrs. Statistical inference with item-response theory models, useful to measure an individual’s performance on a test or questionnaire. Models include parametric, nonparametric, unidimensional, multidimensional, and cognitive. Same as PSCH 506. May be repeated to a maximum of 8 hours. Extensive computer use required. Prerequisite(s): ED 501 and EPSY 503 and EPSY 546 or the equivalent. Appropriate score on the department placement test. Graduate or professional standing required or consent of the instructor.
EPSY 509 Research Design in Education 4 hrs. Emphasis is placed on the methodology and program evaluation research, distinguishing the parts of the study, and designing a research proposal. Prerequisite(s): Admission to a graduate program.
EPSY 510 Theory of Statistics 4 hrs. The foundations of statistical analysis and probability modeling, including probability theory, parameter estimation, axioms and principles of rational decision making, and large-sample theory. Prerequisite(s): EPSY 546 or EPSY 547 or EPSY 563; and graduate or professional standing; or consent of the instructor or equivalent.
EPSY 512 Hierarchical Linear Models 4 hrs. Parametric and semiparametric approaches to hierarchical linear modeling, for the analysis of multilevel and categorical multivariate data. These approaches extend on classical linear regression analysis. Extensive computer use required. Prerequisite(s): EPSY 546 or EPSY 547 or EPSY 563; and graduate or professional standing; or consent of the instructor or equivalent.
EPSY 514 Nonparametric Modeling 4 hrs. Contemporary nonparametric and semiparametric models that make minimal assumptions about the data-generating process, in order to permit more accurate conclusions in data analysis. Prerequisite(s): ED 501 and EPSY 503 or the equivalent; and appropriate score on the department placement test.
EPSY 517 Seminar in Urban Youth Development 4 hrs. In-depth analysis of topics and issues in the field of youth development and its relation to youth program development, with special attention to the urban context. Previously listed as CIE 517. Prerequisite(s): Consent of the instructor.
EPSY 519 Curriculum, Instruction, and Assessment in Early Primary Grades 5 hrs. Language arts, mathematics, science, social studies, and fine arts curriculum development and instruction in the primary grades. Prerequisite(s): EPSY 429 and EPSY 520; and consent of the instructor.
EPSY 520 Curriculum and Practice in Early Childhood Education I 5 hrs. Examines curriculum models and methods for fostering learning and development in early childhood. Provides early childhood classroom experience in early childhood classrooms. Prerequisite(s): EPSY 429 and ED 422; and consent of the instructor.
EPSY 521 Early Childhood Education Student Teaching 10 hrs. Instructional methods and curricula in the early-childhood classrooms. Discussion of program and child evaluation. Includes full-time supervised student teaching. Meets Illinois state requirement for Type 04 Certification by providing supervised student teaching experience. Prerequisite(s): EPSY 519 and EPSY 520; and consent of the instructor.
EPSY 522 Internship in Early Childhood 6 hrs. Instructional methods in curricula in early childhood education. Meets Illinois State Board of Education requirement for Type 04 Certification. May be repeated. Full-time fieldwork required in early childhood education classrooms. Prerequisite(s): Consent of the instructor.
EPSY 524 Parent and Staff Relations in Early Education 4 hrs. Methods for involving parents in early childhood education. The role of the director in program administration and in hiring, training, and supervising teachers and staff. Prerequisite(s): Consent of the instructor.
EPSY 525 Advanced Adolescent Development 3 hrs. Examines current theory and research on physiological, intellectual, emotional, and social development during the adolescent years. Examines relationships among individual, interpersonal, and contextual factors related to adolescent development. Prerequisite(s): EPSY 446 or EPSY 502 or ED 431 or ED 445; or ED 445; or consent of the instructor. Recommended background: Course work in developmental psychology or psychology.
EPSY 526 Development in Infancy and Early Childhood 4 hrs. Consideration of development in the preschool years. Stress on theory, research, individual child study, and educational implications. Same as PSCH 520. Prerequisite(s): Consent of the instructor or equivalent.
EPSY 527 Seminar in Moral Development, Character Formation, and Education 4 hrs.
Philosophical assumptions, psychology research, and theory underlying current approaches to moral and character education. Cultural and developmental factors in value formation. Same as PSCH 527. Prerequisite(s): ED 422 or PSCH 422 or the equivalent, or admission to the PhD in Education Program, PhD in Psychology program, or PhD in Social Work program, or consent of the instructor.

EPSY 529 Cognition and Instruction: Advanced Constructivist Approaches 4 hrs.
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. Same as PSCH 552. Prerequisite(s): EPSY 429 or PSCH 429 or the equivalent, and admission into a PhD program in the College of Education or Psychology or consent of instructor.

EPSY 530 Achievement Motivation 4 hrs.
The psychology of achievement motivation will be explored from the perspectives of personality, social, and educational psychology. Same as PSCH 535. Prerequisite(s): Graduate standing in education or psychology or consent of the instructor.

EPSY 546 Educational Measurement 4 hrs.
Contemporary models for the analysis of data arising from multiple-choice tests, rating-scale questionnaires, or expert judgments of examinee performance. Test equating is also covered. Prerequisite(s): ED 501, and ED 503 or EPSY 503 or the equivalent or consent of the instructor.

EPSY 547 Multiple Regression in Educational Research 4 hrs.
Introduction to multiple correlation and regression techniques as tools for the analysis and interpretation of educational and behavioral science data. Prerequisite(s): EPSY 503.

EPSY 553 Assessment for Teachers 4 hrs.
Plan, construct, administer, score, and report on classroom assessments that measure a wide variety of learning outcomes, from simple to complex; select and use standardized achievement tests; develop defensible grading procedures. Prerequisite(s): EPSY 421 and EPSY 422; or consent of the instructor.

EPSY 560 Educational Program Evaluation 4 hrs.
Introduction to concepts, approaches, techniques, and practices of educational program evaluation. Students work toward acquiring knowledge and skills to plan and conduct evaluations of programs, projects, curriculum, and institutions. Prerequisite(s): ED 501 and EPSY 503; or consent of the instructor.

EPSY 561 Assessment for Measurement Professionals 4 hrs.
Plan, construct, administer, score, and report on classroom assessment; select and use standardized achievement tests; develop defensible grade procedures; measure issues in classroom assessment; validity and reliability of classroom assessments. Prerequisite(s): ED 421 and ED 422; or consent of the instructor.

EPSY 563 Advanced Analysis of Variance in Educational Research 4 hrs.
Detailed coverage of the principles of analysis of variance and the analysis of data collected from research employing experimental designs. Prerequisite(s): EPSY 503.

EPSY 564 Forging Collaborations with Family and Community 3 hrs.
Develops skills necessary to work in partnership with the families of children with disabilities, and community members. Same as SPED 582. Prerequisite(s): ED 461 or SPED 461 or the equivalent or consent of the instructor.

EPSY 589 Topics in Educational Sector for Forming Current Issues 4 hrs.
Seminar on a preannounced topic on educational sector methodology for the analysis of educational data. May be repeated. Prerequisite(s): EPSY 547.

EPSY 593 PhD Research Project 1 TO 8 hrs.
Students design, implement, and analyze results of a research problem in this area of specialization. Completed study is reviewed by faculty. May be repeated to a maximum of 8 hours. Prerequisite(s): Admission to the PhD in Education program.

EPSY 594 Special Topics in Educational Psychology 1 TO 4 hrs.
Seminar on a preannounced topic focusing on methodology, research, and educational implications of recent models of learning, problem solving, and thinking. May be repeated to a maximum of 12 hours. Prerequisite(s): ED 421 and ED 422, or consent of the instructor.

EPSY 596 Independent Study 1 TO 4 hrs.
Students carry out independent study in educational psychology under the direction of a faculty member. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): ED 490 or the equivalent, and consent of the advisor and instructor.

EPSY 598 Masters Research 0 TO 16 hrs.
Research on the topic of the student’s master’s thesis. May be repeated to a maximum of 8 hours. Prerequisite(s): Consent of the thesis instructor.

EPSY 599 Thesis Research 0 TO 16 hrs.
Research on the topic of the student’s dissertation. Satisfactory/ Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the dissertation advisor.

Electrical and Computer Engineering

ECE 400 Introduction to Microelectromechanical Systems 3 OR 4 hrs.
Definition, classification, and case studies of transducers, sensors, and actuators. Microfabrication methods for microelectromechanical systems (MEMS). Design, simulation, and modeling of MEMS. 3 undergraduate hours. 4 graduate hours. Previously listed as EECs 400. Prerequisite(s): ECE 346.

ECE 401 Quasi-Static Electric and Magnetic Fields 3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Previously listed as EEEs 401. Prerequisite(s): ECE 322.

ECE 407 Pattern Recognition I 3 OR 4 hrs.
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. Same as BIOM 407. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): MATH 220.

ECE 410 Network Analysis 3 OR 4 hrs.
Matrix algebra for network analysis, network parameters, macromodeling, high-frequency measurements, network functions and theorems. Topics in computer-aided analysis. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 410. Prerequisite(s): Grade of C or better in ECE 310.

ECE 412 Introduction to Filter Synthesis 3 OR 4 hrs.
Fundamentals of network synthesis, filter approximations, and frequency transformations. Active filter synthesis using bi-linear and bi-quad circuits. Topics in computer-aided design. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 412. Prerequisite(s): Grade of C or better in ECE 310.

ECE 415 Image Analysis and Computer Vision I 3 OR 4 hrs.
Image formation, geometry, and stereo. Two-dimensional image analysis by Fourier and other 2-D transforms. Image enhancement, color, image segmentation, compression, feature extraction, object recognition. 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 415. Prerequisite(s): MATH 310 or a grade of C or better in ECE 310.

ECE 417 Digital Signal Processing II 0 TO 5 hrs.
Computer-aided design of digital filters; quantization and round-off effects; FFT algorithms; number-theoretic algorithms; multirate signal processing; DSP architectures and programming. 4 undergraduate hours. 5 graduate hours. Prerequisite(s): ECE 317.
**ECE 418**
Statistical Digital Signal Processing
3 OR 4 hrs.
Stochastic signal models, LMS identification, identification of signals from noise, Wiener filtering, blind separation of mixed signal, discrete wavelet transforms, compression and denoising, cepstral analysis, 3 undergraduate hours. 4 graduate hours. Previously listed as EECS 418. Prerequisite(s): ECE 317 and ECE 341.

**ECE 421**
Introduction to Antennas and Wireless Propagation
3 OR 4 hrs.
Potential, antenna parameters, radiation from linear wires and loops, impedance, arrays, communication links and path loss, tropospheric propagation, fading and diversity, 3 undergraduate hours. 4 graduate hours. Previously listed as ECE 421. Prerequisite(s): ECE 325 and ECE 322.

**ECE 423**
Electromagnetic Compatibility
3 OR 4 hrs.
EMC, requirements for electronic systems. Nonideal behavior of components. Radiated and conducted emissions. Susceptibility. Coupling and shielding. Electrostatic discharge. System design for EMS. 3 undergraduate hours. 4 graduate hours. Previously listed as ECE 423. Prerequisite(s): ECE 320 and ECE 322.

**ECE 424**
RF and Microwave Guided Propagation
0 TO 5 hrs.
Maxwell's equations, transmission lines, Smith chart, strip lines, rectangular and circular waveguides, TE and TM waves, wave impedance, resonators, two-port parameters, power and energy considerations, 4 undergraduate hours. 5 graduate hours. Previously listed as ECE 424. Prerequisite(s): ECE 225 and ECE 322.

**ECE 427**
Modern Linear Optics
3 OR 4 hrs.
Geometrical optics, wave optics, two-dimensional Fourier analysis, scalar diffraction theory, Fourier transforming properties of lenses, coherent and incoherent images, holography, electromagnetic optics, polarization and crystal optics, resonators, 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 427. Prerequisite(s): ECE 310 and ECE 322.

**ECE 431**
Analog Communication Circuits
0 TO 5 hrs.
Introduction to radio frequency circuit design: narrowband transistor amplifiers, impedance matching networks, oscillators, mixers, amplitude and frequency modulation/demodulation, phase-lock loop circuits, amplifier noise, and stability analysis. Laboratory. 4 undergraduate hours. 5 graduate hours. Previously listed as ECECS 431. Prerequisite(s): ECE 311 and ECE 340.

**ECE 432**
Digital Communications
3 OR 4 hrs.
Source coding, quantization, signal representation, channel noise, optimum signal reception, digital modulation: ASK, FSK, MSK, M-ary modulation. Probability of error. Intersymbol interference. 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 432. Prerequisite(s): ECE 311 and ECE 341.

**ECE 434**
Multimedia Systems
3 OR 4 hrs.
Multimedia systems: compression standards; asynchronous transfer mode; Internet; wireless networks; television; videconferencing; telephony; applications. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): ECE 335.

**ECE 435**
Wireless Communication Networks
3 OR 4 hrs.
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, 4 undergraduate hours. 4 graduate hours. Previously listed as ECECS 435. Prerequisite(s): ECE 432 and ECE 333.

**ECE 436**
Computer Communication Networks II
3 OR 4 hrs.
Explores integrated network architecture of service, control signaling and management examples of high-speed LAN/ WAN, next-generation Internet, and mobile wireless network, 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): ECE 335.

**ECE 437**
Wireless Communications
3 OR 4 hrs.
Cellular concept; frequency reuse, mobile radio propagation, channel fading, noise in analog communications, mobile radio channel equalization, multiple access techniques (FDMA, TDMA, CDMA), wireless networking, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ECE 311 and ECE 341.

**ECE 442**
Power Semiconductor Devices and Integrated Circuits
0 TO 5 hrs.
Covers the physics of devices encountered in the powered and switching converter systems, 4 undergraduate hours. 5 graduate hours. Credit is not given for ECE 442 if the student has credit for ECE 442. Previously listed as ECECS 442. ECE 442 is a supplement for ECECS 445 and ECE 545. Prerequisite(s): ECE 342 and ECE 346.

**ECE 444**
Analysis and Design of Power Electronic Circuits
0 TO 5 hrs.
Analysis of different isolated and nonisolated power-converter topologies: understanding of power-converter components, switching schemes, 4 undergraduate hours. 5 graduate hours. Previously listed as ECECS 444. Prerequisite(s): ECE 442 and a grade of C or better in ECE 310.

**ECE 447**
Transistors
3 OR 4 hrs.
Bipolar junction transistors, electronic processes in surface-controlled semiconductor and diode devices, integrated optoelectronic devices. 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 447. Prerequisite(s): ECE 346.

**ECE 449**
Microdevices and Micromachining Technology
0 TO 5 hrs.
Microfabrication techniques for microsensors, microstructures, and microdevices. Selected examples of physical/chemical sensors and actuators. Simulation experiments. Laboratory. Same as ME 449. 4 undergraduate hours. 5 graduate hours. Previously listed as ECECS 449. Prerequisite(s): ECE 347.

**ECE 451**
Control Engineering
3 OR 4 hrs.
State-space representation of systems; realization theory; stability; performance; modern control design techniques, including: fuzzy, learning, adaptive and nonlinear control, 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 451. Prerequisite(s): ECE 350.

**ECE 452**
Robotics: Algorithms and Control
0 TO 4 hrs.
Kinematic and dynamic modeling of robots; configuration space; motion planning algorithms; control of robots; sensors and perception, reasoning, mobile robots. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 201; and a grade of C or better in ECE 213 or a grade of C or better in ECE 225.

**ECE 458**
Electromechanical Energy Conversion
0 TO 4 hrs.
Electromagnetic forces and torque; magnetic circuits and transformers; DC machines; three-phase AC synchronous and induction machines; laboratory demonstrations. Projects are required. 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 458. Prerequisite(s): Grade of C or better in ECE 225.

**ECE 465**
Digital Systems Design
3 OR 4 hrs.
Switching algebra, combinational circuits, Mux, ROM, DCD, PLA-based designs, advanced combinatorial circuit minimization techniques, synchronous and asynchronous sequential circuit synthesis, 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 465. Prerequisite(s): Grade of C or better in PHYS 142 and a grade of C or better in ECE 265 and a grade of C or better in CS 366.

**ECE 466**
Advanced Computer Architecture
3 OR 4 hrs.
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. Same as CS 466. 3 undergraduate hours. 4 graduate hours. Previously listed as ECECS 466. Prerequisite(s): ECE 366 or CS 366.

**ECE 467**
Introduction to VLSI Design
0 TO 5 hrs.
MOS, CMOS circuits VLSI technology, CMOS circuit characterization and evaluation. Static and dynamic MOS circuits, system design, faults, testing, and symbolic layout. Laboratory. 4 undergraduate hours. 5 graduate hours. Previously listed as ECECS 467. Prerequisite(s): ECE 340.
ECE 468 Analog and Mixed-Signal VLSI Design 0 to 5 hrs.
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; 4 undergraduate hours. 4 graduate hours. Previously listed as Eecs 468.
Prerequisite(s): ECE 467.

ECE 469 Computer Systems Design 3 OR 4 hrs.
Analysis and modeling of digital systems; hardware description languages; CAD tools for simulation, synthesis, and verification of computer systems. Project: a simple processor design. 3 undergraduate hours. 4 graduate hours. Same as CS 469. Previously listed as EECS 510.
Prerequisite(s): CS 366; or ECE 317 and ECE 410.

ECE 491 Seminar 1 TO 4 hrs.
Topics of mutual interest to a faculty member and a group of students. Offered as announced by department bulletin or the Schedule of Classes. May be repeated. Previously listed as Eecs 491.
Prerequisite(s): Consent of the instructor.

ECE 493 Special Problems 2 TO 4 hrs.
Special problems or reading by special arrangement with the faculty. No graduation credit for students in the following: MS in Electrical and Computer Engineering or PhD in Electrical and Computer Engineering. Previously listed as Eecs 493.
Prerequisite(s): Consent of the instructor.

ECE 510 Advanced Network Analysis 4 hrs.
Prerequisite(s): ECE 410.

ECE 513 Advanced Analog Filter Synthesis 4 hrs.
The active biquad, sensitivity analysis, realization of active two-port networks, design of broadband matching networks, and the theory of passive cascade synthesis. Previously listed as EECS 513.
Prerequisite(s): ECE 412.

ECE 515 Image Analysis and Computer Vision 4 hrs.
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. Previously listed as Eecs 515.
Prerequisite(s): ECE 415; or consent of the instructor.

ECE 516 Adaptive Digital Filters 4 hrs.
Properties of signals; optimal filters, Wiener and Kalman filters; signal modeling, adaptive filters; channel equalizing, echo canceling, noise canceling, and linear prediction; filter properties. Previously listed as EECs 516.
Prerequisite(s): ECE 317 and ECE 341.

ECE 517 Digital Image Processing 4 hrs.
Operations on 2-D digital images such as transforms, enhancement, restoration, warping, segmentation, registration, compression, and reconstruction from projection. Previously listed as EECs 517.
Prerequisite(s): ECE 317 and ECE 341.

ECE 520 Electromagnetic Field Theory 4 hrs.
Prerequisite(s): ECE 420 and ECE 421.

ECE 521 Computational Electromagnetics 4 hrs.
Prerequisite(s): ECE 420 and ECE 421.

ECE 523 Advanced Antenna Engineering 4 hrs.
Radiation from helix and spiral array antennas; linear and planar array synthesis; Hallén's and other methods for impedance; design of array feeds; reflector and lens antennas. Previously listed as EECs 523.
Prerequisite(s): ECE 421 and ECE 520.

ECE 526 Electromagnetic Scattering 4 hrs.
Prerequisite(s): ECE 520.

ECE 527 Optical Electronics 4 hrs.
Prerequisite(s): ECE 520.

ECE 528 Fiber and Integrated Optics 4 hrs.
Propagation in thin films and fibers. Mode launching, coupling, and losses. Sources, detectors, modulators, interferometers. Fabrication and measurement techniques. Fiber optics systems. Previously listed as EECs 528.
Prerequisite(s): ECE 520 or the equivalent.

ECE 530 Random Signal Analysis 4 hrs.
Probability for communications, properties, and series representations of random processes, random processes through linear and nonlinear systems, minimum MSE and maximum SNR systems. Previously listed as EECs 530.
Prerequisite(s): ECE 341 or consent of the instructor.

ECE 531 Detection and Estimation Theory 4 hrs.
Prerequisite(s): ECE 418 or consent of the instructor.

ECE 532 Advanced Digital Communications 4 hrs.
Characteristics of digitally modulated signals; digital signals over fading channels and with inter符号 interferencia; source and channel coding; synchronization; spread spectrum techniques. Previously listed as EECs 532.
Prerequisite(s): ECE 432 or consent of the instructor.

ECE 533 Advanced Computer Communication Networks 4 hrs.
Computer and telecommunication networks; integrated (data, voice, and video) services; network performance; quality of service provisioning.
Prerequisite(s): ECE 533 and ECE 541; or consent of the instructor.

ECE 534 Elements of Information Theory 4 hrs.
Entropy and mutual information, fundamentals of coding theory, data compression, complexity of sources, channel mutual information and capacity, rate distortion theory, information theory applications. Previously listed as EES 534.
Prerequisite(s): ECE 541 or consent of the instructor.

ECE 535 Advanced Wireless Communication Networks 4 hrs.
Prerequisite(s): ECE 435.

ECE 537 Wireless Data Communications and Networking 4 hrs.
The course discusses data services evolution in 2G wireless systems to achieve specified data rates of 3G. The course focuses on wireless data services in the wide and local area networks. Previously listed as EECs 532 and ECE 435; and senior standing or above; or consent of the instructor.

ECE 540 Physics of Semiconductor Devices 4 hrs.
Electrons in periodic lattice; equilibrium carrier distribution; energy band diagrams in junctions, in homogeneous semiconductors; recombination and generation; nonequilibrium processes, radiation and electric fields; diodes. Same as PHYS 540. Previously listed as EECs 540.
Prerequisite(s): ECE 346 or the equivalent.

ECE 541 Microelectronic Fabrication Techniques 4 hrs.
Current fabrication techniques of microelectronic technology. Plasma and CVD processes; etching techniques; ion implantation; surface analytical methods. Previously listed as ECE 541.
Prerequisite(s): ECE 347 or ECE 449.

ECE 546 Microelectronic Design of Broadband Matching Networks, port networks, design of active biquad, sensitivity Filter Synthesis 4 hrs.

ECE 545 Advanced Power-Electronics Design 4 hrs. High-frequency-magnetics design and measurement, parasitics, modeling, estimation, and measurement, soft switching for DC-DC converters, distributed DC-DC converters, and design layout. Previously listed as EECS 545. Prerequisite(s): ECE 445.

ECE 550 Linear Systems Theory and Design 4 hrs. State variable description, linear operators, impulse response matrix, controllability, observability, reducible and irreducible realizations, state feedback, state observers, and stability. Previously listed as ECE 550. Prerequisite(s): ECE 551. Prerequisite(s): ECE 550 or consent of the instructor.

ECE 551 Optimal Control 4 hrs. Optimal control of dynamic systems in continuous and discrete time, maximum principle, dynamic programming and constraints, learning systems. Previously listed as ECE 551. Prerequisite(s): ECE 551. Prerequisite(s): ECE 550 or consent of the instructor.

ECE 552 Nonlinear Control 4 hrs. Nonlinear phenomena, linear and piecewise linear approximations, describing functions, servomechanisms, phase plane, limit cycles, Lyapunov’s stability theory, bifurcation, bilinear control, vibrational control, learning systems. Previously listed as EECS 552. Prerequisite(s): ECE 550 or consent of the instructor.

ECE 553 System Identification 4 hrs. Online and off-line identification of control systems in frequency and time domain, considering noise effects, nonlinearities, nonstationarities, and distributed parameters. Previously listed as EECS 553. Prerequisite(s): ECE 550.

ECE 559 Neural Networks 4 hrs. Artificial neural networks, perceptron, backpropagation, Kohonen nets, statistical methods, Hopfield nets, associative memories, large memory networks, and cognition. Same as CS 559. Previously listed as EECS 559. Prerequisite(s): Consent of the instructor.

ECE 560 Fuzzy Logic 4 hrs. Crisp and fuzzy sets; membership functions; fuzzy operations; fuzzy relations and their solution; approximate reasoning; fuzzy modeling and programming; applications project. Previously listed as ECE 560. Prerequisite(s): Consent of the instructor.

ECE 565 Physical Design Automation 4 hrs. 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. Same as CS 565. Previously listed as EECS 565. Prerequisite(s): CS 401; and CS 466 or ECE 465.

ECE 566 Parallel Processing 4 hrs. Parallel processing from the computer science perspective. Includes architecture (bus-based, lockstep, SIMD), programming languages (functional, traditional, and extensions), compilers, interconnection networks, and algorithms. Same as CS 566. Previously listed as ECE 566. Prerequisite(s): CS 466 or ECE 466; and CS 401.

ECE 567 Advanced VLSI Design 4 hrs. VLSI subsystem and system design: synthesis, design styles, design process, testing. Case studies: switching networks, graphics engine, CPU. Projects use computer-aided design tools. Previously listed as ECE 567. Prerequisite(s): ECE 467.

ECE 568 Advanced Microprocessor Architecture and Design 4 hrs. Microprocessors: embedded control; processor core; system-on-chip; power-aware design; SMV design; Java processors; media processors; network processors; crypto processors; trusted processor architectures; architecture simulation. Extensive computer use required. Prerequisite(s): ECE 466 and consent of the instructor.

ECE 569 High-Performance Processors and Systems 4 hrs. Instruction-level parallelism, multiple-instruction issue, branch prediction, instruction and data prefetching, novel cache and DRAM organization, high-performance interconnect, compilation issues, case studies. Same as CS 569. Previously listed as ECE 569. Prerequisite(s): CS 460 or ECE 466; and graduate standing.

ECE 572 Nanoscale Semiconductor Structures: Electronic and Optical Properties 4 hrs. Electronic and optical properties of nanoscale semiconductors and devices, carrier interactions in dimensionally confined nanostructures, deformation potential, piezoelectric potential, polar-optical-phonon interaction potential. Prerequisite(s): PHYS 244 and ECE 346. Recommended background: Background in semiconductor device fundamentals such as covered in ECE 346 as well as the underlying physical principles as covered in PHYS 244.

ECE 574 Special Topics 4 hrs. Subject matter varies from term to term and section to section, depending on the specialties of the instructor. May be repeated. Students may register in more than one section per term. Previously listed as ECE 594. Prerequisite(s): Consent of the instructor.

ECE 594 Departmental Seminar 0 hrs. Seminar by faculty and invited speakers. Satisfactory/Unsatisfactory grading only. May be repeated. Previously listed as ECE 594.

ECE 596 Individual Study 1 TO 4 hrs. Individual study or research under close supervision of a faculty member. May be repeated. Students may register in more than one section per term. No graduation credit for students in the following: MS in Electrical and Computer Engineering and PhD in Electrical and Computer Engineering. Previously listed as ECE 596. Prerequisite(s): Consent of the instructor.

ECE 597 Project Research 0 TO 9 hrs. A research design or reading project approved by the director of graduate studies. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Previously listed as ECE 597. Prerequisite(s): Consent of the instructor. For ECE majors only.

ECE 598 MS Thesis Research 0 TO 16 hrs. MS thesis work under the supervision of a graduate advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Previously listed as ECE 598. Prerequisite(s): Consent of the instructor. For ECE majors only.

ECE 599 PhD Thesis Research 0 TO 16 hrs. PhD thesis work under supervision of a graduate advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Previously listed as EECS 599. Prerequisite(s): Consent of the instructor. For ECE majors only.

Energy Engineering

ENER 420 Combined Heat and Power, Design, and Management 4 hrs. BCHP systems, construction, operation, economics, and includes a student design project. Also, builds on previous courses in power plants, engines, HVAC, a stress on economic and software analysis, utility rates, and regulations. Credit is not given in ENER 420 if the student has credit in ME 420. Prerequisite(s): Open only to Master of Energy Engineering students.

ENER 422 Building Heating, Ventilating, and Air-Conditioning 4 hrs. Establishes the basic knowledge needed to understand heating and cooling systems, mass transfer in humidification, solar heat transfer in buildings, and psychrometrics. A computer design project will be completed. Credit is not given for ENER 422 if the student has credit in ME 422. Prerequisite(s): Open only to Master of Energy Engineering students.

ENER 424 Industrial Energy Management and Conservation 4 hrs. Beginning course in energy analysis and auditing, and builds upon the critical background established in the HVAC course. An overview of the energy industry, billing, economic analysis, deregulated markets, and energy purchasing. Credit is not given for ENER 424 if the student has credit in ME 424. Prerequisite(s): Open only to Master of Energy Engineering students.

ENER 429 Internal Combustion Engines 4 hrs. Introduction to engine types, characteristics, and performance. Combustion processes in spark and compression ignition engines; combustion abnormalities. Credit is not given for ENER 429 if the student has credit in ME 429. Prerequisite(s): Open only to Master of Energy Engineering students.

ENER 451 Electric Power Generation 4 hrs. Thermodynamics and practical aspects of central fossil fuel fired electric generating plants. Focus on large steam cycle generating plants, with discussion of geothermal and hydroelectric plants. Prerequisite(s): Open only to Master of Energy Engineering students.
ENER 501 Engineering Project Coordination and Management 4 hrs. Theory, strategy, and tactics of the use of project management, including project planning, matrix management concept, and team meetings. Prerequisite(s): Open only to Master of Energy Engineering students.

ENER 552 Design of Energy Efficient Buildings 4 hrs. Extensive computer use. Undergraduate hours. 4 graduate methods; and trademark protection for novel software, legal and procedural principles; Property Law 3 OR 4 hrs. Graduate hours. Extensive meetings. 3 undergraduate hours. Management concept, and team including project planning, matrix Theory, strategy, and tactics of the future from the perspective of Emerging technologies in designing energy efficient buildings, including new code issues. Prerequisite(s): Open only to Master of Energy Engineering students.

ENER 553 Sustainable Energy Engineering and Renewable Energy 4 hrs. A view of the energy industry's future from the perspective of emerging and alternative technologies. Examples include fuel cells, distributed energy, micro-grids, hydrogen energy systems, and renewables. Prerequisite(s): Open only to Master of Energy Engineering students.

Engineering
ENGR 400 Engineering Law 3 OR 4 hrs. Overview of the legal system. Legal principles affecting the engineering profession. Professional ethics in engineering. Intellectual property law. Basic contract and tort principles. Environmental law. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above.

ENGR 401 Engineering Management 3 OR 4 hrs. Theory, strategy, and tactics of the use of project management, including project planning, matrix management concept, and team meetings. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above.

ENGR 402 Intellectual Property Law 3 OR 4 hrs. Patent, copyright, trade secret, mask work, and cyber-squatting legal and procedural principles; protection for novel software, biotech inventions, and business methods; and trademark protection for domain names. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above.

ENGR 403 Reliability Engineering 3 OR 4 hrs. This course is intended for students with a background in probability, statistics, and engineering. It covers the following topics: system reliability modeling and evaluation; reliability of series and parallel systems; availability; and risk analysis. Prerequisite(s): 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above.

ENGR 404 Entrepreneurship 3 hrs. Identify new business opportunities in technology; market value assessment; competition, business plan, funding acquisition, intellectual property protection, and case studies. Prerequisite(s): Open only to seniors; and consent of the instructor.

ENGR 410 Wireless Data 3 OR 4 hrs. Data communications, existing and emerging wireless data networks, planning, topology, performance, and operation. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above.

ENGR 420 Engineering for Success 1 hr. Interactive seminars will be given by persons with engineering degrees having shown high achievement in either engineering or nonengineering endeavors. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Junior standing or above.

ENGR 429 Special Topics in Engineering 3 OR 4 hrs. Course on multidisciplinary engineering topics that vary from term to term depending on current student and instructor interests. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above; and consent of the instructor.

ENGL 401 Modern English 3 OR 4 hrs. This course is intended for students with a background in the study of English. It covers the following topics: the lexicon, and syntax-semantics of modern American English taught from the linguistic perspective. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or above; or consent of the instructor. Recommended background: ENGL 200.

ENGL 402 Rhetoric 3 OR 4 hrs. Intensive study of central topics in rhetorical theory in their historical depth. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 342 or ENGL 361 or ENGL 370 or ENGL 372 or ENGL 374 or ENGL 375; and senior standing or above; or consent of the instructor.

ENGL 403 Introduction to Old English 3 OR 4 hrs. The elements of Old English grammar and readings from the literature of England before the Norman Conquest. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 240; and ENGL 241 or ENGL 242 or ENGL 243; or consent of the instructor.

ENGL 405 Topics in Old English Literature 3 OR 4 hrs. Studies in the language and literature of pre-Conquest England. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 403; or ENGL 315 or ENGL 316 or ENGL 317; and senior standing or above; or consent of the instructor.

ENGL 406 Topics in Medieval Literature 3 OR 4 hrs. Topics in English literature from the period 450-1500. Content varies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 311 or ENGL 312 or ENGL 313 or ENGL 314; and senior standing or above; or consent of the instructor.

ENGL 407 Topics in Shakespeare 3 OR 4 hrs. Study of a genre, topic, or period in Shakespeare's work. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 311 or ENGL 312 or ENGL 313 or ENGL 314; and senior standing or above; or consent of the instructor.

ENGL 408 Topics in Renaissance Literature and Culture 3 OR 4 hrs. Study of a topic in English literature written between 1500 and 1700. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 311 or ENGL 312 or ENGL 313 or ENGL 314; and senior standing or above; or consent of the instructor.

ENGL 417 Topics in Restoration and Eighteenth-Century Literature and Culture 3 OR 4 hrs. Focus on a particular topic or theme in British literature 1660-1780. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 313 or ENGL 314 or ENGL 315 or ENGL 316; and senior standing or above; or consent of the instructor.

ENGL 419 Topics in Romantic Literature and Culture 3 OR 4 hrs. Focus on a particular aspect of British Romantic writing in order to provide a greater depth of study in the period. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 313 or ENGL 314 or ENGL 315 or ENGL 316 or ENGL 317; and senior standing or above; or consent of the instructor.

ENGL 421 Topics in Victorian Literature 3 OR 4 hrs. Study of a major author, genre, or theme in the Victorian period. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 315 or ENGL 316 or ENGL 317 or ENGL 318; and senior standing or above; or consent of the instructor.

ENGL 422 Topics in Postcolonial and World Literature 3 OR 4 hrs. Study of a major author, topic, movement, or genre within postcolonial and world literatures in English. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 315 or ENGL 316 or ENGL 317 or ENGL 318; and senior standing or above; or consent of the instructor.

ENGL 423 Topics in American Literature and Culture to 1900 3 OR 4 hrs. This course analyzes selected topics in American literature and culture to 1900. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 323 or ENGL 324 or ENGL 325; and senior standing or above; or consent of the instructor.
ENGL 427 Topics in American Literature and Culture, 1900-Present 3 OR 4 hrs.
Study of a specific topic relating American literature to society, culture, history, race, gender, ethnicity. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 324 or ENGL 325 or ENGL 356 or ENGL 327; and senior standing or above; or consent of the instructor.

ENGL 428 Topics in Literature and Culture, 1900-Present 3 OR 4 hrs.
Study of a specific topic relating twentieth-century literature to society, culture, history, race, gender, ethnicity. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 318 or ENGL 319 or ENGL 320 or ENGL 325 or ENGL 336 or ENGL 327; and senior standing or above; or consent of the instructor.

ENGL 429 Topics in Literature and Culture 3 OR 4 hrs.
Study of a specific topic relating literature to society, culture, history, race, gender, ethnicity. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): Six hours of English at the 300-level and senior standing or above; or consent of the instructor.

ENGL 437 Topics in Poetry and Poetic Theory 3 OR 4 hrs.
Investigations into the nature of poetry. Discussions of issues such as technical, theoretical, formal, and historical developments. Topics and readings vary. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 303 or ENGL 316 or ENGL 355; and senior standing or above; or consent of the instructor.

ENGL 438 Topics in Performance Studies 3 OR 4 hrs.
In-depth study of a topic, movement, artist, or author in the field of drama and performance studies, broadly defined. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 304 or ENGL 313 or ENGL 341 or ENGL 342 or ENGL 370 or ENGL 375; and senior standing or above; or consent of the instructor.

ENGL 439 Topics in Fiction and Theories of Fiction 3 OR 4 hrs.
Study of fiction related to a particular theory of fiction (realism, romance, literary naturalism, narrative theory, fictional poetry). Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 302 or ENGL 341 or ENGL 342; and senior standing or above; or consent of the instructor.

ENGL 440 Topics in American Literature and Culture 3 OR 4 hrs.
An advanced seminar that examines various forms of cultural production by Asian American artists of diverse ethnic backgrounds. Topics vary. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 327 or ENGL 328 or ENGL 359; and senior standing or above; or consent of the instructor.

ENGL 441 Topics in Asian American Literature and Culture 3 OR 4 hrs.
Study of a medium, genre, theme, period, influence, or problem in culture and cultural theory. Topics vary. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 302 or ENGL 341 or ENGL 342; and senior standing or above; or consent of the instructor.

ENGL 442 Topics in Gender, Sexuality, and Literature 3 OR 4 hrs.
Specific study of topics in gender and literature. Content varies. Same as ASAM 441. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 303 or ENGL 316 or ENGL 355; and senior standing or above; or consent of the instructor.

ENGL 443 Topics in Literary and Secondary Schools 3 OR 4 hrs.
Intended as a general initiation to the field of secondary English teaching, the course focuses on many of the crucial issues facing teachers in contemporary language arts classrooms. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 374 or ENGL 375 or ENGL 342 or ENGL 402; and senior standing or above; or consent of the instructor.

ENGL 444 Topics in Theories of Gender and Sexuality 3 OR 4 hrs.
Advanced study of theories related to theories of gender and sexuality. Same as GWS 444. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 363 or GWS 101 or GWS 102; and senior standing or above; or consent of the instructor.

ENGL 445 Topics in Disability Studies 3 OR 4 hrs.
This course will focus on topics structured around particular aspects of disability studies and its practical, cultural, and theoretical implications. Same as DHFD 445. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 363 or ENGL 364; and senior standing or above; or consent of the instructor.

ENGL 446 Topics in Criticism and Theory 3 OR 4 hrs.
Focus on a particular critical or theoretical topic, movement, tradition, or figure. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 370 or ENGL 372; and senior standing or above; or consent of the instructor.

ENGL 447 Topics in Rhetorical Studies 3 OR 4 hrs.
Study of rhetorical intersections between rhetoric and cultural studies to describe and explain the ways in which discourse constructs identity, knowledge, and value. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 374 or ENGL 375 or ENGL 342 or ENGL 402; and senior standing or above; or consent of the instructor.

ENGL 448 Topics in Criticism and Theory 3 OR 4 hrs.
Focus on a particular critical or theoretical topic, movement, tradition, or figure. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 370 or ENGL 372; and senior standing or above; or consent of the instructor.

ENGL 449 Introduction to the Teaching of English in Middle and Secondary Schools 3 OR 4 hrs.
Intended as a general initiation to the field of secondary English teaching, the course focuses on many of the crucial issues facing teachers in contemporary language arts classrooms. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): Enrollment in English Education Program and English Education 469; and senior standing or above; or consent of the instructor.

ENGL 450 Women's Literary Traditions 3 OR 4 hrs.
An exploration of issues such as the female aesthetic; women's popular literature; factors that enable creativity; differences of race and class. Same as GWS 469. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 363; and senior standing or above; or consent of instructor.

ENGL 451 Topics in Native American Literatures in the United States 3 OR 4 hrs.
Topics in the literatures of American racial and ethnic groups. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 328 or ENGL 333 or ENGL 350 or ENGL 351 or ENGL 355 or ENGL 357; or ENGL 359; and senior standing or above; or consent of the instructor.

ENGL 471 Women and Film 3 OR 4 hrs.
The history and development of film by and about American Indians. Content varies. Same as NAST 471. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): Senior standing or above and 6 hours of English, African American studies, or Latin American studies; or consent of the instructor.

ENGL 472 African American Literature 3 OR 4 hrs.
Roles and representations of women in classical Hollywood, European art, and independent feminist cinemas. Same as AH 434, and GWS 472. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 302 or ENGL 361 or ENGL 362 or ENGL 363; and senior standing or above; or consent of instructor.

ENGL 473 Women's Literary Traditions 3 OR 4 hrs.
An exploration of issues such as the female aesthetic; women's popular literature; factors that enable creativity; differences of race and class. Same as GWS 469. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): AAST 357 or AAST 360 or ENGL 357; and senior standing or above; or consent of the instructor.
ENGL 474 Topics in Popular Culture and Literature 3 OR 4 hrs.
Study of a specific topic relating literature to popular culture, such as sport, television, and best sellers. Critical analysis of the cultural mythology enunciating these subjects. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s).
Prerequisite(s): ENGL 302 or ENGL 341 or ENGL 342; and senior standing or above; or consent of the instructor.

ENGL 478 The Bible as Literature 3 OR 4 hrs.
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. Same as JST 478 and RELS 478. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in ENGL 240; and grade of C or better in ENGL 241 or grade of C or better in ENGL 242 or grade of C or better in ENGL 243; or consent of the instructor.

ENGL 481 Methods of Teaching English in Middle and Secondary Schools 3 OR 4 hrs.
Theory and practice; emphasis on current approaches to language and literature in multicultural settings. 3 undergraduate hours. 4 graduate hours. All students in the teacher education program must take this course in the term preceding their student teaching. Prerequisite(s): Senior standing or 9 hours of English and consent of the instructor.

ENGL 483 Studies in Language and Rhetoric 3 OR 4 hrs.
Study of a particular topic or movement in language or rhetoric. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s).
Prerequisite(s): Senior standing or above; or consent of the instructor.

ENGL 484 Studies in Language and Cognition 3 OR 4 hrs.
Examination of relationships among theories of language structure, cognition, and discourse, with applications of such theories to the writing process. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ENGL 401; or consent of the instructor.

ENGL 485 Studies in the English Language and Linguistics 3 OR 4 hrs.
Study of a topic such as language diversity and literacy, theories of grammar, literacy in society, and ethnicity and language. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s).
Prerequisite(s): Senior standing or 9 hours of English or consent of the instructor.

ENGL 486 The Teaching of Writing in Middle and Secondary Schools 3 OR 4 hrs.
Rhetoric and composition pedagogy. Study of a topic. Content varies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or 9 hours of English or consent of the instructor.

ENGL 489 The Teaching of Reading and Literature in Middle and Secondary Schools 3 OR 4 hrs.
Intended as a part of the English education methods sequence, with particular emphasis on helping prospective teachers assist struggling readers in the study of literature. 3 undergraduate hours. 4 graduate hours. Fieldwork required. Prerequisite(s): ENGL 459 and completion of the University Writing requirement; or consent of the instructor.

ENGL 490 Advanced Writing of Poetry 3 OR 4 hrs.
Advanced work on poetic techniques and practices; emphasis on analysis of student work, using published examples; particular attention to individual student development. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) by undergraduates.
Prerequisite(s): Undergraduates: Grade of B or better in ENGL 210. Registration restrictions: Graduate students must obtain approval of the Department of English.

ENGL 491 Advanced Writing of Fiction 3 OR 4 hrs.
Advanced practice; emphasis on analysis of student work and published examples. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) by undergraduates.
Prerequisite(s): Undergraduates: grade of B or better in ENGL 212. Registration restrictions: Graduate students must obtain approval of the Department of English.

ENGL 492 Advanced Writing of Nonfiction Prose 3 OR 4 hrs.
Advanced practice in writing essays, articles, reviews, or other forms of nonfiction prose. Content varies. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) by undergraduates. Prerequisite(s): Undergraduates: grade of B or better in ENGL 201. Registration restrictions: Graduate students must obtain approval of the Department of English.

ENGL 493 Internship in Nonfiction Writing 0 TO 6 hrs.
Approved internship where students learn professional writing and organizational communication with an emphasis on initiative, planning, and meeting deadlines. Both the instructor and a supervisor mentor students during the course. May be repeated to a maximum of 6 hours. A maximum of 3 hours may be applied toward either the undergraduate major in English or a graduate degree in English. Credit is not given for ENGL 493 if the student has credit in ENGL 593.
Prerequisite(s): ENGL 201 and ENGL 202 or completion of the Chicago Civic Leadership Certificate Program (CCLCP) 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 for the application process.

ENGL 494 Topics in the Teaching of English 1 TO 4 hrs.
Study of a topic in literature, composition, and/or pedagogy. The content varies with each offering. May be repeated to a maximum of 8 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

ENGL 495 Playwriting 3 OR 4 hrs.
The development of scripts for stage performance. Same as THTR 423. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above; and approval of the department and submission and approval of a playwriting sample or dialog-centered fiction prior to registration.

ENGL 498 Educational Practice with Seminar I 6 hrs.
The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Satisfactory/Unsatisfactory grading only. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

ENGL 499 Educational Practice with Seminar II 6 hrs.
The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Satisfactory/Unsatisfactory grading only. Graduate credit only with approval of the department. Prerequisite(s): 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.

ENGL 500 Masters' Proseminar 4 hrs.
Study of disciplinary foundations of research in literary criticism, broadly defined.

ENGL 501 Introduction to Research in Language, Literacy, and Rhetoric 4 hrs.
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.

ENGL 503 Proseminar I: Theory and Practice of Criticism 4 hrs.
Forms and theories of criticism, analysis of their application to specific genres and works, and practice in writing criticism. The first semester of the two-part required PhD proseminar.

ENGL 504 Proseminar II: Seminar in Critical Studies 4 hrs.
More focused attention on the themes presented in Proseminar I. Students will complete major research projects based on bibliographies compiled in Proseminar I. Prerequisite(s): ENGL 503.

ENGL 505 Seminar in Old English 4 hrs.
A topic in Old English: emphasis on literature or philology. Content varies.
ENGL 507 Theory, Rhetoric, and Aesthetics 4 hrs. Emphasizing breadth of knowledge in a field of inquiry involving genres, authors, topics, or periods in theory, rhetoric, or aesthetics.

ENGL 510 Seminar in Language and Rhetoric 4 hrs. Study of a topic or movement in linguistic or rhetorical theory. Content varies. May be repeated to a maximum of 12 hours.

ENGL 515 Seminar in Medieval Studies 4 hrs. The works of Chaucer and other Middle English writers. Content varies. May be repeated to a maximum of 12 hours.

ENGL 517 British Literature and Culture 4 hrs. Emphasizing breadth of knowledge in a field of inquiry involving genres, authors, topics, or periods in British literature and culture.

ENGL 518 Newberry Library Seminar in Renaissance Literature 4 hrs. Late medieval and Renaissance literature. In conjunction with the Newberry Library Center for Renaissance Studies. May be repeated to a maximum of 12 hours.

ENGL 520 Seminar in Renaissance Studies 4 hrs. English literature and culture of the sixteenth and seventeenth centuries. Topic varies. May be repeated to a maximum of 12 hours.

ENGL 525 Seminar in Restoration and Eighteenth-Century Studies 4 hrs. Content varies. Restoration and 18th century studies by topic. May be repeated to a maximum of 12 hours.

ENGL 527 American Literature and Culture 4 hrs. Emphasizing breadth of knowledge in a field of inquiry involving genres, authors, topics, or periods in American literature and culture.

ENGL 530 Seminar in British Romantic Studies 4 hrs. Advanced study of author(s), topic, movement, or genre. Content varies. May be repeated to a maximum of 12 hours.

ENGL 535 Seminar in Victorian Studies 4 hrs. Focus on author, topic, movement, or genre. Content varies. May be repeated to a maximum of 12 hours.

ENGL 537 Global and Multilingual Literatures and Cultures 4 hrs. Emphasizing breadth of knowledge in a field of inquiry involving genres, authors, topics, or periods in global and/or multilingual literatures and cultures.

ENGL 540 Seminar in Modern and/or Contemporary Studies in English 4 hrs. Study of an author, topic, movement, or genre. Content varies. As part of the “Discourse, Text, and Context” series, provides seminar-level instruction in a key field of modern or contemporary English studies. Topic varies by instructor. May be repeated to a maximum of 12 hours.

ENGL 545 Seminar in American Studies to 1865 4 hrs. As part of the “Discourse, Text, and Context” series, provides seminar-level instruction in a key field in American studies to 1865. May be repeated to a maximum of 12 hours.

ENGL 550 Seminar in American Studies After 1865 4 hrs. Seminar topic in American Studies, possibly including mixed media, after 1865. May be repeated to a maximum of 12 hours.

ENGL 552 Research Practicum in Language and Cognition 4 hrs. Research design and methods examining theories of the development of literacy and relationships among learner, text, and context. May be repeated to a maximum of 12 hours.

ENGL 553 Research Practicum in Discourse Analysis 4 hrs. Discourse analysis addresses issues of intentional communication, inference, the structure of texts or talk-in-interaction, and the interactive construction of social actions or identities in discourse. Same as LING 553. May be repeated to a maximum of 12 hours.

ENGL 554 Seminar in English Education 4 hrs. Critical examination of theory and practice in the teaching of English. Content varies.

ENGL 555 Teaching College Writing 4 hrs. Methods, materials, and practice in teaching college writing. Satisfactory/Unsatisfactory grading only.

ENGL 556 Teaching Creative Writing 4 hrs. Methods, materials, and practice in teaching creative writing. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Admission to the Program for Writers or consent of the instructor.

ENGL 557 Language and Literacy 4 hrs. Emphasizing breadth of knowledge in a field of inquiry involving genres, authors, topics, periods, or issues in language and literacy, broadly conceived.

ENGL 560 Practicum in the Teaching of English 1 TO 4 hrs. Provides an opportunity for supervised discussion and evaluation of materials and methods used in undergraduate English instruction. Participation in appropriate departmental workshops. For English Department teaching assistants. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours.

ENGL 567 Discourse Analysis 4 hrs. Addresses issues of intentional communication, inference, the structure of texts or talk-in-interaction, and the interactive construction of social actions or identities in discourse. Same as SPAN 567 and LING 567.

ENGL 570 Program for Writers: Poetry Workshop 4 hrs. Emphasis on poems written by students. May be repeated to a maximum of 12 hours.

ENGL 571 Program for Writers: Fiction Workshop 4 hrs. Emphasis on fiction written by students. May be repeated to a maximum of 12 hours.

ENGL 572 Program for Writers: Novel Workshop 4 hrs. Emphasis on novels written by students. May be repeated to a maximum of 12 hours.

ENGL 573 Program for Writers: Translation Workshop 4 hrs. Emphasis on translations by students. May be repeated to a maximum of 12 hours.

ENGL 574 Program for Writers: Nonfiction Workshop 4 hrs. Emphasis on nonfiction written by students. May be repeated to a maximum of 12 hours.

ENGL 575 Program for Writers: Experimental Writing Workshop 4 hrs. Emphasis on experimentation by students. May be repeated to a maximum of 12 hours.

ENGL 576 Program for Writers: Editing and Publishing 4 hrs. Practicum in basic procedures for students desiring careers in publishing, or who wish to understand the stages of production from proposal to publication. Prerequisite(s): Consent of the instructor.

ENGL 579 The Past Decade 4 hrs. Discussion of the past decade of critical work in any given field within literary, rhetorical, linguistic, or cultural studies.

ENGL 580 Seminar in Genres of Literature, Film, and Media 4 hrs. A single genre, such as the Gothic novel, or mode, such as poetry, fiction, or drama. May be repeated to a maximum of 12 hours.

ENGL 581 Seminar in Interdisciplinary English Studies 4 hrs. Relation between literature and such fields as fine arts, philosophy, psychology, religion, science, sociology, and politics. Content varies. May be repeated to a maximum of 12 hours.

ENGL 588 Seminar in Theories of Literature 4 hrs. Course in appropriate departmental studies.
ENGL 582 Seminar in Multietnic and Transnational Cultures 4 hrs.
Study of a genre, movement, topic, or author in American multietnic and/or transnational culture.
Content varies. May be repeated to a maximum of 12 hours.

ENGL 583 Seminar in Theories of the Popular 4 hrs.
Study of a theme, form, era, or methodological approach. Content varies. May be repeated to a maximum of 12 hours.

ENGL 584 Seminar in Visual Technologies 4 hrs.
One topic or movement. Content varies. May be repeated to a maximum of 12 hours.
Prerequisite(s): Minimum of 3 hours in film.

ENGL 585 Seminar in Theoretical Sites 4 hrs.
One author, topic, or movement in advanced theory. Topic varies by instructor. May be repeated to a maximum of 12 hours.
Prerequisite(s): Theory course at the undergraduate or graduate level.

ENGL 586 Seminar in Discourse, Culture, and Mind 4 hrs.
Interdisciplinary readings relating language and cognition from writing, rhetoric, cognitive psychology, and linguistics on a particular topic. May be repeated to a maximum of 12 hours.
Prerequisite(s): ENGL 484.

ENGL 588 Seminar in Great Cities/Global Cultures 4 hrs.
One author, topic, or movement in text, culture, and public space. May be repeated to a maximum of 12 hours.

ENGL 591 Prospectus Preparation 1 TO 12 hrs.
Students who have passed their preliminary exams may enroll in this independent study with their primary advisor the semester after they have successfully completed their exams. Satisfactory/Unsatisfactory grading only. May be repeated for a maximum of 24 hours of credit.
Prerequisite(s): Consent of the instructor and consent of the director of graduate studies.

ENGL 592 Preliminary Examination Research 1 TO 12 hrs.
Supervised research and reading in preparation for the preliminary examinations. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 24 hours.
Prerequisite(s): Consent of the instructor and consent of the director of graduate studies.

ENGL 593 Graduate Internship in Nonfiction Writing 1 TO 4 hrs.
Directed field experience in an approved professional setting to practice writing, editing, and research skills at an advanced level. May be repeated. A maximum of four hours of credit may be applied toward a graduate degree in English. Credit is not given for ENGL 593 if the student has credit for ENGL 493.
Prerequisite(s): Consent of the English Department internship coordinator. Resume and writing samples are required.

ENGL 596 Independent Study 1 TO 4 hrs.
Independent study and research in literature, creative writing, or language, literacy, and rhetoric. May be repeated to a maximum of 12 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor and consent of the director of graduate studies.

ENGL 597 Master's Project Research in English 0 TO 4 hrs.
Supervised research and reading that facilitates the student in preparation of the project research. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. No more than 4 hours of ENGL 597 may be applied toward the degree.
Prerequisite(s): Consent of the instructor and consent of the director of graduate studies. Open only to master's degree students.

ENGL 599 Thesis Research 0 TO 16 hrs.
For students involved in dissertation research and writing. Satisfactory/Unsatisfactory grading only. May be repeated.
Prerequisite(s): Consent of instructor and consent of the director of graduate studies.

ENGLISH as a Second Language

ESL 401 Communication and Teaching Methods for International Teaching Assistants 1 TO 3 hrs.
Basic communication and presentation skills for international teaching assistants in the culture of the American college classroom. Satisfactory/Unsatisfactory grading only. May be repeated for credit.
Prerequisite(s): Graduates or professional standing. Students must take the SPEAK Test and must obtain consent of the instructor.

Entrepreneurship

ENTR 430 Family Business Management 3 hrs.
Competitive strengths/weaknesses of a family business, dynamics of family interactions within the overlapping family, management and ownership systems. Credit is not given for ENTR 430 if the student has credit for MGMT 430. Recommended background: Prior experience in a family business.

ENTR 450 Entrepreneurship for Scientists and Engineers 3 OR 4 hrs.
Gives nonbusiness students an appreciation for the rewards and challenges of entrepreneurship, especially as it relates to commercializing emerging technologies. 3 undergraduate hours. 4 graduate hours. Credit is not given for students enrolled in a Business Administration degree program.

ENTR 454 New Venture Formation 3 hrs.
Awareness and realistic understanding of the new venture formation process; role of the entrepreneur in the economy and society; self-evaluation, venture feasibility. Credit is not given for ENTR 454 if the student has credit for MGMT 455 or MKTG 454. Prerequisite(s): FIN 300 and MGMT 340 and MKTG 360, or consent of the instructor.

ENTR 464 Entrepreneurial Consulting 3 hrs.
Student teams diagnose and recommend solutions to problems and opportunities facing Chicago-area entrepreneurs and smaller enterprises. Application of previous course work. Credit is not given for ENTR 464 if the student has credit for MGMT 464. Prerequisite(s): ENTR 454; and ECON 218 or ECON 220, and 6 credit hours of other entrepreneurship courses.

ENTR 494 Special Topics in Entrepreneurship 3 hrs.
Exploration of areas not covered in existing course offerings or study of selected topics in greater depth. Subject will vary from semester to semester. May be repeated to a maximum of 6 hours. May be repeated if topics vary.
Prerequisite(s): ENTR 454 and senior standing or above and approval of the department.

ENTR 499 Independent Study in Entrepreneurship 1 TO 3 hrs.
Independent study of an approved topic in entrepreneurship. Student must prepare a written report under the guidance of the instructor. Prerequisite(s): Approval of the department.

ENTR 502 Entrepreneurship 4 hrs.
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. Credit is not given for ENTR 502 if the student has credit for MBA 510 or MGMT 502. Prerequisite(s): ACTG 500 and MKTG 500 or the equivalent courses.

ENTR 545 New Venture Formation 4 hrs.
Students gain awareness and understanding of how to start business ventures by writing and presenting business plans.
Prerequisite(s): ENTR 502.

ENTR 554 Fundamentals of Technology Ventures 4 hrs.
Students gain an understanding of regulatory processes, capital markets, business plans, and other requirements for creating, and launching technology-based new business ventures. Prerequisite(s): Consent of the instructor.

ENTR 555 Technology Venture Formation I 4 hrs.
Students learn about specific emerging technologies, assess their market potential and write business plans to commercialize those technologies. Credit is not given for ENTR 555 if the student has credit for MGMT 555 or MKTG 555. Prerequisite(s): ENTR 554 and consent of the instructor.

ENTR 556 Technology Venture Formation II 4 hrs.
Students gain awareness and understanding of how to start business ventures by writing and presenting business plans.
Prerequisite(s): ENTR 502.

ENTR 558 Entrepreneurial Electronic Commerce 4 hrs.
The role of electronic commerce in entrepreneurial practices, marketing strategies, financing options, creating an e-commerce business plan. Credit is not given for ENTR 558 if the student has credit in MGMT 558 or MKTG 558. Prerequisite(s): ACTG 500 or MBA 501; and MKTG 500 or MBA 506.
ENTR 559 Entrepreneurial Consulting 4 hrs.
Application of principles from management and marketing to entrepreneurial firms. Emphasis on consulting with young and small firms and developing a consulting practice. Assessment, problem solving, and change facilitation. Credit is not given for ENTR 559 if the student has credit for MGMT 559 or MKTG 559. Fieldwork required. Prerequisite(s): ENTR 502.

ENTR 594 Special Topics in Entrepreneurship 4 hrs.
Exploration of areas not covered in existing course offerings or study of selected topics in greater depth. Subject will vary from semester to semester. Prerequisite(s): ENTR 502 and approval of the department.

ENTR 596 Independent Study in Entrepreneurship 1 TO 4 hrs.
Independent study of an approved topic in entrepreneurship. Student must produce a written report under the guidance of the instructor. Prerequisite(s): Approval of the department.

Environmental and Occupational Health Sciences
EOHS 400 Principles of Environmental Health Sciences 3 hrs.
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(s): Enrollment restricted to Public Health students; other graduate, professional, and advanced undergraduate students admitted by consent as space permits. To obtain consent, see the SPH registrar.

EOHS 405 Environmental Calculations 2 hrs.
Problem-solving techniques as applied to environmental and occupational health: dimensional analysis, mass and energy balances, trial and error solutions, numerical and graphical techniques. Recommended background: Mathematics through calculus, college physics, and chemistry.

EOHS 406 Biological, Chemical, Explosives, and Nuclear Weapons as Public Health Threats 3 hrs.
Preparation, understanding of threats, and rescue and response issues pertaining to potential terrorist incidents from a public health perspective. Same as EPID 408. Prerequisite(s): Graduate or professional standing; or consent of the instructor. Recommended background: EOHS 400 and EPID 410.

EOHS 411 Water Quality Management 4 hrs.
Water pollution; historical and current developments in problems and solutions; characterization of pollutants, regulatory framework, risk assessment, standards, modeling, water purification, public health concerns. Prerequisite(s): Taught online. Consent of the instructor.

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

EOHS 421 Fundamentals of Industrial Hygiene 2 hrs.
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(s): EOHS 400 or consent of the instructor.

EOHS 424 Environmental Acoustics 2 hrs.
Fundamentals of noise generation/propagation; filtering; weighting; hearing biomechanics; health effects; audiometry; hearing control methods; sound fields; directivity; diffraction/barriers; regulations; instrumentation; control. Prerequisite(s): General college physics, and ordinary calculus; or consent of the instructor.

EOHS 428 Industrial Hygiene Laboratory I 2 hrs.
Detailed methods and experiments for measuring chemical, biological, and physical agents; and methods for evaluating the effectiveness of control measures. Prerequisite(s): EOHS 400 and EOHS 405 and EOHS 421, or consent of the instructor.

EOHS 431 Air Quality Management I 3 hrs.
Sources, control, dispersion, and effects upon receptors of air pollution: health and other adverse effects, meteorology and dispersion estimation, photochemistry, aerosol characterization. Same as CME 419. Prerequisite(s): EOHS 405 or CME 216 or consent of instructor.

EOHS 438 Air Quality Laboratory 2 hrs.
Basic instrumentation and procedures related to measurement and surveillance of ambient air quality. Methods for collection and identification of gaseous and particulate pollutants. Prerequisite(s): EOHS 405 or consent of the instructor.

EOHS 440 Chemistry for Environmental Professionals 3 hrs.
Introductory atmospheric chemistry, aspects of air pollution, chemistry related to natural water and water treatment; priority organic pollutants and heavy metals. Same as CME 421. Prerequisite(s): One year of college chemistry.

EOHS 450 Principles of Occupational and Environmental Medicine 2 hrs.
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.

EOHS 455 Environmental and Occupational Toxicology 3 hrs.
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. Prerequisite(s): CHEM 232 and CHEM 234 and BIOS 100 or the equivalent courses and senior standing or above or consent of the instructor.

EOHS 460 Safety Engineering 3 OR 4 hrs.
Human protection systems; accident and emergency handling; manufacturing and service hazard systems. Same as IE 460. Prerequisite(s): EOHS 405 and graduate standing. 4 graduate hours. Prerequisite(s): IE 342 or consent of the instructor.

EOHS 461 Community Health and Consumer Protection 2 hrs.
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(s): EOHS 400 or consent of the instructor.

EOHS 463 Safety Management Systems 2 hrs.
Introduction to practical aspects of initiating a safety program in a moderately sized production plant. Prerequisite(s): Consent of the instructor.

EOHS 472 Management of Solid and Hazardous Wastes 3 hrs.
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. Same as CME 423 and GEOG 444.

EOHS 482 Occupational Safety Science 2 hrs.
Principles of occupational safety, safety regulations, accident investigation procedures and engineering, behavioral, and administrative techniques for occupational accident control. Prerequisite(s): EOHS 421 or consent of the instructor.

EOHS 495 Environmental/Occupational Health Seminar 1 hour.
Discussions of current environmental and occupational health topics, with presentations by students, faculty members, and visiting scientists.

EOHS 512 Advanced Water Quality Management Topics 4 hrs.
Water quality management course examining drinking water quality and contaminant discharge topics. Risk assessment methodologies are applied for deriving optimal decisions. Extensive computer use required. Prerequisite(s): EOHS 411 or consent of the instructor.

EOHS 523 Engineering Controls/Ventilation 4 hrs.
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. Prerequisite(s): EOHS 405 and EOHS 421 and EOHS 428, or consent of the instructor.

EOHS 529 Industrial Hygiene Laboratory II 2 hrs.
Fieldwork: comprehensive industrial hygiene surveys of local work places. Health hazard analysis, design of sampling strategies, collection of field data, report preparation. Prerequisite(s): EOHS 428 and EOHS 438; or consent of the instructor.

EOHS 532 Air Quality Management II 2 hrs.
Air quality management: introduction of diverse aspects. Data interpretation; standards setting; policy implementation; equipment design; hazardous spill modeling; indoor air pollution; case studies. Same as CME 526.

EOHS 533 Waste Management 3 hrs.
Management of solid and hazardous waste, including radioactive waste, including radioactive waste: landfills, incineration, recycling, composting, source reduction, groundwater and air pollution impacts, control, regulations, siting, health impacts. Same as CME 423 and GEOG 444.

EOHS 542 Management of Hazardous Materials 3 hrs.
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. Same as CME 423 and GEOG 444.

EOHS 543 Management of Hazardous Materials 3 hrs.
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. Same as CME 423 and GEOG 444.
EOHS 542 Water Chemistry 4 hrs. Chemical equilibria and kinetic principles as applied to processes occurring in natural and engineered water systems. Same as CME 524. Prerequisite(s): EOHS 440 or CME 411.


EOHS 551 Occupational Diseases 4 hrs. Diseases caused by physical, chemical, and biological agents in the workplace: toxicology, epidemiology, pathophysiology, diagnosis, treatment, prevention, high-risk populations, and early detection.

EOHS 553 Global Environmental and Occupational Health 2 hrs. Examines the major current issues in occupational and environmental health and their policy solutions. Prerequisite(s): EOHS 400 or consent of the instructor.

EOHS 554 Occupational and Environmental Epidemiology 2 hrs. 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. Same as EPID 554. Prerequisite(s): EPID 401 and BSTT 401 and EOHS 400; or consent of the instructor.

EOHS 555 Advanced Topics in Toxicology 3 hrs. An in-depth consideration of biotransformation, toxicokinetic modeling, biomarkers, and chemical carcinogenesis. The course is based on articles from the primary literature. Molecular through physiological level effects are considered. Prerequisite(s): Grade of B or better in EOHS 455; or consent of the instructor.

EOHS 557 Design and Analysis of Experiments 4 hrs. Detailed consideration of the mathematical, statistical, and practical aspects of design and analysis of experiments that are encountered in physicochemical, biological and engineering investigations. Extensive computer use required. Prerequisite(s): Completion of one course in statistics, working knowledge of at least one statistical software package (SAS, Design Expert, Minitab, etc.), and consent of the instructor. Recommended Background: A working knowledge of linear algebra and additional advanced course work in statistics.

EOHS 558 Industrial Toxicology 2 hrs. Clinical toxicology and mechanisms of workplace toxicants: metals, fibers, dusts, and organics. Diagnosis and treatment. Prerequisite(s): EOHS 400 and EOHS 457.

EOHS 564 Geographic Information System Application in Public Health 3 hrs. Examination of GIS applications in public health and the process of designing a GIS-based public health investigation. Same as HPA 564. This is an online course. Prerequisite(s): BSTT 400 and HPA 465; or consent of the instructor.

EOHS 565 Data-Mining Applications in Public Health 3 hrs. Presents the key public health information system sources, describes the process of data mining and introduces the student to a sample of data-mining techniques. Same as HPA 565. Extensive computer use required. Prerequisite(s): BSTT 400.

EOHS 570 Hazardous Materials Management 3 hrs. 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. Prerequisite(s): EOHS 405 and EOHS 421 and EOHS 428; or consent of instructor.

EOHS 571 Injury Epidemiology and Prevention 3 hrs. Covers general principles of injury epidemiology and intervention research and will engage students in development and application of preventive activities in workplaces and in the community. Same as EPID 571. Prerequisite(s): Grade of B or better in EPID 400 or grade of B or better in EPID 403; and graduate or professional standing; or consent of the instructor. Recommended background: Grade of B or better in EPID 400.

EOHS 572 Environmental Risk Assessment and Management 4 hrs. Risk assessment from a public health, quantitative, and environmental risk management perspective.

EOHS 574 Radiation Protection 3 hrs. Radioactivity, energetics, kinetics, interactions, external protection, dosimetry, recommendations and standards, measurement, radon. Prerequisite(s): EOHS 405 or consent of the instructor.

EOHS 594 Advanced Special Topics in Environmental Health 1 TO 4 hrs. 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(s): Consent of the instructor.

EOHS 597 Advanced Laboratory Projects in Environmental Health 1 TO 4 hrs. Application and integration of sampling and measurement techniques for characterization of inside and ambient environments. Individuals or groups supervised by EOHS faculty members. Prerequisite(s): Consent of the instructor.

EPID 400 Principles of Epidemiology 3 hrs. Introduction to descriptive and analytic epidemiology, determinants of health and disease in populations, and application of epidemiologic methods to disease control; includes use of basic epidemiologic software. Prerequisite(s): Credit or concurrent registration in BSTT 400 or consent of the instructor. Enrollment restricted to public health students; other graduate, professional, and advanced undergraduate students admitted by consent as space permits. To obtain consent, see the SPH registrar.

EPID 403 Introduction to Epidemiology: Principles and Methods 3 hrs. Introduction to descriptive and analytic epidemiology, and determinants of health and disease in populations. Measures of occurrence, association, and statistical testing will be addressed, along with study designs, bias, and confounding. Prerequisite(s): Credit or concurrent registration in BSTT 400 and graduate or professional standing; or consent of the instructor.

EPID 404 Intermediate Epidemiologic Methods 4 hrs. Introduction to multivariable methods in epidemiology, including stratified analysis and regression modeling. Students will use statistical software to analyze data from epidemiologic studies. Prerequisite(s): EPID 403 and EPID 406; and credit or concurrent registration in BSTT 401; and graduate or professional standing; or consent of the instructor.

EPID 405 Human Growth and Nutrition 3 hrs. 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. Same as ANTH 405.

EPID 406 Epidemiologic Computing 3 hrs. Hands-on course for students using SAS and other computer tools for epidemiologic analysis. Addresses theoretical and practical issues in statistical programming for epidemiology students. Prerequisite(s): BSTT 400 and EPID 400; or BSTT 400 and EPID 403; or consent of the instructor.

EPID 408 Biological, Chemical, Explosives, and Nuclear Weapons as Public Health Threats 3 hrs. Preparation, understanding of threats, and rescue-and-response issues pertaining to potential terrorist incidents from a public health perspective. Same as EOHS 408. Prerequisite(s): Graduate or professional standing; or consent of the instructor. Recommended background: EOHS 400 and EPID 410.

EPID 409 The Epidemiology of HIV/AIDS 2 hrs. Review of the HIV/AIDS pandemic and the global response to it focusing on patterns of transmission, risk factors, and prevention/intervention. Prerequisite(s): EPID 400 or consent of the instructor.

EPID 410 Epidemiology of Infectious Diseases 2 hrs. Epidemiology of selected infectious diseases, including incidence, prevalence, and control of disease. Epidemiologic investigation is emphasized. Prerequisite(s): Credit or concurrent registration in EPID 400; or credit or concurrent registration in EPID 403.

EPID 411 Epidemiology of Chronic Diseases 3 hrs. Selected topics in chronic diseases with critical analysis of current epidemiologic literature. Prerequisite(s): EPID 400 or consent of the instructor.
Course Descriptions

EPID 412  Introduction to Psychosocial Epidemiology  2 hrs.  Reviews landmark studies of psychosocial and psychiatric disorders in U.S. communities; evaluates research methodology, case definition, identification, and empirical findings.  Prerequisite(s): EPID 400 or consent of instructor.

EPID 426  Pharmacopidemiology  2 hrs.  Reviews processes of ethical drug development. EPI methodologies for drug evaluation are presented, giving students opportunity to critically appraise efficacy and safety of clinical data. Course complements BSTT 430.  Prerequisite(s): EPID 400 or consent of the instructor.

EPID 428  Epidemiology of Violence  2 hrs.  Reviews public health aspects of violence-related mortality and morbidity; examines existing databases and conceptual frameworks focusing on etiology, epidemiology, surveillance, and prevention.  Prerequisite(s): EPID 400 or consent of the instructor.

EPID 471  Population  3 OR 4 hrs.  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.  Same as SOC 471, 3 undergraduate hours; 4 graduate hours.  Prerequisite(s): 6 hours of upper-division sociology, including SOC 201, or consent of the instructor.

EPID 494  Introductory Special Topics in Epidemiology  1 TO 4 hrs.  Special topics in substantive areas of epidemiology (including infectious disease, chronic disease, environmental/occupational, social). Course content will vary with each offering. May be repeated. Students may register in more than one section per term.  Prerequisite(s): EPID 400 or EPID 403 or consent of instructor; and graduate or professional standing.

EPID 501  Advanced Quantitative Methods in Epidemiology  4 hrs.  Advanced quantitative methods used in the analysis of case-control studies, cohort studies, and meta-analysis, including computer applications.  Prerequisite(s): EPID 403 and EPID 404; and BSTT 401 and BSTT 505; and consent of the instructor.

EPID 510  Advanced Epidemiology of Infectious Diseases  2 hrs.  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(s): EPID 410 or consent of instructor.

EPID 513  Epidemiology of Aging  2 hrs.  Current methodologic and public health issues in the epidemiology of aging will be explored.  Prerequisite(s): EPID 401 or EPID 411; and consent of the instructor.

EPID 515  Advanced Cancer Epidemiology  3 hrs.  Critical review of topics and issues relevant to cancer epidemiology, to promote synthesis of current knowledge and awareness of research issues.  Prerequisite(s): EPID 401 and EPID 411; or consent of the instructor.

EPID 516  Advanced Cancer Epidemiology  2 hrs.  Critical review of the epidemiology of selected cancer sites to promote synthesis of knowledge, awareness of methodologic issues, and stimulate future research.  Prerequisite(s): EPID 501 and EPID 515; or consent of the instructor. Recommended background: EPID 520.

EPID 517  Epidemiology of Cardiovascular Diseases  2 hrs.  Epidemiology and risk factors of cardiovascular diseases.  Prerequisite(s): EPID 411 or consent of instructor.

EPID 518  The Epidemiology of Pediatric Diseases  3 hrs.  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.  Same as CHSC 518.  Prerequisite(s): EPID 400 or EPID 403; EPID 404 and BSTT 400; or consent of the instructor.

EPID 519  Research Protocol and Grant Development  1 hour.  A review of funding options and examples of developing fundable research proposals.  Satisfactory/Unsatisfactory grading only.  Prerequisite(s): EPID 400.

EPID 520  Genetics in Epidemiology  2 hrs.  Topics in genetic/molecular epidemiology, including genetics, population genetics, molecular biology, and molecular genetics.  Familiarizes students with laboratory/statistical concepts and applications in epidemiological studies.  Prerequisite(s): EPID 401 or consent of the instructor.

EPID 545  Reproductive and Perinatal Health  3 hrs.  Focuses on the epidemiology of key reproductive and perinatal health outcomes and relevant health services and health policies.  Same as CHSC 545.  Prerequisite(s): BSTT 400; and EPID 400 and EPID 403; or consent of the instructor.

EPID 548  Readings in Reproductive and Perinatal Epidemiology  2 hrs.  Advanced seminar in reproductive/perinatal epidemiology with particular emphasis on methodologic issues.  Same as CHSC 548.  Prerequisite(s): CHSC 441 and EPID 404 or consent of the instructor. Recommended background: Maternal and child health and epidemiology.

EPID 549  Advanced Applied Methods in MCH Epidemiology  3 hrs.  Gives conceptual and technical understanding of statistical and epidemiological methods, builds skills/proficiency in applying these. Attention is given to data-handling tasks and to statistical/epidemiologic strategies for analysis and presentation.  Same as CHSC 549.  Prerequisite(s): EPID 402 or EPID 404; and BSTT 401 and EPID 406; or consent of the instructor. Recommended background: Credit or concurrent registration in EPID 501.

EPID 554  Occupational and Environmental Epidemiology  2 hrs.  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.  Same as EOHS 554.  Prerequisite(s): EPID 403 and BSTT 401 and EOHS 406; or consent of the instructor.

EPID 571  Injury Epidemiology and Prevention  3 hrs.  Covers general principles of injury epidemiology and intervention research and will engage students in development and application of preventive activities in workplaces and in the community.  Same as EOHS 571.  Prerequisite(s): Grade of B or better in EPID 400 or grade of B or better in EPID 403; and graduate or professional standing; or consent of the instructor. Recommended background: Grade of B or better in EOHS 408.

EPID 591  Current Epidemiologic Literature  2 hrs.  Student presentation of recently published scientific papers of epidemiologic interest, to promote breadth of knowledge and critical examination of evidence.  Satisfactory/Unsatisfactory grading only. May be repeated.  Prerequisite(s): EPID 401 or EPID 403 or consent of instructor.

EPID 594  Advanced Special Topics in Epidemiology  1 TO 4 hrs.  Advanced special topics in substantive areas of epidemiology (including infectious disease, chronic disease, environmental/occupational, social methods, etc.) Course content will vary with each offering. May be repeated. Students may register in more than one section per term.  Prerequisite(s): EPID 401 or EPID 403 or consent of instructor.

EPID 595  Epidemiology Research Seminar  1 hour.  Current developments in theory and application of biostatistics and epidemiology with presentations by faculty and visiting scientists.  Satisfactory/Unsatisfactory grading only. May be repeated.  Prerequisite(s): Credit or concurrent registration in EPID 400 or EPID 403 or consent of the instructor.

Finance

FIN 412  Portfolio Management  3 hrs.  Development of portfolio theory; establishment of portfolio objectives for individuals, corporations, banks, pension, and mutual funds; evaluation of portfolio performance.  Prerequisite(s): FIN 310.

FIN 415  Fixed Income Securities  3 hrs.  Valuation of fixed income securities, term structure estimation and arbitrage trading with practical application using real data.  Prerequisite(s): FIN 310.
FIN 416 Options and Futures Markets 3 hrs. 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 which determine futures and options prices. Prerequisite(s): FIN 310.

FIN 430 Introduction to Money and Banking 3 hrs. Payment and banking systems; credit and market risk management; the Federal Reserve System; globalization of monetary, banking, and regulatory systems. Prerequisite(s): FIN 300.

FIN 431 Theory and Structure of Financial Markets 3 hrs. The distribution of saving and credit over time and risk categories. The financial services industry. Administration and regulation of global money, security, and derivative markets. Prerequisite(s): FIN 300.

FIN 442 International Finance 3 hrs. 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. Prerequisite(s): FIN 300 and FIN 310.

FIN 444 Small Business Finance 3 hrs. Aspects of acquiring funds for small business enterprises. Topics include the trade-off of liquidity and profitability, management of working capital, and capitalization. Prerequisite(s): FIN 300.

FIN 465 Property and Liability Insurance 3 OR 4 hrs. Using property and liability insurance to manage risk. Topics may include fire, marine, consequential loss, crime, title, automobile, and workers’ compensation insurance. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): FIN 300 or consent of the instructor.

FIN 466 Life and Health Insurance 3 OR 4 hrs. Types, uses, and evaluation of life and health insurance. Economics of the industry. Regulation and taxation. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): FIN 300; or consent of the instructor.

FIN 472 Real Estate Finance 3 OR 4 hrs. Financial 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. Same as ECON 472. 3 undergraduate hours; 4 graduate hours. May not be used to satisfy the economics credit requirement for the MA in Economics and PhD in Economics. Elective credit only will be applied toward these degrees. Prerequisite(s): ECON 218 or ECON 220.

FIN 473 Introduction to Risk Management 3 hrs. Introduction to risk management. Loan and credit management; credit scoring; Risk measurements and reserves; banking and insurance capital requirements, the Basel Accord, tail events, and catastrophic event insurance. Financial contracts and hedging. Same as IDS 473. Prerequisite(s): FIN 300 and IDS 371.

FIN 494 Special Topics in Finance 1 TO 4 hrs. An intensive study of a selected topic in finance. Topics vary by sections and by term. 1 to 3 undergraduate hours; 2 to 4 graduate hours. May be repeated if topics vary. Students may register for more than one section per term. May be repeated to a maximum of 6 hours for undergraduates; may be repeated to a maximum of 8 hours for graduate students. Consent of the instructor.

FIN 495 Competitive Strategy 4 hrs. 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(s): Senior standing in the College of Business Administration and completion of all other CBA core courses, or consent of the instructor.

FIN 500 Introduction to Corporate Finance 4 hrs. 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. Prerequisite(s): ACTG 500 and credit or concurrent registration in ECON 520 and admission to the MBA program, the MA in Real Estate Program, the Master of Health Administration Program, or approval of the director of graduate studies.

FIN 510 Investments 4 hrs. 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(s): FIN 500.

FIN 512 Portfolio Analysis 4 hrs. 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(s): FIN 510.

FIN 516 Theory and Structure of Options and Futures Markets 4 hrs. History and institutional structure of options and futures markets. Uses of futures and options for arbitrage, speculation, and hedging by financial and portfolio managers of domestic and multinational organizations. Analysis of factors which determine futures and options prices. Prerequisite(s): Consent of the instructor.

FIN 520 Corporate Finance 4 hrs. 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(s): FIN 500.

FIN 522 Money and Banking 4 hrs. 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(s): FIN 500.

FIN 573 Risk Management 4 hrs. Financial contracts and hedging. Same as IDS 573. Prerequisite(s): Credit or concurrent registration in IDS 570 and FIN 500.

FIN 594 Special Topics in Finance 1 TO 4 hrs. An intensive study of a selected topic in finance. Topics vary by sections and by term. May be repeated to a maximum of 12 hours if topics vary. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

FIN 596 Independent Study in Finance 1 TO 4 hrs. Independent study under the direction of a faculty member. Must be arranged before the start of the semester. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of department head or instructor.
FIN 599
PhD Thesis Research
0 TO 16 hrs.
Independent research on topic approved for doctoral dissertation under supervision of faculty advisor. Satisfactory/Unsatisfactory grading only. May be repeated.
Prerequisite(s): Consent of the instructor.

French
FR 401
Reading French for Graduate Students
4 hrs.
Grammar, vocabulary, and special reading practice for graduate students wishing to fulfill French reading requirements for the PhD. Credit may not be applied toward a graduate degree. Taught in English. Prerequisite(s): Graduate standing and consent of the instructor. Recommended background: Some prior experience with elementary French.

FR 413
French Feminist and Gender Theory
3 OR 4 hrs.
An introduction to French theories of gender, including feminisms influenced by Lacanian psychoanalysis, political philosophy, and multicultural studies. Same as GWS 413. 3 undergraduate hours. 4 graduate hours. May be used for credit in the French major only with consent of the director of undergraduate studies. Taught in English. Students who intend to use FR 413 toward the major in French must complete assignments in French. Prerequisite(s): FR 301 or FR 302; or consent of the instructor.

FR 415
French Literature of the Middle Ages
3 OR 4 hrs.
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, and Villon. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 times(s). Prerequisite(s): FR 301 or consent of the instructor.

FR 417
Topics in Seventeenth-Century French Literature
3 OR 4 hrs.
Intensive study of Baroque and Classicism, with focus on major genres: theater (Corneille, Moliere, Racine); poetry (La Fontaine); prose (Pascal, de Sevigne); novel (de Lafayette). 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Students may register in more than one section per term. Prerequisite(s): FR 301 or consent of the instructor.

FR 418
Topics in Eighteenth-Century French Literature
3 OR 4 hrs.
Introduction to the literature and philosophy of the Enlightenment through representative authors (Rousseau, Diderot, etc.) and major genres (novel, essay, conte, theater, etc.). 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): FR 301 or consent of the instructor.

FR 419
Topics in Nineteenth-Century French Literature
3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): FR 301 or consent of the instructor.

FR 420
Topics in Twentieth-Century French Literature
3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): FR 301 or consent of the instructor.

FR 422
Françophonie Novel
3 OR 4 hrs.
Intensive analysis of a topic in Françophonie literature. Scope includes Quebec, Africa, the Antilles, and French novelists outside of France. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): FR 301 or consent of the instructor.

FR 433
Topics in Francophone Cinema
3 OR 4 hrs.
This course will examine a selection of French and Francophone films chosen around a period or theme or genre. Topics will vary. 3 undergraduate hours. 4 graduate hours. May be used for credit in the French major only with consent of the Director of Undergraduate Studies. Taught in English. Students who intend to use FR 440 toward the major in French must complete assignments in French. Prerequisite(s): FR 301 or FR 302; or consent of the instructor.

FR 440
Topics in French and Francophone Language Literacy
3 OR 4 hrs.
Provides an introduction to second language acquisition research and its implications for communicative language teaching. Emphasis is on creating activities to develop high school students ’ communicative abilities in speaking and listening. Same as GER 448, and SPAN 448. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above; and consent of the instructor and three courses at the 200- and 300-levels.

FR 448
Foundations of Second Language Teaching
3 OR 4 hrs.
An interdisciplinary approach to French civilization of the fifteenth and sixteenth centuries, including history, literature, the beau-arts, and philosphy. 3 undergraduate hours. 4 graduate hours. Lectures and discussion in French. Prerequisite(s): FR 302 or consent of the instructor.

FR 449
Teaching Second Language Literacy and Cultural Awareness
3 OR 4 hrs.
Examines the nature of literacy as a reciprocal relationship between readers, writers, texts, and culture. Students learn the practical and theoretical foundations of classroom teaching of second language reading and writing skills. Same as GER 449 and SPAN 449. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above; and consent of the instructor.

FR 461
French Civilization I: Medieval and Renaissance
3 OR 4 hrs.
Interdisciplinary approach to French civilization of the Middle Ages and the Renaissance, including history, literature, the beau-arts, and philosophy. 3 undergraduate hours. 4 graduate hours. Lectures and discussion in French. Prerequisite(s): FR 302 or consent of the instructor.

FR 462
French Civilization II: Seventeenth and Eighteenth Centuries
3 OR 4 hrs.
Interdisciplinary approach to French civilization of the seventeenth and eighteenth centuries, including history, literature, the beau-arts, and philosphy. 3 undergraduate hours. 4 graduate hours. Lectures and discussion in French. Prerequisite(s): FR 302 or consent of the instructor.

FR 463
French Civilization III: Nineteenth and Twentieth Centuries
3 OR 4 hrs.
An interdisciplinary approach to French civilization of the nineteenth and twentieth centuries, including history, literature, the beau-arts, and philosphy. 3 undergraduate hours. 4 graduate hours. Lectures and discussion in French. Prerequisite(s): FR 302 or consent of the instructor.

FR 464
Topics in French Civilization
3 OR 4 hrs.
An interdisciplinary approach to French civilization, including history, literature, the beau-arts, and philosophy. Each topic focuses on a specific period between the Middle Ages and the present. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): FR 302 or consent of the instructor.

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

FR 471
Educational Practice with Seminar II
6 hrs.
The second half of a two-semester sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.
FR 494 Special Topics 3 OR 4 hrs.
Topics will vary from term to term and may cover such areas as literary theory or culture. Same as SPAN 494 and ITAL 494. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Taught in English. Prerequisite(s): Junior standing or above; and approval of the department.

FR 496 Independent Study 1 TO 4 hrs.
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(s): French major with senior or graduate standing and consent of the department.

FR 502 Theoretical and Research Foundations of Communicative Language Teaching 4 hrs.
Introduces students to contemporary theory and research on second language acquisition. Emphasis is on understanding the research and examining classroom practice. Same as SPAN 502. Credit is not given for FR 502/SPAN 502 if the student has credit for SPAN 450 or FR 450 or GER 407. Taught in English. Prerequisite(s): Approval of a teaching assistant. For students outside the department: consent of the instructor.

FR 510 Seminar in Literary Studies 4 hrs.
Topics vary. May be repeated. Beyond 12 hours of credit earned, consent of the director of graduate studies required.

FR 560 Seminar in Cultural Studies 4 hrs.
Topics vary. May be repeated to a maximum of 12 hours.

FR 570 Seminar in Literary Theory and Criticism 4 hrs.
Theories of literary production and reception; their application to the practice of literary criticism. Specific themes and topics vary. Same as SPAN 570. May be repeated to a maximum of 8 hours with approval. Approval to repeat course granted by the instructor. Taught in English.

FR 575 French Abroad 0 TO 16 hrs.
Leave requires more than one semester/year and practical work in francophone literature and civilization in France. May be repeated to a maximum of 33 hours. Prerequisite(s): Approval of the department.

FR 596 Independent Study 1 TO 4 hrs.
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(s): Junior standing or above; and approval of the department.

FR 598 Thesis Research 0 TO 16 hrs.
Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 8 hours. Prerequisite(s): Approval of the director of graduate studies.

Gender and Women's Studies

GWS 403 Culture and Sexuality: Cultural History of Same-Sex Relations 3 OR 4 hrs.
Lesbian/gay studies; issues in the history of (homo)sexuality; cultural and historical analysis of same-sexuality in several periods, including our own. Same as HIST 403, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or consent of the instructor.

GWS 406 Politics of Race, Gender, and Class 3 OR 4 hrs.
Formation of social status categories, individual and collective identity construction, the mechanisms of group-based marginalization and stigmatization; relationship between social status categories. Same as AAST 406, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): AAST 100 or GWS 102 or GWS 101; or graduate or professional standing; or consent of the instructor.

GWS 412 Women and the Environment 3 OR 4 hrs.
Women's place in the built environment; the role of gender in environmental experience, including women as users, designers, planners, policy makers, and critics. Same as ARCH 412, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Advanced undergraduate or graduate standing, or consent of the instructor.

GWS 413 Feminist and Gender Theory 3 OR 4 hrs.
An introduction to French theories of gender, including feminisms influenced by Lacanian psychoanalysis, political philosophy, and multicultural studies. Same as FR 413. 3 undergraduate hours. 4 graduate hours. May be used for credit in the French major only with consent of the director of undergraduate studies. Taught in English. Students who intend to use FR 413 toward the major in French must complete assignments in French. Prerequisite(s): FR 301 or FR 302; or consent of the instructor.

GWS 419 Public Health Aspects of Sexuality and Women's Health 3 hrs.
An overview of human sexuality from a public health view with special emphasis on family planning, sexuality, and behavior effects on women's health. Same as CHSC 419. Prerequisite(s): Graduate standing; or junior standing or above with consent of the instructor.

GWS 424 Gender, Crime, and Justice 3 OR 4 hrs.
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. Same as CLJ 424, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CLJ 101 and CLJ 220; or consent of the instructor.

GWS 425 Sociology of Gender 3 OR 4 hrs.
Variety and change in gender roles; patterns and consequences of gender inequality: gender and sexuality; gender and social institutions such as family, economy. Same as SOC 424, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): 6 hours of upper-division sociology or gender and women's studies courses or consent of the instructor.

GWS 428 Asian/Asian American Women in the Global Economy 3 OR 4 hrs.
Examines the racialization and feminization of a global division of labor and focuses primarily on Asian and Asian American women's participation and incorporation as workers and key actors in the development of the global economy. Same as ASAM 428 and SOC 428. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ASAM 125 or ENGL 125 or SOC 125 or AAST 225 or LALS 225 or SOC 225 or ASAM 228 or ASST 228 or SOC 228 or ASAM 290 or two 200-level courses in either SOC, GWS or ASAM, or a combination of these.

GWS 439 Gender and Cultural Production 3 OR 4 hrs.
Issues of gender representation and gender politics examined through the use of theoretical texts or through the study of women authors. Same as GER 439, 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) if topics vary. Taught in English. Students who intend to use GER 439/GWS 439 toward a degree offered by the Department in Germanic Studies will do assignments in German: Area, Language/Culture. Prerequisite(s): GER 212 or consent of the instructor.

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

GWS 443 Topics in Gender, Sexuality, and Literature 3 OR 4 hrs.
Specific study of topics in gender and literature. Content varies. Same as ENGL 443. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): ENGL 361 or ENGL 362 or ENGL 363 or GWS 101 or GWS 102; and senior standing or above; or consent of the instructor.
GWS 444 
Topics in Theories of Gender and Sexuality 3 OR 4 hrs.

GWS 478 
Women in Chinese History 3 OR 4 hrs.

GWS 484 
Topics in the History of Women 3 OR 4 hrs.

GWS 485 
Gender and Politics 3 OR 4 hrs.

GWS 489 
Advanced Topics in the Study of Sexuality 3 OR 4 hrs.

GWS 494 
Advanced Topics in Gender and Women's Studies 3 OR 4 hrs.

GWS 497 
Women and Film 3 OR 4 hrs.

GWS 514 
Gender Issues in Cross-Cultural Perspectives 4 hrs.

GWS 515 
Psychology of Women and Gender 3 hrs.

GWS 521 
Violence Against Women 4 hrs.

GWS 525 
Social Work with Women 3 hrs.

GWS 540 
Language and Gender 4 hrs.

GWS 547 
Race, Class, and Gender Dimensions of Crime and Justice 4 hrs.

GWS 551 
Feminist Theories 4 hrs.

GWS 552 
Research Approaches in Gender and Women's Studies 4 hrs.

GWS 593 
Women in Education 4 hrs.

GEOG 401 
Topics in Regional Geography 3 OR 4 hrs.

GEOG 418 
Ethnographic and Qualitative Research Methods 3 OR 4 hrs.

PSCH 315 or GWS 315.

SAME AS ENGL 302

GWS 450 
Women and Mental Health Nursing 3 hrs.

GWS 462 
AIDS, Politics, and Culture 3 OR 4 hrs.

GWS 469 
Women's Literary Traditions 3 OR 4 hrs.

GWS 472 
Women and Film 3 OR 4 hrs.

GWS 502 
Research Approaches in Gender and Women's Studies 4 hrs.

GWS 504 
Language and Gender 3 OR 4 hrs.

GWS 505 
Social Work with Women 3 hrs.

GWS 514 
Gender Issues in Cross-Cultural Perspectives 4 hrs.

GWS 515 
Psychology of Women and Gender 3 hrs.

GWS 521 
Violence Against Women 4 hrs.

GWS 525 
Social Work with Women 3 hrs.

GWS 540 
Language and Gender 4 hrs.

GWS 547 
Race, Class, and Gender Dimensions of Crime and Justice 4 hrs.

GWS 551 
Feminist Theories 4 hrs.

GWS 552 
Research Approaches in Gender and Women's Studies 4 hrs.

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Women in Education 4 hrs.

GEOG 401 
Topics in Regional Geography 3 OR 4 hrs.

GEOG 418 
Ethnographic and Qualitative Research Methods 3 OR 4 hrs.

Prerequisite(s):

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Consent of the instructor.
GEOG 242 Environmental Hazards and Risks 3 OR 4 hrs. Environmental risks of natural and technological hazards; causes and consequences to people; social theories of risks; coping mechanisms used to reduce risk. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): GEOG 251 or GEOG 441 or consent of the instructor.

GEOG 444 Management of Solid and Hazardous Wastes 3 hrs. 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. Same as CME 423 and EOHS 472.

GEOG 453 Seminar in Cultural Ecology 3 OR 4 hrs. Cultural ecology and cultural evolution, emphasizing peasant farming and other subsistence systems. Soil management under shifting and sedentary agriculture. Same as ANTH 453, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ANTH 102 or consent of the instructor.

GEOG 455 Quantitative Methods 3 OR 4 hrs. Introductory statistics course in statistical methods for anthropological problem solving. Primary emphasis is on univariate and bivariate statistics, such as means standard deviations, correlation, chi square, t-tests, and simple regressions. Same as ANTH 455, 3 undergraduate hours, 4 graduate hours. Prerequisite(s): ANTH 102 or GEOG 451 or consent of the instructor.

GEOG 461 Location and Land Use 3 OR 4 hrs. Environmental, demographic, and institutional influences on land availability/use at global/local scales; geographies of production/use intensity; market/governmental control over land/uses. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): GEOG 131 or EAES 101 or consent of the instructor.

GEOG 464 Geographic Modeling of Transportation Systems 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): GEOG 100 and GEOG 161.

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

GEOG 471 Educational Practice with Seminar II 6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.

GEOG 475 Thematic Cartography 4 hrs. 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(s): GEOG 276 or GEOG 278 or consent of the instructor.


GEOG 478 Mapping with Microcomputers 4 hrs. Microcomputer applications, including cartography in the classroom. Principles of mapping, direct control of devices for mapping, characteristics and limitations of mapping programs. Same as ANTH 484. Prerequisite(s): GEOG 475 or consent of the instructor.

GEOG 481 Geographic Information Systems I 4 hrs. Components and performance properties of geographic information systems. Geographic hierarchies and data structures. Problems and solutions in handling large geographic files. Geocoding. Same as ANTH 481. Prerequisite(s): GEOG 100 and one from GEOG 278, GEOG 386, IDS 109; or consent of the instructor.

GEOG 482 Geographic Information Systems II 4 hrs. Application of raster (or grid-based) geographic information systems to the spatial analysis of landscapes. Same as ANTH 482.

GEOG 483 Geographic Information Systems III 4 hrs. Problems encountered in the analysis and portrayal of geographic data. Topics include cartographic presentation, geographic data structure, surface analysis, time series, Markov probabilities, and computer cartographic procedures for displaying output from analytic procedures. Same as ANTH 483. Prerequisite(s): GEOG 482 or ANTH 482 or consent of the instructor.

GEOG 484 Qualitative Methods in Geographic Research 3 OR 4 hrs. Use of qualitative methods in geographic research. Research design choices, data collection and analysis, writing. Applications in environmental and urban geography. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): GEOG 481 or Geography major or minor or consent of instructor.


GEOG 486 Analysis of Geographic Patterns 4 hrs. Analytical methods for evaluating arrangements of points, lines, and surfaces across regions. Development of noncentral measures of spatial association as an alternative to correlation analysis. Prerequisite(s): GEOG 482 or consent of the instructor.
GEOG 491 History and Philosophy of Geography 3 OR 4 hrs. The philosophy of geography, its theory and research techniques. Analysis of bibliographic sources; criticism of papers on assigned topics. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Declared major or minor in Geography; or consent of the instructor.

GEOG 496 Internship 1 TO 4 hrs. Professional field experience with an agency or organization in the private or public sector on projects related to the student's area of specialization. Same as ANTH 496. May be repeated to a maximum of 8 hours. Only 4 hours of credit may be applied toward the minor in Geography. Prerequisite(s): Declared major in Anthropology, minor in Geography or full graduate standing in Anthropology or Geography and consent of the faculty advisor, head of the department, or the director of internship programs.

GEOG 505 Seminar on the Geography of Colonialism and Neocolonialism 3 hrs. Colonialism: historical, political, and development geographies. Colonialism in the evolution of Europe and the Third World. Anti-colonial liberation movements. Theories of neocolonialism, underdevelopment, and dependency. May be repeated to a maximum of 6 hours. Prerequisite(s): GEOG 415 or GEOG 421 or consent of the instructor.

GEOG 510 Seminar in Social Organization 4 hrs. Theoretical and substantive issue about how societies are organized. Same as ANTH 510. May be repeated to a maximum of 12 hours.

GEOG 511 Topics in Urban Geography 3 hrs. Critical analysis of selected theories, methods, and problems of urban and settlement geography. May be repeated to a maximum of 9 hours. Prerequisite(s): One 400-level course in urban, economic, or transportation geography.

GEOG 530 Seminar in Physical Geography 3 hrs. General topic to be defined by instructor; specific approved topic to be defined, researched, and discussed by student. May be repeated to a maximum of 6 hours. Prerequisite(s): GEOG 421 or GEOG 431 or consent of the instructor.

GEOG 541 Seminar on Resource Management and Policy 3 hrs. Social policy issues in the resolution of resource management conflicts. Topics will vary. May be repeated to a maximum of 6 hours. Prerequisite(s): GEOG 411 or GEOG 461 or consent of the instructor.


GEOG 575 Seminar in Cartography 3 hrs. Review of recent developments in computer mapping and identification of mapping needs. Research on conceptual and program solutions to computer mapping problems. May be repeated to a maximum of 6 hours. Prerequisite(s): GEOG 475 or GEOG 487; or consent of the instructor.

GEOG 589 Geographic Information Systems for Planning 4 hrs. Applications of geographical information systems to urban planning and policy making. Same as UPP 508. Prerequisite(s): Graduate standing in Urban Planning and Policy or consent of the instructor.

GEOG 592 Research Proposal Design 1 hour. Research techniques, including problem definition, literature search, and methodological design. Prerequisite(s): GEOG 595.

GEOG 595 Departmental Seminar 3 hrs. Review of contemporary geographic theory in academic research and professional practice. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Graduate standing in Geography.

GEOG 596 Independent Study 1 TO 4 hrs. Independent research on approved topic not related to thesis preparation. May be repeated to a maximum of 6 hours. Students may register in more than one section per term. Prerequisite(s): Consent of faculty advisor and the instructor.

GEOG 598 Master's Thesis Research 0 TO 16 hrs. Independent research on a topic approved for a graduate thesis. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 16 hours. Prerequisite(s): Consent of thesis research advisor.

GEOG 599 Advanced Practice in German Language Skills 3 OR 4 hrs. Communicative use of German techniques for understanding written and spoken texts, practicing conversation, and writing texts, such as essays, compositions, letters, and e-mail. 3 undergraduate hours. 4 graduate hours. May be repeated. Only majors and minors outside the Department of Germanic Studies may repeat this course for a maximum of 6 hours of credit. Area: language. Prerequisite(s): GER 212 or the equivalent. Recommended background: Credit or concurrent registration in GER 310.

GER 401 Introduction to Translation Theory 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Area: language. Prerequisite(s): GER 212 or the equivalent, or graduate standing.

GER 411 The Cultural Focus 3 OR 4 hrs. Interdisciplinary study of urban culture with focus on German-speaking countries. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s). 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. Area: literature/culture. Prerequisite(s): For majors and minors in the Department of Germanic Studies only: GER 212 or the equivalent or consent of the instructor.

GER 420 Germanic Cultural Studies I: Genres 3 OR 4 hrs. Concentration on a genre, with stress on cultural analysis and theoretical inquiry. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s) if topics vary. 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(s): GER 212 or consent of the instructor.

GER 421 Germanic Cultural Studies II: Authors, Movements, Periods 3 OR 4 hrs. Critical analysis of texts in the biographical, social, cultural, and historical context. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s) if topics vary. 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(s): GER 212 or consent of the instructor.
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>GER 422</td>
<td>Germanic Cultural Studies III: Theories I</td>
<td>3-4 hrs.</td>
<td>Explores themes in German-speaking societies, such as the family, xenophobia, crime, and science, with stress on literary analysis and interpretation. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s) if topics vary. 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(s): GER 212 or consent of the instructor.</td>
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<tr>
<td>GER 430</td>
<td>Classical German Philosophy</td>
<td>3-4 hrs.</td>
<td>Introduction to German philosophy and intellectual history through the critical analysis of major authors and texts. 3 undergraduate hours. 4 graduate hours. Area: literature/culture. Prerequisite(s): One 300-level course in Germanic Studies or consent of the instructor.</td>
</tr>
<tr>
<td>GER 437</td>
<td>Contemporary Germanic Literature</td>
<td>3-4 hrs.</td>
<td>Literature of the German-speaking world since World War II, with emphasis on current issues and recent critical approaches to literature. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) if topics vary. Area: literature/culture. Prerequisite(s): GER 211 or the equivalent or graduate standing or consent of the instructor.</td>
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<tr>
<td>GER 438</td>
<td>The Faust Legend</td>
<td>3-4 hrs.</td>
<td>Discusses Goethe's Faust within the context of European and non-European literatures. Traces the origins, significance, and interpretation of the Faust figure. 3 undergraduate hours. 4 graduate hours. Knowledge of German not required.</td>
</tr>
<tr>
<td>GER 449</td>
<td>Gender and Cultural Production</td>
<td>3-4 hrs.</td>
<td>Issues of gender representation and gender politics examined through the use of theoretical texts or through the study of women authors. Same as GWS 439. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) if topics vary. Taught in English. Students who intend to use GER 449 toward a degree offered by the Department of Germanic Studies will do assignments in German. Area: literature/culture. Prerequisite(s): GER 212 or consent of the instructor.</td>
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<tr>
<td>GER 448</td>
<td>Foundations of Second Language Teaching</td>
<td>3-4 hrs.</td>
<td>Provides an introduction to second language acquisition research and its implications for communicative language teaching. Emphasis is on creating opportunities to develop high school students' communicative abilities in speaking and listening. Same as FR 448 and SPAN 448. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above; and consent of the instructor and three courses at the 200- and 300-levels.</td>
</tr>
<tr>
<td>GER 449</td>
<td>Teaching Second Language Literacy and Cultural Awareness</td>
<td>3-4 hrs.</td>
<td>Explores the nature of literacy as a reciprocal relationship between readers, writers, texts, and culture. Students learn the practical and theoretical foundations of classroom teaching of second language reading and writing skills. Same as FR 449 and SPAN 449. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above; and consent of the instructor.</td>
</tr>
<tr>
<td>GER 450</td>
<td>Business Operations in German-Speaking Countries</td>
<td>3-4 hrs.</td>
<td>The political, cultural, historical, and economic environment in which business operates in the German-speaking countries; the effects of this environment on international business. 3 undergraduate hours. 4 graduate hours. Knowledge of German not required.</td>
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<tr>
<td>GER 461</td>
<td>German Abroad 0 TO 17 hrs.</td>
<td></td>
<td>Taken in a German-speaking country. Lectures, seminars, and practical work in German language, literature, and civilization. May be repeated to a maximum of 34 hours. Prerequisite(s): GER 104 or the equivalent; 2.75 overall grade point average; 3.00 grade point average in Germanic Studies, and approval of the department.</td>
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<tr>
<td>GER 470</td>
<td>Exploring the Field of Germanic Studies</td>
<td>3-4 hrs.</td>
<td>Team-taught. Research in film studies, gender studies, Jewish culture, minorities, literary studies, intellectual history, applied linguistics in Germanic Studies. Each unit taught by a different faculty member from the Department of Germanic Studies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Undergraduate students must obtain approval of the department.</td>
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<tr>
<td>GER 480</td>
<td>Hegel Studies 3 OR 4 hrs.</td>
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<td>Studies in the philosophy of Hegel, including principal texts (e.g., Phenomenology), or problems (e.g., critique of metaphysics) or comparative studies (e.g., Hegel’s critique of Kant). 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Taught in English. Area: literature/culture. Prerequisite(s): GER 450; or consent of the instructor. Recommended background: PHIL 224 or PHIL 425.</td>
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<tr>
<td>GER 487</td>
<td>Computer Assisted Language Learning</td>
<td>3-4 hrs.</td>
<td>An introduction to computer assisted language learning (CALL); the use of computer technology in second language reading and research. The effectiveness of CALL technology is assessed based on SLA theory and research studies. Same as LING 487 and SPAN 487. 3 undergraduate hours. 4 graduate hours. Taught in English. Extensive computer use required. Prerequisite(s): LING 483 or CIE 483 or GER 448 or FR 448 or SPAN 448 or GER 449 or FR 449 or SPAN 449; or SPAN 502 or FR 502 or the equivalent; and senior standing or above.</td>
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<tr>
<td>GER 492</td>
<td>Internship Seminar: Business</td>
<td>1 TO 4 hrs.</td>
<td>Student placement in an international organization or firm in a German-speaking country or in its U.S. subsidiary or division. Satisfactory/Unsatisfactory grading only. May be repeated with approval. Approval to repeat course granted by the department. Prerequisite(s): GER 211; and consent of the instructor and a GPA of 2.00. Recommended background: Concurrent registration in GER 493 or registration in GER 495 in the semester immediately following.</td>
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<tr>
<td>GER 493</td>
<td>Internship Seminar: Business</td>
<td>1 TO 4 hrs.</td>
<td>Academic component of the internship experience. Studies in the field of the internship and further investigation of related topics. May be repeated with approval. Approval to repeat course granted by the department. A maximum of 3 hours of credit may be applied toward an undergraduate degree offered by the Department of Germanic Studies, and a maximum of 4 hours of credit may be applied toward a graduate degree offered by the Department of Germanic Studies. Prerequisite(s): GER 211 and credit or concurrent registration in GER 492 and consent of the instructor and a grade point average of 2.00.</td>
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<tr>
<td>GER 494</td>
<td>Educational Practice with Seminar II</td>
<td>6 hrs.</td>
<td>The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.</td>
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<tr>
<td>GER 495</td>
<td>Educational Practice with Seminar II</td>
<td>6 hrs.</td>
<td>The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.</td>
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<tr>
<td>GER 513</td>
<td>Germanic Culture from the Enlightenment to the 1848 Revolution</td>
<td>4 hrs.</td>
<td>Explores the history and theory 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.</td>
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<tr>
<td>GER 514</td>
<td>Germanic Culture from the Industrial Revolution to the Present</td>
<td>4 hrs.</td>
<td>Explores the history and theory 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.</td>
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<tr>
<td>GER 515</td>
<td>Film and Media Culture</td>
<td>4 hrs.</td>
<td>Explores the history and theory 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.</td>
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<tr>
<td>GER 531</td>
<td>Seminar in Special Topics</td>
<td>4 hrs.</td>
<td>In-depth study of a theme, genre, or other element in Germanic literature and culture not confined to a single historical period. Topics vary and may be repeated to a maximum of 12 hours if topics vary.</td>
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<tr>
<td>GER 572</td>
<td>The Role of Reading in Second Language Acquisition</td>
<td>4 hrs.</td>
<td>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.</td>
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</table>
GCLS 501 \textbf{Core molecular genetics course} covering basic principles of gene expression, genome replication, and molecular interactions important to biological processes in prokaryotes and eukaryotes. Restricted to students enrolled in a graduate program offered through the Colleges of Medicine or Pharmacy or the Departments of Bioengineering or Biological Sciences or consent of the instructor.

GCLS 502 \textbf{Molecular Biology} 3 hrs. Core molecular biology course covering basic principles of gene expression, genome replication, and molecular interactions important to biological processes in prokaryotes and eukaryotes. Restricted to students enrolled in a graduate program offered through the Colleges of Medicine or Pharmacy or the Departments of Bioengineering or Biological Sciences or consent of the instructor.

GCLS 503 \textbf{Cell Biology} 3 hrs. Advanced course on fundamental aspects of cell biology; basic concepts will be integrated with key examples which span gene, protein, cell, and tissue function. Credit is not given for GCLS 503 if the student has credit in BCHE 561 or ANAT 585 or MIM 585 or PHVB 585. Restricted to students enrolled in a graduate program offered through the Colleges of Medicine, Pharmacy, or Applied Health or the Departments of Bioengineering or Biological Sciences or consent of the instructor.

GCLS 504 \textbf{Research Methods I} 1 TO 2 hrs. Lectures, demonstrations, and discussions concerned with principles and practical aspects of modern quantitative biochemical, molecular biological, physiological, and biophysical methodology such as separation techniques and studies of biomembranes. May be repeated. Students may register for more than one section per term. Restricted to students enrolled in a graduate program offered through the College of Medicine or Pharmacy or the Departments of Bioengineering or Biological Sciences or consent of the instructor.

GCLS 505 \textbf{Research Methods II} 1 TO 3 hrs. Lectures, demonstrations, and discussions concerned with principles and practical aspects of modern quantitative biochemical, molecular biological, physiological, and biophysical methodology such as bioimaging and biochemical analysis. May be repeated. Students may register for more than one section per term. Restricted to students enrolled in a graduate program offered through the Colleges of Medicine or Pharmacy or the Departments of Bioengineering or Biological Sciences or consent of the instructor.

GCLS 506 \textbf{GEMS Research Rotation} 2 TO 5 hrs. Research rotation course in which first year students from the GEMS program will undertake research projects in laboratories affiliated with this program. Satisfactory/Unsatisfactory grading only. May be repeated. Animals used in instruction. Prerequisite(s): Open only to PhD degree students.

GCLS 515 \textbf{Receptor Pharmacology and Cell Signaling} 3 hrs. Advanced course on cell-surface and nuclear receptors and mechanisms of signaling through receptors. Provides an overview of receptor theory, hands-on data analysis, and lectures and discussions on various signaling mechanisms. Credit is not given for GCLS 515 if the student has credit in PCOL 505 or PHVB 515, Prerequisite(s): GCLS 501 or approval of the department. Restricted to students enrolled in a graduate program offered through the Colleges of Medicine or Pharmacy or the Departments of Bioengineering or Biological Sciences or consent of the instructor.

GCLS 594 \textbf{Special Topics in Life Sciences} 1 TO 4 hrs. Systematic study of advanced selected topics in life sciences from an interdisciplinary approach. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.
Health Policy and Administration

HPA 400 Principles of Management in Public Health 3 hrs.
A detailed discussion of the conceptual and theoretical foundations to the principles of management with an emphasis on public health and healthcare settings. Prerequisite(s): Enrollment restricted to Public Health students; other graduate, professional, and advanced undergraduate students admitted by consent as space permits. To obtain consent, see the SPH registrar.

HPA 402 Social Ethics and Public Health 3 hrs.
Application of ideas from philosophy, law, political science, and economics to analyze the ethical basis of public health policies and programs.

HPA 403 U.S. Healthcare System 3 hrs.
Overview of the U.S. healthcare system, including its evolution, utilization patterns, providers—human, institutional, and organizational—financing, regulating, evaluating, and reforming.

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

Designed to provide the student with the core public health and emergency management practices and principles to prepare for and execute emergency management and business-continuity planning and operations. Taught online only. Prerequisite(s): Graduate or professional standing or consent of the instructor.

HPA 410 Health Organizational Leadership 3 hrs.
Examines the roles, responsibilities, and impact of leaders of organizations in the health industry. Critical structures and techniques of effective organizational leaders are taught.

HPA 417 Quality Management in Health Services 3 hrs.
Surveys development of quality management and theoretical basics and diverse perspectives of quality management and regulation. Presents relevant research and management methodologies.

HPA 429 Introduction to Health Services Research 2 hrs.
Introduction to health services research using classic studies and current trends which examine access, cost, quality, and outcomes of healthcare. Prerequisite(s): HPA 400.

HPA 430 Introduction to Public Health Policy Analysis 3 hrs.
Identities and discusses health status as a function of public policy; policy making to improve the public’s health; current health policy topics and methodology.

HPA 431 Law and Public Health 3 hrs.
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.

HPA 432 Public Health Advocacy 3 hrs.
Examination of the courts, government agencies, legislatures, and public opinion and an analysis of their decision making, planning an advocacy campaign using “strategic analysis.”

HPA 434 Law and the Healthcare System 3 hrs.
Survey of legal topics important to the management of healthcare organizations. They include relationships among the parties involved in the delivery of healthcare and the law of business organizations. Prerequisite(s): Graduate or professional standing and approval of the department.

HPA 437 Healthcare Data 3 hrs.
Review of data types in a healthcare information system. How data is transformed into information and then again transformed into knowledge through integrated computer systems. Same as BHIS 437. Taught online only. A UIC netid is required. Prerequisite(s): Graduate standing and consent of the instructor.

HPA 441 Strategic Management of Healthcare Organizations 4 hrs.
Introduction to strategic competitive analysis for healthcare organizations. Topics include: healthcare competition, entrepreneurship, technology and innovation, multi-constituent environment, and human resources. Prerequisite(s): Graduate or professional standing and approval of the department.

HPA 444 Healthcare Budgeting and Strategic Planning 3 hrs.
Budgeting systems in healthcare; budgeting techniques, flexible budgeting, cost behavior and forecasting, revenue and expense analysis; strategic planning in healthcare agencies; continuous quality improvement.

HPA 451 Healthcare Finance 3 hrs.
Examines practical aspects of finance in healthcare and recent developments in financial management of healthcare organizations, and applications of financial management techniques to specific problems facing healthcare managers. Prerequisite(s): Graduate or professional standing and approval of the department.

HPA 460 Introduction to the Economics of Health and Healthcare 2 hrs.
Introduces principles of economic analysis, with examples from public health and medical care. Examines how consumers and companies decide what to buy or sell, why markets determine a product’s price, and when public intervention improves welfare.

HPA 463 Managerial Health Economics 3 hrs.
Uses managerial economics to study healthcare system; demand for medical services; role of health insurance; productivity/cost measurement; labor markets and competition. Prerequisite(s): HPA 400 or consent of the instructor.

HPA 465 Health Information and Decision Support Systems 4 hrs.
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 online course.

HPA 494 Introductory Special Topics in Health Policy and Administration 1 TO 4 hrs.
Introductory topics in health administration, policy analysis, healthcare financing, cost-effectiveness evaluation. Topics vary by semester.

HPA 495 MHA Preceptorship 1 TO 3 hrs.
Preceptor-guided field experience in health administration designed to promote critical or professional standing and problem-solving skills, and application of management knowledge and skills in a practice setting. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 6 hours. Prerequisite(s): Graduate or professional standing and approval of the department.

HPA 496 MHA Capstone 2 hrs.
Individual, integrative product in health administration designed to demonstrate student’s mastery of health administration concepts and skills, including information access, synthesis, and use in critical thinking. Prerequisite(s): Graduate or professional standing and approval of the department.

HPA 497 Integrative Project in Emergency Management 2 hrs.
Independent investigation that draws upon the professional experience and knowledge synthesis of the student. Students investigate a topic/problem in their field and write an article. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

HPA 510 Healthcare Information Systems 4 hrs.
Examination, through case studies, group and class discussions, and problem-based learning, of the effective utilization of information technology applications currently in place and on the horizon in healthcare organizations. Same as BHIS 510. Taught online only. A UIC netid is required. Prerequisite(s): Graduate standing and consent of the instructor.

HPA 511 Organization Theory Applied to Health Programs 3 hrs.
Classical and modern organization theories applied to health programs. Includes organization structure and goals, management functions and processes, and managerial controls and evaluation. Prerequisite(s): HPA 400 or consent of the instructor.

HPA 512 Ethics in Clinical Research 1 hour.
Survey of key ethical issues involved in conducting research with human subjects, including informed consent, confidentiality, access, and equity. Same as MHPE 512. Extensive computer use required. Requires completion of an online course in human subjects research, to be supplemented by classroom discussion of the topics raised in that course and others. Prerequisite(s): Approval of the department. Students must be enrolled in the Master of Science in Public Health program.

HPA 516 Health Personnel Management 3 hrs.
Health personnel policies and programs, human resources requirements, recruitment, development, performance appraisal, salary and wage administration, and management/ labor relations in the health industry. Prerequisite(s): HPA 400 and consent of the instructor.
Examination and management of data communications in and between healthcare facilities, including examination of issues, standards, technologies, and system configurations. Same as BHIS 515. Taught online only. A UIC netid is required. Prerequisite(s): HPA 510 or BHIS 510; and graduate standing and consent of the instructor.

HPA 522 Public Health Research Design and Methods 3 hrs.
Graduate-level quantitative research methods course. Utilizes social science research methods with an emphasis on experimental and quasi-experimental research designs in the study of methodologically sound public health research investigations. Prerequisite(s): BSTT 400.

HPA 525 Management of Population Health Risks 3 hrs.
Examines the roles that healthcare delivery organizations can play, and methodologies used, in developing programs specific to the needs of the community they serve. Prerequisite(s): HPA 403 and HPA 410 and HPA 495.

HPA 527 Critical Issues in LongTerm Care Policy 3 hrs.
Long-term care organization, financing, delivery utilization, and policy, emphasizing affordability, access, and quality in a managed-care environment. Same as CHSC 527. Prerequisite(s): CHSC 400 and CHSC 425; or consent of the instructor.

HPA 531 Health Information Systems Analysis and Design 4 hrs.
A project course applying systems analysis and design theory to healthcare systems evaluation, modeling, and implementation. Same as BHIS 520. Taught online only. A UIC netid is required. Prerequisite(s): HPA 510 or BHIS 510; and graduate standing and consent of the instructor.

HPA 532 Research Design and Grant Writing 2 hrs.
Introduction to the skills necessary to plan a research project and write a research grant proposal using a systematic approach. Same as MHPE 532. Previously listed as MHPE 451. Prerequisite(s): Graduate or professional standing; and approval of the department.

HPA 535 Translating Research into Practice 3 hrs.
Current theory and practical reality related to the adoption and use of new scientific findings in patient care. The influence of research on public policy. Same as MHPE 535. Extensive computer use required. Prerequisite(s): Graduate or professional standing; and approval of the department.

HPA 540 Social and Organizational Issues in Health Informatics 4 hrs.
Examines the impact of information systems on the healthcare organization and applies theory through case study analysis. Same as BHIS 525. Taught only online. A UIC netid is required. Prerequisite(s): HPA 510 or BHIS 510; or BHIS 515 or BHIS 520 or BHIS 530 or HPA 520 or HPA 531 or HPA 550; or consent of the instructor.

HPA 550 Topics in Health Informatics 4 hrs.
Current theories and methods in health informatics. Same as BHIS 530. Taught only online; A UIC netid is required. Prerequisite(s): HPA 510 or BHIS 510; or HPA 520 or BHIS 515, or HPA 531 or BHIS 520, or HPA 540 or BHIS 525; and graduate standing and consent of the instructor.

HPA 551 Marketing Health Programs 3 hrs.
Concepts of marketing as a management tool; application of marketing to healthcare: the marketing process, marketing resources, and strategies for accomplishing marketing objectives. Prerequisite(s): HPA 400 or MKTG 563 or consent of the instructor.

HPA 556 U.S. Mental Health Policy 2 hrs.
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 U.S. Prerequisite(s): HPA 400 and HPA 430 and either EPID 400 or BSTT 400.

HPA 557 Measurement in Health Services Research 3 hrs.
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. Prerequisite(s): BSTT 400 and BSTT 401; or consent of the instructor.

HPA 563 Web-Based Public Health Information Systems 4 hrs.
Examination of Web-based applications in public health practice and factors in the design of Web-based public health education and database systems. This is an online course. Prerequisite(s): HPA 465; and consent of the instructor. Unless otherwise permitted, limited to students in the Public Health Informatics track of HPA.

HPA 564 Geographic Information System Application in Public Health 3 hrs.
Examination of GIS applications in public health and the process of designing a GIS-based public health investigation. Same as EHHS 564. This is an online course. Prerequisite(s): BSTT 400 and HPA 465 and consent of the instructor.

HPA 565 Data-Mining Applications in Public Health 3 hrs.
Presents the key public health information system sources, describes the process of data mining and introduces the student to a sample of data-mining techniques. Same as EHHS 565. Extensive computer use required. Prerequisite(s): BSTT 400.

HPA 573 Principles of Economic Evaluations of Healthcare Interventions 3 hrs.
Principles, models, and practical methods for the economic evaluation of healthcare services with an emphasis on pharmaceutical care. Same as PMAD 573. Previously listed as PMAD 571. Prerequisite(s): HPA 460; and graduate standing; and consent of the instructor.

HPA 590 Grant Writing 1 hour.
Students will learn how to write a grant proposal through the guidance of a mentoring committee. They will formulate a research proposal which will be presented to a panel of researchers who will critique the proposed study.

HPA 594 Advanced Special Topics in Health Policy and Administration 1 TO 4 hrs.
Advanced topics in health administration, policy analysis, healthcare financing, cost-effectiveness evaluation. Topics vary by semester. Prerequisite(s): Consent of the instructor.

Histology

HSTL 451 Oral Histology 4 hrs.
Comprehensive learning experiences in the structure and function of human tissue, organs, and organ systems with special emphasis on the oral cavity. Registration in HSTL 452 is required in the spring term. HSTL 451: Prerequisite(s): Approval of the department. Students must also register for HSTL 452 in the spring term.

HSTL 452 Histology II 4 hrs.
Continuation of HSTL 451. Provides a baseline of normal structure and function of human tissues necessary for the study of oral pathology and advanced courses in histology. Prerequisite(s): HSTL 451; and approval of the department or first year standing in the Doctor of Dental Surgery program.

HSTL 503 Biology of Mineralized Tissues 2 hrs.
Lectures and discussion on the formation, structure, and functions of bone, dentin, and enamel. Emphasizes the mechanisms of mineralization. Prerequisite(s): A basic course in histology and consent of the instructor.

HSTL 504 Fine Structure of Oral Soft Tissues 2 hrs.
Discussions of electron microscopic research methodologies as applied to oral biology with special emphasis on structural-functional relationships in oral soft tissues. Prerequisite(s): HSTL 401 and HSTL 451 or the equivalents and consent of the instructor.

HSTL 506 Advanced Oral Histology-Lymphoid Tissues 2 hrs.
Lectures and discussions on the structure and functions of lymphoid tissues with special interest in orally related diseases. Prerequisite(s): HSTL 401, a course in microbiology, and consent of the instructor.

HSTL 507 Physiological Basis of Pathology 2 hrs.
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." Same as PATH 507. Prerequisite(s): HSTL 401 or PATH 421 and PATH 422.

HSTL 514 Oral Biology Seminar 1 hour.
Invited speakers present the progress of current research work in their field of interest related to oral tissues. Same as OMDS 527. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.
HSTL 515  
Electron Microscopy in Dentistry  
Prerequisite(s): Consent of the instructor.

History

HIST 400  
Topics in Ancient History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history.

HIST 401  
Topics in Greek History  
3 OR 4 hrs.  
Specific topics are announced each term. Same as CL 401. 3 undergraduate hours. 4 graduate hours. May be repeated.  
Prerequisite(s): 3 hours of history or classics.

HIST 402  
Topics in Roman History  
3 OR 4 hrs.  
Specific topics are announced each term. Same as CL 402. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history or classics.

HIST 403  
Culture and Sexuality: Cultural History of Same-Sex Relations  
3 OR 4 hrs.  
Lesbian/gay studies; issues in the history of (homo)sexuality; cultural and historical analysis of same-sexuality in several periods, including our own. Same as GWS 403, 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): Junior standing or consent of the instructor.

HIST 404  
Roman Law and the Civil Law Tradition  
3 OR 4 hrs.  
Roman law and its relationship to values and social structure; social analysis through law; continental law tradition. Same as CL 404, and CLJ 404. 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): CLJ 200 or CL 203 or HIST 203 or consent of the instructor.

HIST 405  
Herodotus and His World  
3 OR 4 hrs.  
Examines the Histories of Herodotus—both the text and the culture of Classical Greece compared to the Near East and Egypt. Same as CL 405. 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): Sophomore standing or above.

HIST 406  
Topics in Medieval History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history, or junior standing or above, or consent of the instructor.

HIST 409  
Topics in Early Modern European History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history.

HIST 410  
Topics in Modern European History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history.

HIST 415  
American Indian Ethnohistory  
3 OR 4 hrs.  
Introduction to ethnohistory, an interdisciplinary approach to researching, conceptualizing, and writing American Indian history. The course is organized topically and centers on classic and current monographs and articles. Same as NAST 415, 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): Junior standing or above and consent of the instructor. Recommended background: Courses in cultural anthropology, American Indian anthropology, American Indian literature.

HIST 418  
Topics in German History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of European history, or consent of the instructor.

HIST 420  
Teaching the Social Sciences  
3 OR 4 hrs.  
This course focuses on acquiring and practicing the skills for teaching the social sciences at the secondary level within the content of history. 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): 9 hours of credit in the social sciences and approval of the instructor.

HIST 421  
Topics in British and Irish History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 6 hours of history or consent of the instructor.

HIST 424  
Topics in French History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): One 200-level course in French or European history or consent of the instructor.

HIST 429  
Topics in Italian History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history.

HIST 433  
Topics in Eastern European History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of European history or consent of the instructor.

HIST 435  
Topics in Russian History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of European history or consent of the instructor.

HIST 441  
Topics in African History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of African history, African American studies, or consent of the instructor.

HIST 445  
History of Islam in the African World  
3 OR 4 hrs.  
A comprehensive study of the history of Islam and its role among the peoples of African descent in sub-Saharan Africa and the United States. Same as AAST 445, 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): Consent of the instructor. Recommended background: At least one history course at the 100-level.

HIST 452  
Topics in Revolutionary and Early-National United States History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history.

HIST 453  
Topics in Nineteenth-Century United States History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of U.S. history or consent of the instructor.

HIST 454  
Topics in Twentieth-Century United States History  
3 OR 4 hrs.  
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history.

HIST 456  
Topics in the History of Communications  
3 OR 4 hrs.  
This course introduces students to major developments in the history of communications, with a focus on the political and cultural dimension of technologies. Same as COMM 456, 3 undergraduate hours. 4 graduate hours.  
Prerequisite(s): Consent of the instructor. Recommended background: At least one history course at the 100-level.

HIST 461  
Topics in Latin American History  
3 OR 4 hrs.  
Specific topics are announced each term. Same as LALS 461, 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.  
Prerequisite(s): 3 hours of history, Latin American and Latino studies, or consent of the instructor.
HIST 462 AIDS, Politics, and Culture 3 OR 4 hrs.
Introduction to the study of AIDS as a medical, social, political, and cultural construction. Explores the epidemiology of AIDS, the politics of the state's response, how activists have addressed AIDS, and media representations of AIDS. Same as GWS 462. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): GWS 101 or GWS 102 or GWS 203 or GWS 214 and junior standing or above; or consent of the instructor.

HIST 472 Issues and Events in Twentieth-Century China 3 OR 4 hrs.
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. Same as ASST 472. 3 undergraduate hours. 4 graduate hours. Recommended background: Previous course work in Chinese history at the 100- or 200-level.

HIST 473 Topics in East Asian History 3 OR 4 hrs.
Specific topics are announced each term. Same as ASST 473. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of East Asian history or consent of the instructor.

HIST 475 Educational Practice with Seminar I 6 hrs.
The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

HIST 476 Educational Practice with Seminar II 6 hrs.
The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.

HIST 477 Topics in Middle Eastern History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 478 Women in Chinese History 3 OR 4 hrs.
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. Same as ASST 478, and GWS 478. 3 undergraduate hours. 4 graduate hours. Recommended background: Previous course work in Chinese history or women's studies.

HIST 479 Culture and Colonialism in South Asia 3 OR 4 hrs.
Examines the emergence of colonial cultures of domination and resistance on the Indian subcontinent from the 18th century to 1947. Same as ANTH 479 and ASST 479. 3 undergraduate hours. 4 graduate hours.

HIST 480 Topics in Economic History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.

HIST 481 Topics in Social History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 482 Topics in Migration History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 483 Topics in the History of Public Policy 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 484 Topics in the History of Women 3 OR 4 hrs.
Specific topics are announced each term. Same as GWS 484. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or gender and women's studies or consent of the instructor.

HIST 485 Topics in African and African American History 3 OR 4 hrs.
African and/or African American history for students with significant background in the field. Topics vary. Same as AAST 481. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 486 Topics in the History of Science 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 credit hours of history.

HIST 487 Topics in the History of Sexuality 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.

HIST 488 Topics in Urban History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 489 Topics in Military History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.

HIST 490 Topics in Diplomatic History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 491 Topics in Constitutional History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 492 Topics in Intellectual History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 493 Topics in Historiography 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 494 Topics in Political History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history.

HIST 495 Topics in Religious History 3 OR 4 hrs.
Specific topics are announced each term. Same as RELS 495. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.

HIST 496 Topics in Race, Ethnic, and Minority History 3 OR 4 hrs.
Specific topics are announced each term. Same as AAST 496. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.

HIST 497 Topics in Cultural History 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.

HIST 498 Topics in Quantitative Methods 3 OR 4 hrs.
Specific topics are announced each term. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history or consent of the instructor.
HIST 500 Colloquium on the Teaching of History 1 TO 4 hrs. Reading in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 501 Introduction to Graduate Study in History 4 hrs. Introduction to history as a discipline and profession. Approach is comparative and by topic. Required for graduate students in the MA and PhD in History programs. Prerequisite(s): Graduate standing in History.

HIST 502 Seminar on Ancient History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 503 Colloquium on World History 4 hrs. Graduate introduction to theories and historiography of the new world history. Prerequisite(s): Open only to PhD degree students; and approval of the department.

HIST 508 Seminar on Medieval History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 511 Colloquium on European History 4 hrs. Reading in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 512 Seminar on European History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 521 Colloquium on British History 4 hrs. Reading in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 522 Seminar on British History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 523 Seminar on Russian History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 541 Colloquium on African History 4 hrs. Readings on select topics in African history. May be repeated. Students may register in more than one section per term.

HIST 542 Seminar on African History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 551 Colloquium on American History 4 hrs. Reading in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 552 Seminar on American History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 561 Colloquium on Latin American History 4 hrs. Topics on themes in Latin American history. Specific topics are announced each term. Same as LALS 561. May be repeated. Students may register in more than one section per term.

HIST 562 Seminar on Latin American History 4 hrs. Research in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 591 Preliminary Examination and Dissertation Proposal 1 TO 8 hrs. Under the supervision of a faculty mentor, the student will prepare for the preliminary examination and prepare the dissertation prospectus required by the department. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 8 hours. Prerequisite(s): Approval of the department or completion of all didactic course work in the PhD in History program.

HIST 592 Colloquium on Approaches to History 4 hrs. Reading in topics. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 596 Independent Study 1 TO 4 hrs. Independent study in selected areas in history. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

HIST 599 PhD Thesis Research 0 TO 16 hrs. Thesis research for the PhD in History. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Preliminary examination.

Honors College Courses

HON 401 Advanced Honors Seminar 3 hrs. Student, faculty, and invited guests act as partners in the in-depth exploration of a focused topic. This interaction is fostered through common readings, written assignments, and open discussions. May be repeated to a maximum of 6 hours. Students may register for more than one section per term. Prerequisite(s): Sophomore standing or above and consent of the instructor. Graduate students may obtain instructor consent. Recommended background: HON 201.

Human Nutrition

HN 410 Human Nutrition Principles of Clinical Nutrition I 4 hrs. A thorough discussion of the absorption, transport, and metabolism of macronutrients, plus factors affecting these processes. Treats in an integrated fashion how various organs participate. Prerequisite(s): HN 410 and HN 420; or consent of the instructor.

HN 420 Clinical Nutrition II 2 hrs. Principles of nutrition, biochemistry, physiology, pathology, education, and psychology related to management of selected diseases (renal disease, AIDS and cancer, and pediatrics). Prerequisite(s): HN 320; or consent of the instructor.

HN 421 Clinical Practice II 4 hrs. Practical experiences in the nutritional management and support of selected disease processes such as cancer, and gastrointestinal and hypermetabolic states. Satisfactory/Unsatisfactory grading only. Prerequisite(s): HN 321 and credit or concurrent registration in HN 420; or consent of the instructor.

HN 422 Clinical Nutrition III 2 hrs. Principles of nutrition, biochemistry, physiology, and pathology related to the management of critically ill patients. Prerequisite(s): HN 309 and HN 420; or consent of the instructor.

HN 423 Clinical Practice III 5 hrs. Clinical practicum which focuses on the nutritional management of critically ill patients or specialized patient populations (renal and pediatric patients). Satisfactory/Unsatisfactory grading only. Prerequisite(s): HN 421 and credit or concurrent registration in HN 422; or consent of the instructor.

HN 450 Professional Practice 6 hrs. Extended practicum which integrates acquired skills, knowledge, and attitudes in dietetics. Special emphasis on current dietetic issues facing the healthcare professional. Satisfactory/Unsatisfactory grading only. Prerequisite(s): HN 423; or consent of the instructor.

HN 480 Field Study 2 hrs. Provides practical experience to develop/strengthen the student’s knowledge and skills in an area of nutrition practice. Prerequisite(s): HN 410; or consent of the instructor.

HN 500 Nutrition—Physiological Aspects 3 hrs. A thorough discussion of the absorption, transport, and metabolism of macronutrients, plus factors affecting these processes. Treats in an integrated fashion how various organs participate. Prerequisite(s): HN 410 and PHYB 341 or the equivalent, or consent of the instructor.

HN 510 Vitamins in Human Nutrition 2 hrs. Clinical aspects of vitamin requirements and metabolism in human nutrition; bioavailability, nutrient interactions and interrelationships of vitamins with various disease states. Prerequisite(s): HN 410; or consent of the instructor.

HN 514 Minerals in Human Nutrition 2 hrs. Clinical aspects of essential mineral requirements and metabolism in human nutrition; bioavailability, nutrient interactions, and trace and ultra-trace elements. Prerequisite(s): HN 410; or consent of the instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HN 530</td>
<td>Research Methods in Human Nutrition</td>
<td>3 hrs.</td>
<td>Research design in human nutrition; conceptual issues in clinical and population studies; problems in collection and analysis of dietary, behavioral, and self-reported data. Prerequisite(s): AHS 510; or consent of the instructor.</td>
</tr>
<tr>
<td>HN 532</td>
<td>Evaluation of Nutritional Status</td>
<td>3 hrs.</td>
<td>Community and clinical considerations in nutrition status surveillance and monitoring systems; characterization in the collection, standards, and reference population development. Prerequisite(s): HN 410; or consent of the instructor.</td>
</tr>
<tr>
<td>HN 535</td>
<td>Nutrition and Human Performance</td>
<td>2 hrs.</td>
<td>Nutrition which impacts on human performance; impaired performance due to nutritional problems; aspects relevant to the professional athlete. Same as MVSC 535. Prerequisite(s): HN 410; and PHYB 341 or MVSC 352; or consent of the instructor.</td>
</tr>
<tr>
<td>HN 541</td>
<td>Innocial Practicum</td>
<td>2 hrs.</td>
<td>Teaching practicum in clinical dietetics and/or nutrition. Prerequisite(s): HN 201 and HN 410 and HN 570 or the equivalent, or consent of the instructor.</td>
</tr>
<tr>
<td>HN 594</td>
<td>Special Topics in Human Nutrition</td>
<td>1 TO 4 hrs.</td>
<td>Advanced course dealing with selected topics. Topics vary from year to year and may include drug/nutrient interaction, protein metabolism, nutrition and behavior, nutrition and exercise. May be repeated. Prerequisite(s): HN 410; or consent of the instructor.</td>
</tr>
<tr>
<td>HN 595</td>
<td>Seminar in Human Nutrition</td>
<td>1 hour.</td>
<td>Topics of current interest in human nutrition. Includes discussions of current journal articles and important new developments in the specific disciplines. Satisfactory/ Unsatisfactory grading only. May be repeated with approval. Approval to repeat course granted by the department. Prerequisite(s): HN 410; or consent of the instructor.</td>
</tr>
<tr>
<td>HN 596</td>
<td>Independent Study in Human Nutrition</td>
<td>1 TO 4 hrs.</td>
<td>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. May be repeated. Students may register in more than one section per term. Prerequisite(s): Admission to the Human Nutrition graduate program and consent of the instructor.</td>
</tr>
<tr>
<td>HN 597</td>
<td>Project Research</td>
<td>1 TO 4 hrs.</td>
<td>For graduate students who wish to pursue a project other than thesis research. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 4 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>HN 598</td>
<td>Research in Human Nutrition</td>
<td>0 TO 16 hrs.</td>
<td>Independent research in one area of human nutrition. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>HN 599</td>
<td>PhD Thesis Research</td>
<td>0 TO 16 hrs.</td>
<td>Independent dissertation research by the student under the guidance of the advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the faculty advisor.</td>
</tr>
<tr>
<td>IE 411</td>
<td>Mechatronics I</td>
<td>0 TO 4 hrs.</td>
<td>Elements of mechatronic systems, sensors, actuators, microcontrollers, modeling, hardware-in-the-loop simulations, real-time software, electromechanical systems, and laboratory experiments. Same as ME 411. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Senior standing or approval of the department.</td>
</tr>
<tr>
<td>IE 412</td>
<td>Dynamics Systems Analysis I</td>
<td>3 OR 4 hrs.</td>
<td>Classical control theory, concept of feedback. Laplace transform, transfer functions, control system characteristics, root locus, frequency response, compensator design. Same as ME 412. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.</td>
</tr>
<tr>
<td>IE 444</td>
<td>Interdisciplinary Product Development I</td>
<td>3 OR 4 hrs.</td>
<td>Cross-functional teams (w/students from AD 420/423 and MKTG 594) research and develop new product concepts. Focus on the identification of technologically appropriate product design problems. Same as ME 444. 3 undergraduate hours. 4 graduate hours. Project course. Prerequisite(s): Senior standing or above; and consent of the instructor.</td>
</tr>
<tr>
<td>IE 445</td>
<td>Interdisciplinary Product Development II</td>
<td>4 hrs.</td>
<td>Cross-functional teams (w/students from AD 420 and MKTG 594) research and develop new product concepts. Focus on solutions to the opportunities identified in IE/ME 444 to functional prototypes. Serves as a replacement for IE/ME 396. Same as ME 445. Year-long (with IE/ME 444) project course. Prerequisite(s): IE 444 or ME 444; and senior standing or above; and consent of the instructor.</td>
</tr>
<tr>
<td>IE 446</td>
<td>Quality Control and Reliability</td>
<td>3 OR 4 hrs.</td>
<td>Principles of statistical quality control, including control by variable and by attribute, construction and use of control charts for variables, fraction defective and number of defects and use of standard plans, reliability and life-cycle testing. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 342.</td>
</tr>
<tr>
<td>IE 461</td>
<td>Safety Engineering</td>
<td>3 OR 4 hrs.</td>
<td>Human protection systems; accident and emergency handling; manufacturing and service hazards systems. Same as EHS 460. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 342 or consent of the instructor.</td>
</tr>
<tr>
<td>IE 463</td>
<td>Plant Layout and Materials Handling</td>
<td>3 OR 4 hrs.</td>
<td>Facilities design functions, computer-aided plant layout, facility location, warehouse layout, minimin location, deterministic and probabilistic conveyor models. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 471.</td>
</tr>
<tr>
<td>IE 464</td>
<td>Virtual Automation</td>
<td>3 OR 4 hrs.</td>
<td>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. Same as ME 464. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 201; and CS 107 or CS 108.</td>
</tr>
<tr>
<td>IE 465</td>
<td>Manufacturing Information Systems</td>
<td>0 TO 4 hrs.</td>
<td>Design and implementation of supervisory control and data-acquisition systems; manufacturing systems controller and communication networks. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior or graduate standing, or consent of the instructor; and familiarity with computer programming.</td>
</tr>
<tr>
<td>IE 466</td>
<td>Production Planning and Inventory Control</td>
<td>3 OR 4 hrs.</td>
<td>Principles of demand forecasting, production planning, master scheduling, critical path scheduling, job sequencing, design and control of deterministic and stochastic inventory systems, and material requirement planning. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 345 and IE 471.</td>
</tr>
<tr>
<td>IE 467</td>
<td>Industrial Systems Simulation</td>
<td>3 OR 4 hrs.</td>
<td>The solution of industrial problems by means of computer simulation. Simulation strategies. Simulation perspectives. In-depth study of some specific simulation programming languages, with projects. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 307 or CS 108.</td>
</tr>
<tr>
<td>IE 468</td>
<td>Virtual Manufacturing</td>
<td>3 OR 4 hrs.</td>
<td>Virtual reality applications in manufacturing systems design, manufacturing applications of networked virtual reality, virtual reality modeling of occupational safety engineering. Same as ME 468. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 201; and CS 107 or CS 108.</td>
</tr>
</tbody>
</table>
IE 471 Operations Research I 3 OR 4 hrs.
Introduction to operations research, formulation of linear programming problems, simplex methods, duality theory, sensitivity analysis, network models, and integer linear programming. A undergraduate hours. 4 graduate hours. No graduate credit for Industrial Engineering majors.
Prerequisite(s): MATH 210.

IE 472 Operations Research II 3 OR 4 hrs.
Nonlinear programming problems, unconstrained optimization search techniques. Kuhn-Tucker theory, quadratic programming, separable programming, Markov chain, queuing theory, and dynamic programming. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 342 and IE 471 or equivalent standing.

IE 494 Special Topics in Industrial Engineering 3 OR 4 hrs.
Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): Consent of the instructor.

IE 499 Professional Development Seminar 0 hrs.
Students are provided general information about their role as UIC alumni in society and the role of the University in their future careers. Students provide evaluations of their educational experience in the MIE department. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Open only to seniors; and approval of the department. Must be taken in the student’s last semester of study.

IE 511 Mechatronics II 4 hrs.
Microcontrollers II: Microcontrollers used in electromechanical systems for measurement and control purposes, interface hardware, real-time software and development tools, applications in robotic motion control and factory automation. Same as ME 511. Prerequisite(s): ME 411 and consent of the instructor.

IE 525 Technology to Promote Physical Activity Among Persons with Disabilities 3 hrs.
Applications of new and emerging technologies to promote participation in and adherence to healthful physical activity by people with disabilities. Consider ways of redesigning physical, social, and attitudinal environments to achieve these outcomes. Same as HHD 525. Recommended background: HHD 515 or an equivalent course on interpreting research findings.

Deterministic and statistical models for modeling and optimizing engineering systems, in the broader context of product design, manufacturing process development, and designing for life cycle issues. Same as ME 542. Prerequisite(s): Programming language experience.

IE 552 Applied Stochastic Processes 4 hrs.
Stationary point processes; Markov renewal theory; semi-Markov processes; regenerative processes; computational methods and applications to queues, inventories, dams, and reliability. Prerequisite(s): IE 542.

IE 562 Supervisory Control of Discrete Event Systems 4 hrs.
Discrete event systems; languages and automata, supervisory control, timed models, supervisory control applications. Extensive computer use required.

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. Prerequisite(s): CS 102 or CS 107 or the equivalent.

IE 567 Data Mining for Machine Health Diagnosis and Prognosis 4 hrs.
Theories and techniques of data mining to machinery health diagnosis and prognosis, case studies on rotor shafts, bearing, and machine faults, and machine remaining useful life prognosis.

IE 569 Advanced Virtual Manufacturing 4 hrs.
Manufacturing systems design optimization using virtual environments, optimization of manufacturing decision support using virtual reality interfaces, analysis and evaluation of virtual environments. Same as ME 569. Prerequisite(s): Consent of the instructor.

IE 571 Statistical Quality Control and Assurance 4 hrs.
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. Same as IDS 571. Prerequisite(s): At least one term of statistics.

IE 575 Integer and Combinatorial Optimization 4 hrs.
Modeling, computational complexity, polyhedral theory, valid inequalities, duality and relaxation, branch-and-bound algorithms, cutting plane algorithms, heuristic algorithms, and real-world applications. Prerequisite(s): IE 471.

IE 576 Nonlinear Optimization 4 hrs.
Convex analysis, line-search techniques, unconstrained and constrained optimization, optimality conditions, duality, convex and nonconvex optimization, large-scale optimization, and real-world applications. Prerequisite(s): IE 471 or the equivalent.

IE 594 Current Topics in Industrial Engineering 4 hrs.
Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. May be repeated. Prerequisite(s): Consent of the instructor.

IE 595 Seminar on Industrial Engineering Research 1 hour.
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. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Graduate standing in Industrial Engineering.

IE 596 Independent Study 1 TO 4 hrs.
Individual study under close supervision of a faculty member. May be repeated to a maximum of 4 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

IE 598 MS Thesis Research 0 TO 16 hrs.
Individual research in specialized problems under close faculty supervision. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

IE 599 PhD Thesis Research 0 TO 16 hrs.
Individual research on specialized problems under close faculty supervision. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Information and Decision Sciences

IDS 400 Advanced Business Programming Using Java 0 TO 4 hrs.
Visual extended business language capabilities, including creating and using controls, menus and dialogs, objects and instances, mouse events, graphics, file-system controls. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 201 or IDS 351 or a programming course in mathematics or computer science, or consent of the instructor.

IDS 401 Business Object Programming Using Java 0 TO 4 hrs.
Basic concepts in object-oriented programming such as objects, classes, class inheritance and interfaces, data abstraction and encapsulation, polymorphism, and dynamic binding. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 201 or the equivalent.

IDS 403 Information Security 3 OR 4 hrs.
Examine the field of information security to prepare students for their future roles as business decision makers. Presents a balance of the managerial and technical aspects of information security. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 200 or the equivalent.

IDS 405 Business Systems Analysis and Design 3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 201.

IDS 406 Business Systems Project 3 OR 4 hrs.
Project experience in a business setting. Analysis, design, development, and evaluation of computer-based business information systems. Project planning, scheduling, and management. Project work at an outside company or University office. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Knowledge of programming and databases; or consent of the instructor. Recommended background: Familiarity with systems analysis and design (IDS 405).
IDS 410 Business Database Technology 3 OR 4 hrs. Computer software techniques used in business with emphasis on information management and database management systems. Data management and analysis. Major types of accounting systems, query languages. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 201 or IDS 331.

IDS 412 Decision Analysis Business Systems 3 OR 4 hrs. Organizational aspects and underlying concepts of distributed business systems, decentralization versus centralization issues, costs of distributed computing, and performance evaluation measures. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 201 or IDS 330; and credit or concurrent registration in IDS 410.

IDS 413 Internet Technology and Management 3 hrs. The technologies of World Wide Web development. Topics include: TCP/IP, HTTP, HTML, HTML authoring, XML, ASP programming, client-side programming, Web 2.0, Web servers, database servers, business application servers, and Internet. Credit is not given for IDS 413 if the student has credit for IDS 424. Extensive computer use required. Prerequisite(s): IDS 201 and IDS 410.

IDS 420 Business Model Simulation 3 OR 4 hrs. Simulation analysis of strategic business decision models for investment, marketing, product introduction, and operational policies concerning inventory, production planning, quality assurance, and supply chain management. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Credit or concurrent registration in IDS 355; or credit or concurrent registration in IDS 331 or the equivalent.

IDS 422 Knowledge Management Systems 3 OR 4 hrs. Computer-based methods for decision support. It aims at providing exposure and insights into a range of approaches and tools for decision aiding, and how they can be utilized in supporting various managerial decision processes. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 410 or consent of the instructor.

IDS 435 Optimization Models and Methods 3 OR 4 hrs. Linear, nonlinear, dynamic programming, combinatorial methods. Use of spreadsheet and other software tools. Duality, sensitivity analysis. Models for business operations and planning, computer systems, transportation, and finance. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 355; or IDS 371 or the equivalent. Business Administration students must have declared a major.

IDS 437 Stochastic Methods 3 OR 4 hrs. Stochastic processes and other applications of probability theory. Use of spreadsheet and other software tools for analysis, simulation and decision theory. Models for business operations and planning, computer systems, transportation, finance. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 355 and IDS 371.

IDS 446 Decision Analysis 3 OR 4 hrs. Prior and posterior distributions; conjugate prior; value of information; applications to decision making in business. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 355 or the equivalent. Business Administration students must have declared a major.

IDS 450 Advanced Operations Management 0 TO 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): IDS 355 or the equivalent. Business Administration students must have declared a major.

IDS 454 Introduction to Supply Chain Management 3 OR 4 hrs. Supply chain management is studied as an information-intensive, integrated system for managing material flows, logistics, and interorganizational partnerships to deliver products and services. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 355.

IDS 460 Survey Sampling: Theory and Methods 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 371.

IDS 462 Statistical Software for Business Applications 3 OR 4 hrs. Statistical software in business applications and data mining. SAS and other packages such as SPSS, MATLAB, Maple, S-Plus, B345, SCA. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 371 or consent of the instructor.

IDS 470 Multivariate Analysis 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 371; or MATH 310; or MATH 320.

IDS 472 Business Data Mining 3 OR 4 hrs. Searching for relationships between variables in databases. Decision trees, cluster analysis, logistic regression, path analysis. Applications to marketing, quality assurance, operations management, human resources. 3 undergraduate hours. 4 graduate hours. Credit is not given for IDS 472 if the student has credit for IDS 572. Prerequisite(s): IDS 371 or the equivalent.

IDS 473 Introduction to Risk Management 3 hrs. Introduction to risk management. Loan and credit management; credit scoring. Risk measurements and reserves; banking and insurance capital requirements, the Basel Accord, tail events, and catastrophic events. Financial contracts and hedging. Same as FIN 473. Prerequisite(s): FIN 300 and IDS 371.

IDS 474 Quality and Productivity Improvement Using Statistical Methods 3 OR 4 hrs. Directed experimentation for quality and productivity improvement, quality surveillance, design and analysis of two-level factorial experiments and multi-level experiments, data transformation. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 371 or consent of the instructor.

IDS 475 Database Systems 3 OR 4 hrs. Concepts and principles of designing database systems to perform accounting functions, applications of microcomputer accounting software packages, system design tools, and computerized transaction cycles. Same as ACTG 475. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): ACTG 211 and IDS 200.

IDS 476 Business Forecasting Using Time Series Methods 3 OR 4 hrs. Autoregressive, moving average, and seasonal models for time series analysis and business forecasting. Forecasting using multivariable transfer function models is also included. Same as ECON 450. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 371 or ECON 346 or consent of the instructor.

IDS 478 Regression Analysis 3 OR 4 hrs. Data collection and exploration; model building; variable least squares; residual analysis; variable selection; multicollinearity; ridge regression; nonlinear regression; nonparametric regression. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IDS 371.

IDS 494 Topics in Information and Decision Sciences 3 OR 4 hrs. Topics vary; selected readings; case analysis. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) if topics vary. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

IDS 495 Competitive Strategy 4 hrs. 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(s): Senior standing in the College of Business Administration and completion of all other CBA core courses, or consent of the instructor.

IDS 499 Independent Study in Information and Decision Sciences 1 TO 3 hrs. Intensive study of selected topics determined in consultation with the instructor and department head. May be repeated to a maximum of 9 hours. Students may register in more than one section per term. Prerequisite(s): Major in Information and Decision Sciences and consent of the instructor.
IDS 500
Information Systems in Organizations 4 hrs.
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.

IDS 504
Introduction to Electronic Commerce 4 hrs.
Addresses issues on electronic commerce for businesses and consumers, considering topics, such as competition, distribution, infrastructure on the Internet, shopping, and product characteristics.

IDS 505
Business Information Systems Analysis and Design 4 hrs.
Analysis, design, and development of information systems. Management concerns in systems design, development, and evaluation. A student who has taken IDS 405 must see an advisor to determine whether another graduate course from IDS, MATH, or CS must be substituted for IDS 505. Prerequisite(s): IDS 500; consent of the instructor.

IDS 506
Survey of Healthcare and Information Technology 4 hrs.
Impact, use, and trends of information technology in healthcare. Healthcare systems technology and stakeholders. Analysis of strategic, economic, operational, ethical, privacy, and security considerations. Prerequisite(s): Introductory information systems course is required. Recommended background: Advanced information system courses such as databases and system analysis.

IDS 507
Advanced Systems Analysis and Design Project 4 hrs.
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(s): Consent of the instructor and completion of three MS in MIS courses.

IDS 508
E-Commerce Project 4 hrs.
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. Prerequisite(s): IDS 504 or MGMT 558 or MKTG 558; consent of the instructor.

IDS 509
Business Process Analysis and Modeling 4 hrs.
Principles and concepts for the analysis and design of business processes and for the development of information systems that support such processes. Prerequisite(s): IDS 401 or consent of the instructor.

IDS 510
Organizational Data Resources 4 hrs.
Data as a competitive resource. Understanding, organizing, and utilizing data in enterprises. Data resource development and management. Leveraging data assets. Exploiting the power of data. Understanding regulatory requirements. A student who has taken IDS 410 must see an advisor to determine whether another graduate course from IDS, MATH, or CS must be substituted for IDS 510. Prerequisite(s): IDS 500.

IDS 511
Query Processing in Database Systems 4 hrs.
Query processing in deductive databases and in distributed/parallel databases systems. Same as CS 580. Prerequisite(s): CS 480.

IDS 512
Information Systems Project & Program Management 4 hrs.
Theory and practice of managing IS projects based on a life-cycle management model. Technology, organizational behavior, team dynamics, and economic analysis in the context of larger organizational strategies. Project plans, budgets, and schedules. Extensive computer use required. Prerequisite(s): Introductory information systems course. Recommended background: Advanced information system courses such as databases and system analysis.

IDS 513
Enterprise Components and Web Services 4 hrs.
Exposes students to advances in the technical aspects of electronic business. Topics include XML, UDDI, SOAP, service quality, security, and queuing models. Extensive computer use required.

IDS 514
Management of Information Systems 4 hrs.
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(s): IDS 505 or IDS 510.

IDS 515
Information Systems Strategy and Policy 4 hrs.
Examines how businesses can leverage IT and digital technologies to maximize business performance. Covers IS strategy formulation, strategy implementation, e-business transformation, inter-organizational and multorganizational IS strategies. Prerequisite(s): Consent of the instructor.

IDS 516
Data Warehousing and Decision Support 4 hrs.
Analysis, design, and development of data warehousing. Related methods and tools in the provision of decision support and business analytics/intelligence. Prerequisite(s): IDS 505 or IDS 510 or consent of the instructor.

IDS 517
Enterprise Application Infrastructure 4 hrs.
The course explores the choices available for building an enterprise applications infrastructure. Topics such as advanced applications design, and development, tools, methodologies, and technologies will be covered. Extensive computer use required. Prerequisite(s): IDS 201 or IDS 400 and IDS 401 and IDS 410 or the equivalent.

IDS 518
Electronic Marketing 4 hrs.
Overview of the electronic marketing value chain. Internet and Web technologies, system design, payment systems, business requirements for e-marketing, design, and ethical issues. Same as MKTG 518. Prerequisite(s): MKTG 500 or MBA 506 or consent of the instructor.

IDS 519
Topics in Information Systems 4 hrs.
Selected topics in information systems. Information management and information technology. Content varies. Topics will be announced. May be repeated if topics vary. Prerequisite(s): IDS 505 or IDS 510; consent of the instructor.

IDS 520
Distributed Processing and Telecommunications Systems 4 hrs.
Topics include components of telecommunications and distributed information systems, data communication devices, computer networks, configuration management, and distributed databases.

IDS 521
Advanced Database Management 4 hrs.
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.

IDS 523
Audit and Control of Information Systems 4 hrs.
Modeling and analysis of information systems application in organizations; measurement of effectiveness; strategies for implementation and updating; interface with other management control systems.

IDS 524
Strategic Emergency Management and Continuity Planning 3 hrs.
Introduction to frameworks and methods for designing, developing, implementing, and evaluating for emergency management and business continuity strategies in the public and private sectors. No graduation credit given to students enrolled in the Master of Business Administration program. Students who are not in the EMCP program should contact External Education at emcp@uic.edu for approval to register for this course.

IDS 526
Computer Performance Evaluation and Modeling 4 hrs.
Probabilistic, simulation, and statistical techniques for modeling computer systems with a view to evaluating their performance. Models of multi programming, multi access systems, input/output systems, priority queues, and paging systems. A student who has taken IDS 426 must see an advisor to determine whether another graduate course from IDS, MATH, or CS must be substituted for IDS 526. Prerequisite(s): IDS 532; and IDS 505 or IDS 510.

IDS 529
Seminar on Management Information Systems 4 hrs.
Special research topics in management information systems. Topics vary from term to term depending on the interests of the instructor and students. May be repeated if topics vary.

IDS 532
Introduction to Operations Management 4 hrs.
The management of operations for the production and delivery of goods and services. Topics include the management of projects, production, supply chain, inventory, and quality. Credit is not given for IDS 532 if the student has credit in MBA 507 and MBA 509. Prerequisite(s): Admission to the MBA program.
IDS 416 Foundations in Anthropology and Global Health II 3 OR 4 hrs. Provides an evolutionary and biocultural approach to human biology, physiology, health, and disease. Same as ANTH 416. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of B or better in ANTH 232; and junior standing or above; or consent of the instructor.

IPHS 404 Introductory Special Topics—Interdepartmental 1 TO 4 hrs. Introductory special topics in public health. Course content will vary from semester to semester. May be repeated. Students may register in more than one section per term.

IPHS 401 Public Health Leadership Seminar I 3 OR 4 hrs. Doctoral seminar in advanced public health leadership topics, primarily for DrPH degree students. Prerequisite(s): Enrollment in the DrPH program or consent of the instructor.

IPHS 402 Public Health Leadership Seminar II 3 OR 4 hrs. Doctoral seminar in advanced public health leadership topics. Primarily for DrPH degree students. Prerequisite(s): IPHS 501 or consent of the instructor.

IPHS 503 Public Health Integrative Seminar I 4 hrs. Doctoral seminar in advanced public health leadership topics with emphasis on methodological skills; primarily for DrPH degree students. Prerequisite(s): IPHS 502 and EPID 403 and BSTT 401; or consent of the instructor. Recommended background: Enrollment in the DrPH or PhD degree program.

IPHS 516 Anthropology and Global Health Integrative Seminar I 4 hrs. Critical examination of global health issues from social science and public health perspectives. Includes consideration of cultural underpinnings, geopolitical influences, design of appropriate and effective interventions, and policy formation. Same as ANTH 516. Prerequisite(s): Graduate or professional standing; and consent of the instructor.

IPHS 530 Practicum in Mental Health Diagnosis 4 TO 8 hrs. Review of mental health diagnostic process. Students in psychosocial epidemiology participate with medical students in a psychiatry clerkship. Prerequisite(s): CHSC 460 and consent of the instructor.
PHS 591 Readings in Anthropology and Global Health 1 TO 4 hrs. Student along with his/her advisor will develop a series of readings focused on a specific topic of interest to the student. Same as ANTH 591. May be repeated up to 1 time(s). Prerequisite(s): Consent of the instructor.

PHS 592 Research in Anthropology and Global Health 1 TO 8 hrs. Research and methods class combined with practical fieldwork in anthropology and global health. Same as ANTH 592. May be repeated to a maximum of 8 hours. Fieldwork required. Prerequisite(s): Consent of the instructor.

PHS 593 Special Topics in Anthropology and Global Health 4 hrs. Special topics in anthropology and global health. Same as ANTH 593. May be repeated if topics vary. Prerequisite(s): Graduate or professional standing; and consent of the instructor.

PHS 594 Advanced Special Topics Interdepartmental 1 TO 4 hrs. Advanced special topics in public health. Course content will vary from semester to semester. May be repeated. Students may register in more than one section per term.

PHS 595 Seminar in Interdisciplinary Public Health Sciences 1 TO 3 hrs. Analysis of current research in public health. Course content will vary from semester to semester. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PHS 596 Independent Study in Public Health 1 TO 4 hrs. Selected aspects of specific public health problems; independent study under close supervision of faculty. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of instructor who has supervised at least one course in the area of the independent study.

PHS 598 Research in Public Health Sciences—MS 0 TO 16 hrs. Individual research in public health directed by a faculty member. Directed toward the thesis requirements for the Master of Science degree. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PHS 599 Research in Public Health Sciences—PhD 0 TO 16 hrs. Individual research in public health directed by a faculty member. Directed toward the dissertation for the Doctor of Philosophy degree. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PHS 650 Field Experience in Public Health 1 TO 5 hrs. Preceptor-guided field experience in public health practice through an association or public health oriented community program for students in the Master of Public Health degree program. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): All course requirements should be completed for the Master of Public Health degree.

Prerequisite(s): Consent of the instructor.

Interdisciplinary Studies in the Arts
ISA 400 Advanced Topics in Interdisciplinary Arts 3 OR 4 hrs. Exploration of advanced topics in interdisciplinary arts which include architecture, art and design, art history, music, and theater. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s).

ISA 500 Topics in Interdisciplinary Studies in the Arts 4 hrs. Provides the opportunity for students to explore interdisciplinary methods in research, in specific the arts and historical-related topics not covered in a regular course curriculum. May be repeated to a maximum of 8 hours. Course can also be used as a continuing education module in the visual and performing arts, as well as preservation studies, museology, architectural, and art history. Prerequisite(s): Consent of the instructor.

Italian
ITAL 411 Literary Forms in Early Renaissance 3 OR 4 hrs. The development of epic poetry (Pulci, Boiardo, Ariosto) within the literary, political, and social context (Machiavelli and Castiglione). 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ITAL 310 or consent of the instructor.

ITAL 412 Literary Forms in Late Renaissance and Baroque 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ITAL 310 or consent of the instructor.

ITAL 421 Modern Italian Literature I 3 OR 4 hrs. From romanticism to decadentism: emphasis on the work of Leopardi and Manzoni; analysis of poems by Carducci, Pascoli, D’Annunzio, Gozzano. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ITAL 311 or consent of the instructor.

ITAL 422 Contemporary Italian Literature I 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ITAL 322 or consent of the instructor.

ITAL 450 Divina Commedia I 3 OR 4 hrs. An in-depth study of the Divine Comedy against the philosophical and theological background of the Middle Ages. Covers Inferno and half of Purgatorio. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ITAL 310 or consent of the instructor.

ITAL 451 Divina Commedia II 3 OR 4 hrs. An in-depth study of the Divine Comedy against the philosophical and theological background of the Middle Ages. Covers Paradiso and half of Purgatorio. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ITAL 310 or consent of the instructor.

ITAL 461 Educational Practice with Seminar I 6 hrs. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

ITAL 462 Educational Practice with Seminar II 6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.
Latin
LAT 499 Independent Reading  3 OR 4 hrs.
Individual study under faculty direction. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 4 hours in Latin at the 200-level or the equivalent.

Latin American and Latino Studies
LALS 409 Ancient Maya Writing, Language, and Culture  3 OR 4 hrs.
Recent trends in Maya epigraphy, information gained from Maya hieroglyphs, linguistics, and historical ethnographies are applied to anthropological analyses of past lifeways. Same as ANTH 409. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above; and consent of the instructor.

LALS 423 Andean Prehistory  3 OR 4 hrs.
An overview of the cultural evolution of the Andean region from the arrival of the first inhabitants to the development of the Inca empire. Same as ANTH 423. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ANTH 228 or ANTH 269 or consent of the instructor.

LALS 427 Studies in Language Policy and Cultural Identity  3 OR 4 hrs.
Examines the development, articulation, and effects of language policies on identity formation and culture. Focuses on the United States and the Spanish language, although other countries and languages are included. Same as SPAN 427. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above. Reading and writing knowledge of Spanish.

LALS 461 Topics in Latin American History  3 OR 4 hrs.
Specific topics are announced each term. Same as HIST 461. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): 3 hours of history, Latin American and Latino studies, or consent of the instructor.

LALS 475 Indians of the Andes and the Amazon  3 OR 4 hrs.
Intensive research in theoretical and ethnographic problems in South American Indian social structures and cultures. Special attention will be given Levi-Strauss’ ideas on the formulation of cultural theory in South America. Same as ANTH 475. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ANTH 213 or consent of the instructor.

LALS 491 Interdisciplinary Seminar in Latin American Studies  3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): Any two 200-level Latin American and Latino Studies courses or consent of the instructor.

LALS 495 Interdisciplinary Seminar in Latino Studies  3 OR 4 hrs.
In-depth study of Latino communities and current issues from an interdisciplinary perspective, with emphasis on the learning and use of investigative methodologies. 3 undergraduate hours. 4 graduate hours. May be repeated if topics vary. Prerequisite(s): Any two 200-level Latin American and Latino Studies courses or consent of the instructor.

LALS 499 Advanced Independent Study  1 TO 4 hrs.
Individual advanced reading or research project in Latin American or U.S. Latino studies, with instructor's consent and supervision. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. Prerequisite(s): 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 the instructor's discretion only.

LALS 501 Latinos and Latin America in Transnational Context  4 hrs.
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.

LALS 502 Topics in Latin American and Latino Studies  4 hrs.
In-depth study of selected research topics related to Latin America and/or U.S. Latinos that reflect the major and most current debates in these fields. May be repeated if topics vary. Prerequisite(s): Graduate or professional standing; or consent of the instructor.

LALS 561 Colloquium on Latin American History  4 hrs.
Topics on themes in Latin American history. Specific topics are announced each term. Same as HIST 561. May be repeated. Students may register in more than one section per term.

LALS 596 Independent Study  1 TO 4 hrs.
Investigation of special problems under the direction of a faculty member. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

Learning Sciences
LRSC 500 Introduction to the Learning Sciences  4 hrs.
Key principles of learning, development, and language. Cognitive, social, and affective dimensions of learning. Applicability to diverse learners and contexts of learning.
Prerequisite(s): Admission to the PhD program in Learning Sciences or consent of the instructor.

LRSC 501 Research Methods in the Learning Sciences I  4 hrs.
Focuses on understanding the components of research design and scientific arguments as they apply to the diverse research issues investigated in the learning sciences. Prerequisite(s): Admission to the PhD program in the Learning Sciences or consent of the instructor. Recommended background: Interest in the study of human learning as related to the design and evaluation of complex learning environments.

LRSC 502 Research Methods in the Learning Sciences II  4 hrs.
Focuses on deepening students' understanding of the components of scientific arguments and execution of the research design and analysis process as they apply to the diverse research problems that characterize the learning sciences. Prerequisite(s): LRSC 500 and LRSC 501 and admission to the PhD program in Learning Sciences; or consent of the instructor.

LRSC 503 Foundations of Scientific Inquiry  4 hrs.
Explores different meanings attached to the idea of inquiry teaching and learning, including how this varies by the age of the student and academic discipline. Prerequisite(s): Admission to the PhD program in Learning Sciences or consent of the instructor. Recommended background: Master's degree or advanced study in a learning sciences-related field.

LRSC 511 Analysis of Teaching and Learning Interactions  4 hrs.
Tools and techniques for the capture and analysis of multi-modal interaction among learners, teachers, and environments. Discusses structure, media, and instrumentation. Prerequisite(s): LRSC 500 and admission to the PhD program in Learning Sciences; or consent of the instructor.

LRSC 512 Design of Learning Environments  4 hrs.
This course explores design and evaluation of formal and informal learning environments, with respect to learners, knowledge, assessment, and community. Prerequisite(s): LRSC 500 and LRSC 501 and LRSC 502 and LRSC 503.

LRSC 513 Change in Individuals and Organizations: Implementing and Institutionalizing Change for Learning  4 hrs.
This course examines the relationships between processes of learning and the ways in which organizations can be changed to foster learning in individuals or groups. Prerequisite(s): Admission to the PhD program in the Learning Sciences or consent of the instructor.

LRSC 540 Learning Sciences Journal Club  2 hrs.
 Helps students establish guidelines and criteria by which to judge the efficacy of a research effort as presented in published scholarly literature. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the PhD program in the Learning Sciences or consent of the instructor.

LRSC 590 Research Apprenticeship  2 TO 8 hrs.
Designed as a supervised research course. Students enroll in between 2 and 8 hours per semester dependent upon the time they are spending on research projects, supervised by the faculty member with whom they enroll. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): LRSC 500 and admission to the PhD program in the Learning Sciences and consent of the faculty member with whom the student enrolls.

LRSC 599 Thesis Research  0 TO 16 hrs.
Designed for students engaged in research that constitutes the dissertation. Hours of enrollment per semester is dependent upon the stage in the dissertation research. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Advancement to candidacy in the PhD program in the Learning Sciences.
Linguistics

LING 425 Linguistic Structures II 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours.

LING 459 Topics in Linguistics 3 OR 4 hrs. Topics vary. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 times. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

LING 474 Cognitive Psychology of Language 3 hrs. Provides students with a survey of methods, theory, and research in language and discourse processing. Same as COMM 454 and PSCH 454. Prerequisite(s): Graduate standing or consent of the instructor.

LING 480 Sociolinguistics 3 OR 4 hrs. Variations in language that correlate with variation in societies and smaller social groups; interactions of languages and societies. Same as ANTH 480. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): LING 405 or junior standing and consent of the instructor.

LING 483 Methodology of TESOL 3 OR 4 hrs. Methods of teaching listening, speaking, reading, and writing to speakers of English as a second or foreign language. Same as CLJ 483. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing and consent of the instructor.

LING 487 Computer Assisted Language Learning 3 OR 4 hrs. An introduction to computer assisted language learning (CALL): the use of computer technology in second language reading and research. The effectiveness of CALL testing is based on SLA theory and research studies. Same as GER 487 and SPAN 487. 3 undergraduate hours. 4 graduate hours. Tought in English. Extensive computer use required. Prerequisite(s): LING 483 or CI 483 or GER 448 or FR 448 or SPAN 448 or GER 449 or FR 449 or SPAN 449; or SPAN 502 or FR 502 or the equivalent; and senior standing or above.

LING 496 Independent Study 1 TO 4 hrs. 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. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

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

LING 531 Grammar for TESOL 4 hrs. Survey of major grammatical structures and patterns as they relate to TESOL instruction. Same as ANTH 480. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): LING 405 or junior standing and consent of the instructor.

LING 540 Language and Gender 4 hrs. Examination of sociolinguistic research and theories on the interrelationships between language and gender, including gender categories in linguistic systems, gender differences in language use, interaction, and cross-cultural comparisons. Same as GWS 540.

LING 551 Research Practicum in Sociolinguistics 4 hrs. Strategies and methods for studying language use in communities: participant observation, interviewing, elicitation, using public-domain data, note taking vs. tape recording, and issues of transcription and ethics. Same as SPAN 551. May be repeated to a maximum of 12 hours. Prerequisite(s): LING 480; or consent of the instructor.

LING 553 Research Practicum in Discourse Analysis 4 hrs. Discourse analysis addresses issues of intentional communication, inference, the structure of texts or talk-in-interaction, and the interactive construction of social actions or identities in discourse. Same as ENGL 553. May be repeated to a maximum of 12 hours.

LING 556 Second Language Learning 4 hrs. An introduction to research findings and methods in second language learning. Same as SPAN 556. Prerequisite(s): Consent of the instructor.

LING 559 Independent Study in Linguistics 1 TO 6 hrs. 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. May be repeated to a maximum of 6 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor and approval of the head of the department.

LING 567 Discourse Analysis 4 hrs. Discourse analysis addresses issues of intentional communication, inference, the structure of texts or talk-in-interaction, and the interactive construction of social actions or identities in discourse. Same as ENGL 567 and SPAN 567.

LING 582 Qualitative Methods in Communication 4 hrs. Qualitative methods course analyzing language and culture patterns. Same as COMM 580. Prerequisite(s): COMM 501 or consent of the instructor.

LING 583 Materials and Curriculum Development in TESOL 4 hrs. Evaluation, adaptation, and development of curricula, syllabi, and materials for TESOL. Prerequisite(s): LING 483.

LING 586 Classroom Testing for TESOL 4 hrs. Theory and practice in the creation and evaluation of classroom tests for TESOL.

LING 594 Internship in TESOL 0 TO 12 hrs. Observation of English as a second or foreign language class. Peer teaching and discussion, followed by supervised teaching experience. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 15 hours. Students register for 1 to 12 hours. Prerequisite(s): LING 531 and LING 583 and consent of the instructor.

LING 596 Independent Study in Linguistics 1 TO 6 hrs. 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. May be repeated to a maximum of 6 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor and approval of the head of the department.

LING 597 Research in Linguistics 0 TO 16 hrs. Independent research in linguistics. Satisfactory/Unsatisfactory grading only. May be repeated with approval. Approval to repeat course granted by the department. A maximum of 4 hours of credit may be applied toward the MA in Linguistics degree. Prerequisite(s): Consent of the instructor and the director of graduate studies. Open only to degree candidates.
LING 598 Master's Thesis Research 0 TO 16 hrs. 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. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the thesis supervisor and approval of the head of the department. Open only to degree candidates.

Lithuanian
LITH 410 Structure of Lithuanian 3 OR 4 hrs. Synchronic analysis of the structure of Lithuanian; emphasis on discourse analysis of oral and written texts. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): LITH 405 or 18 hours of Lithuanian or the equivalent.

LITH 425 Translation of Lithuanian Texts 3 OR 4 hrs. Problems of translating Lithuanian texts; in-class lecture and discussion. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): Consent of the instructor.

LITH 499 Independent Study 1 TO 4 hrs. Investigation of special problems under the general direction of a staff member. May be repeated to a maximum of 8 hours. Graduate students may register for more than one section per term; undergraduates may only register for one section per term. Prerequisite(s): Senior or graduate standing, consent of the instructor, and the head of the department.

LITH 510 History of Lithuanian Language 4 hrs. 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.

LITH 515 Lithuanian Linguistics and Poetics 4 hrs. Linguistic and stylistic analysis of Lithuanian texts based on contemporary theories of style.

LITH 520 Topics in Historical Lithuanian Linguistics 4 hrs. Covers major topics and trends in historical Lithuanian linguistics: linguistic history, sociolinguistic history, history of grammar, and dictionaries. Will also cover historical sites of various linguistic schools. May be repeated to a maximum of 12 hours. Taught in Lithuanian. Prerequisite(s): Consent of the instructor.

LITH 545 Lithuanian Renaissance and Baroque Literature 4 hrs. Lithuanian prose, poetry, and historical works of the sixteenth, seventeenth, and eighteenth centuries.

LITH 550 Studies in Lithuanian Romanticism 4 hrs. Study of a genre, author, or movement. Content varies. May be repeated to a maximum of 12 hours.

LITH 560 Studies in Lithuanian Realism 4 hrs. Study of a topic, author, or movement. Content varies. May be repeated to a maximum of 12 hours.

LITH 565 Studies in Twentieth-Century Lithuanian Literature 4 hrs. Study of a topic, author, or movement. Content varies. May be repeated to a maximum of 12 hours.

LITH 570 Studies in Lithuanian Literary Criticism 4 hrs. Function of literary criticism in all epochs of Lithuanian literature. May be repeated to a maximum of 12 hours.

LITH 596 Independent Study 1 TO 4 hrs. Investigation of special problems under the general direction of a staff member. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor and the head of the department.

Management
MGMT 445 Organizational Theory 3 hrs. Emphasis on organizational theories and models to analyze and improve functioning and performance of organizations. Structure, technology, environmental adaptation, and managerial control systems. Prerequisite(s): MGMT 340 and junior standing.

MGMT 447 Organizations 3 OR 4 hrs. Characteristics of business, government, and not-for-profit organizations; approaches used to study organizations; theoretical and empirical analysis of organizational processes. Same as SOC 447. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): 6 hours of upper-division sociology; management, or political science; or consent of the instructor.

MGMT 452 Organizational Behavior 3 hrs. 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(s): Junior standing and MGMT 340.

MGMT 453 Human Resource Management 3 hrs. Examination of the activities involved in attracting, retaining, and motivating employees. Topics include planning, selection, compensation, performance appraisal, succession, and legal issues. Prerequisite(s): MGMT 340 and MGMT 350 and junior standing.


MGMT 460 Business, Society, and the Global Economy 3 hrs. Managing in a free-enterprise system, Market, regulatory, ethical, and cultural norms. Internationalization of business; urban problems of business; landmark and contemporary case analyses. Prerequisite(s): MGMT 340 and MGMT 350 and junior standing.

MGMT 463 Negotiation and Conflict Resolution 3 hrs. 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(s): MGMT 340.

MGMT 465 Compensation and Reward Systems 3 hrs. Examination of compensation and reward systems designed to enhance employee motivation and performance. Topics include pay structure design, incentive systems, and benefits. Prerequisite(s): MGMT 453 and MGMT 454.

MGMT 466 Managerial Effectiveness Through Diversity 3 hrs. Management of diverse work forces. Discrimination, affirmative action, career development, socialization and social change policies; historical, psychological, sociological, legal, and managerial viewpoints. Prerequisite(s): MGMT 340.

MGMT 467 Impact of Technological Change 3 hrs. 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. Prerequisite(s): MGMT 340 and MGMT 350.

MGMT 470 Career Planning and Development 3 hrs. Individual and organizational perspectives in career planning. Self-direction, networking, support facilities, and corporate management systems are considered. Prerequisite(s): MGMT 340 or the equivalent and junior standing.

MGMT 471 Organizational Design 3 hrs. 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. Prerequisite(s): MGMT 340 and MGMT 452, or consent of the instructor.

MGMT 480 Transportation Systems Management 3 hrs. 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. Prerequisite(s): MGMT 340 and MGMT 350, or consent of the instructor.

MGMT 481 Managerial Logistics 3 hrs. Management of activities governing flow of materials and products through stages of production and distribution. Includes design of logistical systems and use of mathematical techniques. Prerequisite(s): IDS 355 or consent of the instructor.

Program.

MBA or MS in Accounting

Prerequisite(s):
- Senior standing
- 9 hours of 400-level Management courses, or consent of the instructor.

MGMT 495

Competitive Strategy

4 hrs.

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(s):
- Senior standing in the College of Business Administration and completion of all other CBA core courses, or consent of the instructor.

MGMT 499

Independent Study

Management 1 TO 3 hrs.

Independent study of an approved topic in management. Student must prepare a written report under the guidance of the instructor. May be repeated to a maximum of 6 hours. Students may register in more than one section per term.

Prerequisite(s):
- Consent of the department head.

MGMT 500

Family Business Management

4 hrs.

Special issues facing family-owned and closely held firms. Emphasis on behavioral, operational, and strategic issues, family dynamics, and interpersonal issues in professional settings; succession planning.

Prerequisite(s):
- Admission to the MBA Program.
- Recommended background:
  - MGMT 502 or MKTG 502.

MGMT 540

Organizational Analysis and Practice

4 hrs.

Organizational analysis and applications based on key organizational theories; structure, technology, environmental adaptation, management functions and controls, formal and informal organization. Preparation for Admission to the MBA or MS in Accounting program.

MGMT 541

Organizational Behavior

4 hrs.

The organization as a social system. Topics include leadership, interpersonal effectiveness, group behavior, managing change, conflict management, motivation and behavior, and interpersonal communications. Credit is not given for MGMT 541 if the student has credit for MGMT 505.

Prerequisite(s):
- Admission to MBA or MS in Accounting program.

MGMT 553

Human Resource Management

4 hrs.

Human resource management programs and policies. Staffing, training and development; historical evolution of personnel policies, modern labor force, and technological trends; supervision, salary administration, human resource research, and utilization.

Prerequisite(s):
- MGMT 541 or consent of the instructor.

MGMT 557

International Management

4 hrs.

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(s):
- MGMT 541.

MGMT 564

Negotiations

4 hrs.

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. Credit is not given for MGMT 564 if the student has credit for MGMT 594. Special topics: negotiations.

Prerequisite(s):
- MGMT 541.

MGMT 568

Compensation Administration

4 hrs.

Compensation theory, policies, and practices, including job analysis and evaluation, compensation surveys, wage and salary structures, merit and incentive compensation elements, and pension plans.

Prerequisite(s):
- MGMT 553.

MGMT 570

Social and Legal Environment of the Firm

4 hrs.

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(s):
- ECON 520.

MGMT 573

Research Methods in Organizational Behavior and Human Resource

4 hrs.

Methodologies 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(s):
- PhD student status or consent of instructor.

MGMT 575

Seminar: Topics in Personnel Practices and Relations

4 hrs.


Prerequisite(s):
- PhD student status or consent of instructor.

MGMT 576

Behavioral Science Applications in Human Resource Management

4 hrs.

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(s):
- PhD student status or consent of the instructor.

MGMT 579

Contemporary American and International Management

4 hrs.

Student teams evaluate case studies, present findings and recommendations for business strategies and research corporations of visiting executives, prepare presentations, and critique lectures.

MGMT 581

Administrative Structure and Organizational Design

4 hrs.

An advanced exploration of theories of administrative structure and organizational design. Course topics include: conceptual models; macro- middle- and micro-level variables and principles of organizational change and development.

Prerequisite(s):
- MGMT 541.

MGMT 582

Management of Innovation and Technological Change

4 hrs.

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(s):
- MGMT 541.

MGMT 583

Seminar: Topics in Organizational Behavior and Human Resources

4 hrs.

Topics of current research interest in human resource systems and organizational behavior. Issues on current issues in published literature and unpublished research.

Prerequisite(s):
- PhD student status or consent of the instructor.

MGMT 588

Seminar: Topics in Strategic Management

4 hrs.

Selected topics and current problems in organizational strategy. Research and fieldwork in strategic planning. Application of theory and concepts to problems in strategic management.

Prerequisite(s):
- Admission to the PhD in Business Administration program.

MGMT 589

Seminar: Topics in Human Resource Management

4 hrs.

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(s):
- PhD student status or consent of the instructor.

MGMT 590

Strategic Management

4 hrs.

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(s):
- Enrollment in the final year of the MBA program.

MGMT 591

Research Apprenticeship

2 TO 4 hrs.

Directed training in conducting research in specific areas of management, and in developing skills related to the research. Satisfactory/ Unsatisfactory grading only. May be repeated.

Prerequisite(s):
- Consent of the instructor.

MGMT 594

Special Topics in Management

1 TO 4 hrs.

An intensive study of a selected topic in management. Topics vary by section and by term. May be repeated to a maximum of 12 hours if topics vary. Students may register in more than one section per term.

Prerequisite(s):
- Consent of the instructor.

MGMT 596

Independent Study

Management 1 TO 4 hrs.

Independent study under direction of a faculty member. May be repeated. Students may register in more than one section per term.

Prerequisite(s):
- Consent of the head of the department.

MGMT 599

PhD Thesis Research

0 TO 16 hrs.

Independent research on topic approved for the doctoral dissertation. Satisfactory/ Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.

Prerequisite(s):
- Consent of the instructor.

Marketing

MKTG 482

Principles of Retailing

3 hrs.

The theory and practice of making retailing decisions regarding pricing, product, place, and promotion, and the development of strategy based on market competition and trends.
MKTG 460  Marketing Analytics 3 hrs.  Introduction to data-centered analysis for critical aspects of marketing, such as sales forecasting, profitability analysis, market segmentation, promotion budgeting, and database marketing. Prerequisite(s): MKTG 360 and IDS 270.

MKTG 461  Consumer Market Behavior 3 hrs.  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(s): MKTG 360 or consent of the instructor.

MKTG 462  Marketing Research 3 hrs.  An investigation of the gathering, analyses, and interpretation of information used in solving marketing problems. Both qualitative and quantitative methods are employed in developing an analytical framework. Prerequisite(s): MKTG 360 and IDS 270.

MKTG 463  Marketing Channels and E-Commerce 3 hrs.  Develop an integrated distribution system; relationship to firms marketing structure (logistics); evaluation of decisions on sources, plant and warehouse location, domestic and international outlets. Analysis by marketing channels and e-commerce role in distribution. Prerequisite(s): MKTG 360. Business Administration students must have declared a major, or have received consent of the instructor.

MKTG 465  Strategic Marketing Planning and Management 3 hrs.  Development of marketing plans for strategic and tactical programs to achieve the firm’s marketing objectives. Prerequisite(s): 15 hours of marketing.

MKTG 466  Comparative Marketing Systems 3 hrs.  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. Prerequisite(s): MKTG 360 or consent of the instructor. Business Administration students must have declared a major.

MKTG 469  Global Marketing 3 hrs.  The strategic and tactical marketing of goods and services to countries beyond domestic or current markets. Distinct economic, sociocultural, and political-legal-regulatory environments are considered. Prerequisite(s): MKTG 360 and BA 200; or consent of the instructor.

MKTG 471  Services Marketing 3 hrs.  An exploration of the special challenges of services marketing, including analyzing and developing solutions for new services, services quality, design and delivery of services, and services recovery. Prerequisite(s): MKTG 360.

MKTG 473  The Personal Selling Effort in Marketing 3 hrs.  Analysis of selling strategies and tactics in different situations; problems of managing sales force. Cultural differences in selling techniques as well as ethical concerns will be discussed. Prerequisite(s): MKTG 461 or consent of the instructor.

MKTG 474  Advertising and Sales Promotion 3 hrs.  The management, planning, creation, evaluation, and use of advertising and sales promotion. Evaluation and critique of an ad campaign. Prerequisite(s): MKTG 461 or consent of the instructor.

MKTG 475  Product Management 3 hrs.  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(s): MKTG 462 or consent of the instructor.

MKTG 476  Business-to-Business (B2B) Marketing 3 hrs.  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(s): MKTG 360.

MKTG 494  Special Topics in Marketing 3 hrs.  Intensive study of selected problems. Reading assignments from scholarly and professional journals; emphasis on covering relatively few areas in great depth. Prerequisite(s): Business Administration students must have declared a major.

MKTG 499  Independent Study in Marketing 3 hrs.  Topic and research methodology is to be determined by consultation with the instructor. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Major in marketing. Consent of the head of the department and the instructor must be obtained prior to registration.

MKTG 500  Introduction to Marketing 4 hrs.  Client/consumer behavior and the way institutions respond to such behavior through the planning, pricing, promotion, and distribution of goods and services. Credit is not given for MKTG 500 if the student has credit for MBA 500. Prerequisite(s): Graduate standing in the College of Business Administration or consent of the instructor.

MKTG 518  Electronic Marketing 4 hrs.  Overview of the electronic marketing value chain. Internet and Web technologies, system design, payment systems, business requirements for e-marketing, design, and ethical issues. Same as IDS 518. Prerequisite(s): MKTG 500 or MBA 506 or consent of the instructor.

MKTG 560  Marketing Management 4 hrs.  The structural system for the management of marketing; environmental considerations; goal determinations; the sequential process; marketing planning; product-market integration; channel components; demand stimulation; evaluation and audit. Prerequisite(s): MKTG 500 or consent of the instructor.

MKTG 561  Consumer Behavior 4 hrs.  Application of knowledge from the behavioral sciences to the study of consumer behavior. Individual and group influences on consumer preferences and purchasing patterns are considered. Both theory and application are stressed. Prerequisite(s): MKTG 500.

MKTG 563  Information for Marketing Decisions 4 hrs.  Definition and selection of appropriate research techniques for solving specific marketing problems. Establishment and administration of information systems giving firms a systematic, continuing appraisal of its market position. Prerequisite(s): MKTG 500.

MKTG 565  Marketing Communication and Promotional Strategy 4 hrs.  How a firm uses advertising, public relations, sales promotion, and personal selling to communicate with its customers. Functional characteristics of each of these is assessed in terms of varying marketing situations in the process of formulating the firm’s strategy. Prerequisite(s): MKTG 500.

MKTG 571  International Business Operations 4 hrs.  Centers attention on the policies and problems of firms operating across international frontiers and the social questions they generate. Attention is directed at investing overseas, licensing agreements, joint ventures, and contracting. Prerequisite(s): MKTG 500.

MKTG 572  International Marketing 4 hrs.  Focuses on firms that operate internationally from their home country base. Attention is directed toward working with overseas distributors, promotion and pricing problems, governmental export assistance, and physical distribution matters. Prerequisite(s): MKTG 500.

MKTG 573  Marketing Channels Management 4 hrs.  Operations of various institutions that constitute the channel(s) for marketing goods and services. Emphasis on the practices of institutions at each level in the distribution system and the interaction that occurs among them. Prerequisite(s): MKTG 500.

MKTG 574  Product Planning 4 hrs.  In-depth coverage of all aspects of the product, service, and program planning process. Conceptual aspects as applied to new and existing product entries. Prerequisite(s): MKTG 500.


MKTG 581  Seminars in Consumer Behavior 4 hrs.  Theories and concepts relevant to consumer behavior; the decision-making process for both profit and nonprofit goods and services. Prerequisite(s): Admission to the PhD in Business Administration program.
MKTG 583 Seminar in Marketing Theory 4 hrs. 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(s): Admission to the PhD in Business Administration program.

MKTG 584 Product Innovation and Development 4 hrs. An in-depth investigation of the factors affecting the new product strategy of the firm and its development process. Prerequisite(s): Admission to the PhD in Business Administration program.

MKTG 585 Seminar: Topics in Quantitative Models in Marketing 4 hrs. Formulation of conceptual and quantitative models which relate marketing activities and behaviors to other behaviors, sales, or profits. Examinations of methods that researchers have used to test hypothesized marketing models. Prerequisite(s): Admission to the PhD in Business Administration program.

MKTG 586 Advanced International Marketing 4 hrs. Concepts and problems pertaining to export marketing with emphasis on multinational businesses. Includes product modification, differential pricing, national, social, and commercial policies, promotion, and logistical issues. Prerequisite(s): Admission to the PhD in Business Administration program.

MKTG 587 Advanced Marketing Research 4 hrs. Multidimensional scaling, conjoint analysis, including hybrid analysis, choice models, including multinomial logit and probit models, and selective models. Prerequisite(s): Admission to the PhD in Business Administration program.

MKTG 588 Marketing Communications 4 hrs. 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. Prerequisite(s): Admission to the PhD in Business Administration program and consent of the instructor.

MKTG 589 Special Topics in Marketing 4 hrs. An intensive study of a selected topic in marketing. Prerequisites vary. Students should contact the instructor to find out what topics will be covered. Prerequisite(s): MKTG 500.

MKTG 590 Professional Topics 2 TO 4 hrs. A series of skills workshops designed to develop critical management skills and to explore timely management issues not directly related to core business functional areas. May be repeated to a maximum of 6 hours if topics vary. Students may register in more than one section per term. Prerequisite(s): Admission to the MBA program.

MBA 500 Corporate Strategy 2 hrs. Analysis of major strategic decisions affecting the long-term performance of a firm and its ability to sustain competitive advantage. Meets eight weeks of the semester. Prerequisite(s): Admission to the MBA Program.

MBA 501 Business Concepts and Skills 2 hrs. Introduction to concepts and skills required for success in the MBA program including: institutions and vocabulary of U.S. business, game theory; mathematics and statistics; spreadsheets and databases; and business writing and presentation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

MBA 502 Master of Business Administration Project 8 hrs. Multidisciplinary team project at an outside company or University office. A written report and an oral presentation of the project is required. Prerequisite(s): Admission to the MBA program and consent of the director.

MBA 504 Special Topics—Master of Business Administration Program 0 TO 16 hrs. Lectures, seminars, and independent travel/study abroad in conjunction with admission to the MBA program. May be repeated to a maximum of 24 hours. Prerequisite(s): Admission to the MBA program and consent of the director.

MBA 509 Thesis Research 0 TO 16 hrs. Independent research on topic approved for the doctoral dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

NUMC 502 Concepts for Pediatric/Perinatal Clinical Nurse Specialist Practice I 2 hrs. Students analyze theory and research related to pediatric or perinatal nursing personnel and organizational spheres of influence. Prerequisite(s): NUMC 500 and credit or concurrent registration in NUMC 520.

NUMC 504 Concepts for Pediatric/Perinatal Clinical Nurse Specialist II 2 hrs. Students analyze theories and research related to pediatric or perinatal nursing personnel and organizational spheres of influence. Prerequisite(s): NUMC 502 and credit or concurrent registration in NUMC 521.

NUMC 507 Biological Basis for Women’s Health and Perinatal Nursing I 2 hrs. Focuses on the anatomy and physiology of reproductive function, pregnancy, parturition, the puerperium, and menopause as the biological basis for women’s health and perinatal nursing. Same as NUWH 507. Prerequisite(s): Consent of the instructor.

NUMC 508 Biological Basis for Women’s Health and Perinatal Nursing II 2 hrs. The anatomy, physiology, and genetics of conception, embryonic development, and fetal and neonatal growth and development as the biological basis for women’s health and perinatal nursing. Prerequisite(s): NUMC 507 or NUWH 507 or consent of the instructor.

NUMC 510 Advanced Nursing Care of the Well Infant, Child, and Adolescent 3 hrs. Emphasizes prevention, health promotion, and maintenance for all childhood age groups through teaching, counseling, guidance, and support of children and their families. Prerequisite(s): Credit or concurrent registration in NUSC 530 or consent of the instructor.

NUMC 511 Primary Care Management of Acute/Chronic Conditions in Childhood 3 hrs. Emphasizes clinical decision making and management of acute episodic illnesses and stable chronic illnesses commonly encountered in pediatric ambulatory healthcare settings. Prerequisite(s): Credit or concurrent registration in NUSC 530 and credit or concurrent registration in NUSC 531, or consent of the instructor.
NUMC 512 Practicum in Advanced Pediatric Primary Care 1 TO 4 hrs. Emphasizes clinical experiences in prevention, health promotion, and maintenance through teaching, counseling, guidance, and support of children and their families. May be repeated. Prerequisite(s): Credit or concurrent registration in NUMC 510 or credit or concurrent registration in NUSC 532, or consent of the instructor.

NUMC 513 Practicum in Advanced Pediatric Primary Care II 1 TO 4 hrs. Emphasizes clinical experiences and management of acute episodic and stable chronic illnesses commonly encountered in pediatric ambulatory healthcare settings. May be repeated. Prerequisite(s): Credit or concurrent registration in NUMC 512 or consent of the instructor.

NUMC 514 Practicum in Advanced Pediatric Primary Care III 1 TO 4 hrs. 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 healthcare settings. May be repeated. Prerequisite(s): Credit or concurrent registration in NUMC 513 or consent of the instructor.

NUMC 517 Healthcare of Women I 4 hrs. Healthcare of women through the life span with an emphasis on health promotion and disease prevention, fertility control, and pregnancy care. Same as NUWH 517. Prerequisite(s): Credit or concurrent registration in NUMC 507 or credit or concurrent registration in NUWH 507, and credit or concurrent registration in NUSC 532, or consent of the instructor.

NUMC 518 Healthcare of Women II 4 hrs. Healthcare of women through the life span with an emphasis on the parturition, the puerperium, and common health and pregnancy problems. Same as NUWH 518. Prerequisite(s): NUMC 508; and NUMC 517 or NUWH 517, or consent of the instructor.

NUMC 519 Healthcare of Women III 4 hrs. Healthcare of women through the life span with an emphasis on gynecologic and primary care. Same as NUWH 519. Prerequisite(s): NUMC 518 or NUWH 518; and NUSC 531 and NUSC 532 and NUSC 535.

NUMC 520 Pediatric and Perinatal Clinical Nurse Specialist Practicum I 3 hrs. The application of advanced knowledge of theory and research related to pediatric and perinatal patients and families who require the care of a clinical nurse specialist. Prerequisite(s): NUSC 500 and NUSC 531 and NUSC 532 and credit or concurrent registration in NUSC 590.

NUMC 521 Pediatric and Perinatal Clinical Nurse Specialist Practicum II 4 hrs. The application of theory and research related to pediatric and perinatal nursing personnel and the healthcare organization; systematic assessment for problem identification and outcome evaluation. Prerequisite(s): NUMC 520 and NUSC 504.

NUMC 522 Pediatric and Perinatal Clinical Nurse Specialist Practicum III 5 hrs. The application of theory and research for expansion of professional role competencies related to pediatric and perinatal nursing personnel and the healthcare organization. Prerequisite(s): Credit or concurrent registration in NUMC 521.

NUMC 524 Dimensions of Midwifery and Women's Health Practice 3 hrs. Examines the complex functions and roles of women's healthcare providers. Prerequisite(s): NUMC 519 and NUMC 525 and NUSC 528 and NUSC 529.

NUMC 525 Practicum: Healthcare of Women 1 TO 8 hrs. Clinical experiences to develop nurse-midwifery and nurse-practitioner competencies in the healthcare of women. May be repeated. Prerequisite(s): NUMC 517 and NUSC 531 and NUSC 532.

Mathematical Computer Science

MCS 401 Computer Algorithms I 3 OR 4 hrs. Design and analysis of computer algorithms. Divide-and-conquer, dynamic programming, greedy method, backtracking. Algorithms for sorting, searching, graph computations, pattern matching, NP-complete problems. Same as CS 401. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 215; and grade of C or better in MATH 310 or grade of C or better in MATH 320; or consent of the instructor.

MCS 411 Compiler Design 3 OR 4 hrs. Language translation: lexical analysis, parsing schemes, symbol table management, syntax and semantic error detection, and code generation. Development of fully functional compiler. Same as CS 473. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in CS 301 or grade of C or better in MCS 441; and grade of C or better in CS 202 or grade of C or better in MCS 360; and grade of C or better in CS 266.

MCS 415 Programming Language Design 3 OR 4 hrs. 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. Same as CS 476. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): MCS 560 or CS 340.

MCS 421 Combinatorics 3 OR 4 hrs. The pigeonhole principle, permutations and combinations, binomial coefficients, inclusion/exclusion principle, recurrence relations and generating functions, special counting sequences, Polya theory of counting, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 215; and grade of C or better in MATH 310 or grade of C or better in MATH 320; or consent of the instructor.

MCS 423 Graph Theory 3 OR 4 hrs. Basic concepts of graph theory, including Eulerian and Hamiltonian cycles, trees, colorings, connectivity, shortest paths, minimum spanning trees, network flows, bipartite matching, planar graphs. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 215; and grade of C or better in MATH 310 or grade of C or better in MATH 320; or consent of the instructor.

MCS 425 Codes and Cryptography 3 OR 4 hrs. Mathematical foundations of cryptography. Basic ideas and information necessary to understand both coding theory and cryptography. Basic ideas and highlights for both coding theory and cryptography, including public-key cryptosystems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 215; and grade of C or better in MATH 310 or grade of C or better in MATH 320; or consent of the instructor.

MCS 441 Theory of Computation I 3 OR 4 hrs. Introduction to formal languages; relations between grammars and automata; elements of the theory of computable functions. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): MCS 215.

MCS 451 Object-Oriented Programming in C++ 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Credit is not given for MCS 451 if the student has credit for CS 474. Extensive computer use required. Prerequisite(s): Grade of C or better in MCS 360 or the equivalent or consent of the instructor.

MCS 471 Numerical Analysis 3 OR 4 hrs. Introduction to numerical analysis; floating point arithmetic, computational linear algebra, iterative solution to nonlinear equations, interpolation, numerical integration, numerical solution of ODE's, computer subroutine packages. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MCS 275 or grade of C or better in CS 102 or grade of C or better in CS 108; or consent of instructor.

MCS 472 Introduction to Industrial Math and Computation 3 OR 4 hrs. Technical writing and oral presentations in preparation for industrial projects. Topics include quality control, operations research, cost-benefit analysis, differential equations, using scientific software. Extensive computer use required. Prerequisite(s): Grade of C or better in MCS 471 or consent of the instructor. Recommended background: Designed for students with a desire to explore mathematics via practical fieldwork.
MCS 481 Computational Geometry 3 OR 4 hrs. Advanced topics in computational geometry, including algorithms and problems on sets of points, rectangles, intervals, arcs, chords, polygons. Counting, reporting, location, intersection, pairing, static and dynamic data structures, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MCS 401 or consent of the instructor.

MCS 494 Special Topics in Computer Science 3 OR 4 hrs. Topics in computer science, such as symbolic computation, automated reasoning, cryptography, or geometric algorithms. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MCS 496 Independent Study 1 TO 4 hrs. Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the instructor and the department.


MCS 503 Mathematical Methods for Algorithm Analysis 4 hrs. Discrete mathematical techniques useful in algorithm analysis: summation methods, floor/ceiling expressions, modular arithmetic techniques, harder binomial expressions, modular arithmetic useful in algorithm analysis: generating functions, asymptotics. Prerequisite(s): Grade of C or better in MCS 401 and grade of C or better in MCS 421.

MCS 504 Mathematics and Information Science for Industry Workshop 4 hrs. A project-based course on one or more topics in applied mathematics, statistics, or computer science, motivated by industrial problems. The topics vary from year to year. May be repeated. Students may register in more than one section per term. Prerequisite(s): Grade of B or better in MCS 401 and grade of B or better in MCS 471 and grade of B or better in MCS 507.

MCS 507 Mathematical, Statistical, and Sociological Software 4 hrs. The design, analysis, and use of mathematical, statistical, and scientific software. Prerequisite(s): Grade of B or better in MCS 360 and grade of C or better in an equivalent or consent of instructor.

MCS 521 Combinatorial Optimization 4 hrs. Combinatorial optimization: network flows, bipartite matching, Edmonds’ algorithm for non-bipartite matching, the matching polytope, matroids, greedy algorithm, matroid union and intersection algorithms, matroid polyhedra, polymatroids. Prerequisite(s): MCS 423 and STAT 471.

MCS 531 Error-Correcting Codes 4 hrs. Finite fields, cyclic codes, quadratic residue codes, BCH codes, decoding schemes. Reed-Muller codes, weight distributions, codes and designs. Prerequisite(s): Grade of C or better in MCS 261, and grade of C or better in STAT 401 or grade of C or better in STAT 410.

MCS 541 Computational Complexity 4 hrs. Time and space complexity of computations, classification of NP problems according to their computational complexity, P=NP problem. Prerequisite(s): Consent of the instructor.

MCS 548 Mathematical Theory of Artificial Intelligence 4 hrs. Valiant’s learning model, positive and negative results in learnability, correlation bound, perceptrons, Rosenblatt’s theorem, convergence theorem, threshold circuits, inductive inference of programs, grammars, and automata. Prerequisite(s): MCS 541.

MCS 551 Generic Programming and the C++ Standard Template Library 4 hrs. Generic programming in C++. Templates, namespaces, smart pointers, reference counting, Algorithms, ranges, concepts and modeling, Iterators, function objects, adapters, and containers. Algorithms and container classes in the STL. Extensive computer use required. Prerequisite(s): Grade of C or better in MCS 451 or grade of C or better in an equivalent course in C++.

MCS 563 Analytic Symbolic Computation 4 hrs. Analytic computation, including integration algorithms, differential equations, perturbation theory, mixed symbolic-numerical algorithms, and other related topics. Prerequisite(s): Grade of C or better in MCS 460 or the equivalent, and MATH 480 or consent of the instructor.

MCS 565 Mathematical Theory of Databases 4 hrs. Abstract systems for databases, syntax, and semantics of operational languages, dependences and normal forms, axiomizations, queries and query optimization, null values, algebraic interpretations.


MCS 572 Introduction to Supercomputing 4 hrs. Introduction to supercomputing on vector and parallel processors: architectural comparisons, parallel algorithms, vectorization techniques, parallelization techniques, actual implementation on real machines. Prerequisite(s): MCS 481 or MCS 471 or consent of the instructor.

MCS 575 Computer Performance Evaluation 4 hrs. 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. Prerequisite(s): STAT 401 and MCS 412 or consent of the instructor.

MCS 589 Advanced Topics in Computer Science 4 hrs. 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. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MCS 589 Masters Thesis 0 TO 16 hrs. Research work under the supervision of a faculty member leading to the completion of a master’s thesis. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.
MATH 425 Linear Algebra II 3 OR 4 hrs.
Canonical forms of a linear transformation, inner product spaces, spectral theorem, principal axis theorem, quadratic forms, special topics such as linear programming. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 210.

MATH 430 Formal Logic I 3 OR 4 hrs.
First-order logic, syntax, and semantics, completeness-incompleteness. 3 undergraduate hours. 4 graduate hours. Credit is not given for MATH 430 if the student has credit for PHIL 412.
Prerequisite(s): Grade of C or better in CS 202 or grade of C or better in MCS 261 or grade of C or better in MATH 215.

MATH 431 Abstract Algebra II 3 OR 4 hrs.
Further topics in abstract algebra: Sylow theorems, Galois theory, finitely generated modules over a principal ideal domain. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 320 and grade of C or better in MATH 330.

MATH 435 Foundations of Number Theory 3 OR 4 hrs.
Primes, divisibility, congruences, Chinese remainder theorem, primitive roots, quadratic residues, quadratic reciprocity, and Jacobi symbols. The Euclidean algorithm and strategies of computer programming. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 320 and grade of C or better in MATH 330.

MATH 436 Number Theory for Applications 3 OR 4 hrs.
Primality testing methods of Lehmer, Rabin, Cohen-Lenstra, Atkin, Factorization methods of Gauss, Pollard, Shanks, Lenstra, and quadratic sieve. Computer algorithms involve libraries and nested subroutines. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 345.

MATH 442 Differential Geometry of Curves and Surfaces 3 OR 4 hrs.
Frenet formulas, isoperimetric inequality, local theory of surfaces, Gaussian and mean curvature, geodesics, parallelism, and the Gauss-Bonnet theorem. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 320.

MATH 445 Introduction to Topology I 3 OR 4 hrs.
Elements of metric spaces and topological spaces including product and quotient spaces, compactness, connectedness, and completeness. Examples from Euclidean space and function spaces. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 313.

MATH 446 Introduction to Topology II 3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of C or better in MATH 445.

MATH 480 Applied Differential Equations 3 OR 4 hrs.
Prerequisite(s): Grade of C or better in MATH 220.

MATH 481 Applied Partial Differential Equations 3 OR 4 hrs.
Prerequisite(s): Grade of C or better in MATH 220.

MATH 494 Special Topics in Mathematics 3 OR 4 hrs.
Course content is announced prior to each term in which it is given. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Approval of the department.

MATH 496 Independent Study 1 TO 4 hrs.
Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Approval of the instructor and the department.

MATH 502 Metamathematics I 4 hrs.
First-order logic, completeness theorem, and model theory. Same as PHIL 562. Prerequisite(s): MATH 430 or consent of the instructor.

MATH 503 Metamathematics II 4 hrs.
Incompleteness theorems, elementary recursion theory and proof theory: first- and second-order arithmetic. Same as PHIL 563. Prerequisite(s): MATH 502 or PHIL 562.

MATH 504 Set Theory I 4 hrs.
Naive and axiomatic set theory. Independence of the continuum hypothesis and the axiom of choice. Same as PHIL 565. Prerequisite(s): MATH 430 or MATH 502 or PHIL 562.

MATH 506 Model Theory I 4 hrs.
Introduction to stability theory: categoricity, stability, forking, finite equivalence relation theory, indiscernibles, orthogonality. Same as PHIL 567. Prerequisite(s): MATH 502 or PHIL 562.

MATH 507 Model Theory II 4 hrs.
Intermediate stability theory: dependence, prime models, isomorphism, regular types, dimension, weights. Same as PHIL 568. Prerequisite(s): MATH 506 or PHIL 567.

MATH 509 Universal Algebra I 4 hrs.
Algebraic systems, homomorphisms, congruences, subalgebras, direct and subdirect products. Equational classes, free algebras, Birkhoff's theorem. Malcev conditions, congruence distributive equational classes. Prerequisite(s): MATH 330 and MATH 425.

MATH 510 Universal Algebra II 4 hrs.
Discriminator and directly representable varieties, ultraproducts and quasi-varieties, finitely based equational theories, commutator and center. Prerequisite(s): MATH 509.

MATH 512 Advanced Topics in Logic 4 hrs.
Advanced topics in modern logic; e.g., descriptive set theory, model theory of fields, theory of hierarchies, stable groups. Same as PHIL 569. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Approval of the department.

MATH 513 Advanced Topics in Universal Algebra and Lattice Theory 4 hrs.
Special topics. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Approval of the department.

MATH 514 Number Theory I 4 hrs.
Introduction to classical, algebraic, and analytic number theory. Euclid's algorithm, unique factorization, quadratic reciprocity, and Gauss sums, quadratic forms, real approximations, arithmetic functions, Diophantine equations.
MATH 515 Number Theory II 4 hrs. Introduction to classical, algebraic, and analytic number theory. Algebraic number fields, units, ideals, and P-adic theory. Riemann zeta function, Dirichlet's theorem, prime number theorem.

Prerequisite(s): MATH 514.

MATH 516 Second Course in Abstract Algebra I 4 hrs. Structure of groups, Sylow theorems, solvable groups; structure of rings, polynomial rings, projective and injective modules, finitely generated modules over a PID.

Prerequisite(s): MATH 330 and MATH 425.

MATH 517 Second Course in Abstract Algebra II 4 hrs. Rings and algebras, polynomials in several variables, power series rings, tensor products, Mat. Galoi theory, Wedderburn theorems. Prerequisite(s): MATH 516.

MATH 518 Representation Theory 4 hrs. Major areas of representation theory, including structure of group algebra, Wedderburn theorems, characters and orthogonality relations, idempotents, and blocks.

Prerequisite(s): MATH 517.

MATH 519 Algebraic Groups 4 hrs. Classical groups as examples; necessary results from algebraic geometry; structure and classification of semisimple algebraic groups. Prerequisite(s): MATH 517.

MATH 521 Advanced Topics in Algebra 4 hrs. Research-level topics such as groups and geometries, equivalences of module categories, representations of Lie-type groups. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MATH 531 Complex Analysis I 4 hrs. Introduction to real analysis. Lebesgue measure and integration, differentiation, Lp classes, abstract integration. Prerequisite(s): MATH 411 or MATH 417 or equivalent.

MATH 532 Complex Analysis II 4 hrs. Continuation of MATH 531. Prerequisite(s): MATH 417.


MATH 534 Complex Analysis II 4 hrs. Normal families, Riemann mapping theorem. Analytic continuation, harmonic and subharmonic functions, Picard theorem, selected topics. Prerequisite(s): MATH 535.

MATH 535 Introduction to Harmonic Analysis 4 hrs. Fourier transform on Lp spaces, Wiener's Tauberian theorem, Hilbert transform, Paley-Wiener theorem. Prerequisite(s): MATH 533, and MATH 417 or MATH 535.

MATH 537 Functional Analysis I 4 hrs. Topological vector spaces, Hilbert spaces, Hahn-Banach theorem, open mapping, uniform boundedness principle, linear operators in a Banach space, compact operators. Prerequisite(s): MATH 533.

MATH 541 Partial Differential Equations I 4 hrs. Theory of distributions; fundamental solutions of the heat equation, wave equation, and Laplace equation. Harmonic functions. Cauchy problem for the wave equation. Prerequisite(s): MATH 517.


MATH 546 Advanced Topics in Analysis 4 hrs. Subject may vary from semester to semester. Topics include partial differential equations, several complex variables, harmonic analysis and ergodic theory. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MATH 547 Algebraic Topology I 4 hrs. The fundamental group and its applications, covering spaces, classification of compact surfaces, introduction to homology, development of singular homology theory, applications of homology. Prerequisite(s): MATH 430 and MATH 445.

MATH 548 Algebraic Topology II 4 hrs. Homotopy groups and fibrations. The Serre spectral sequence and its applications. Classifying spaces of classical groups. Characteristic classes of vector bundles. May be repeated. Students may register in more than one section per term. Prerequisite(s): MATH 548 or consent of the instructor.

MATH 549 Differentiable Manifolds I 4 hrs. Smooth manifolds and maps, tangent and normal bundles, Sand's theorem and transversality, embedding, differential forms, Stokes' theorem, degree theory, vector fields. Prerequisite(s): MATH 445.

MATH 550 Differentiable Manifolds II 4 hrs. Vector bundles and classifying spaces, Lie groups and Lie algebras, tensors, Hodge theory. Poincare duality. Topics from elliptic operators, Morse theory, cobordism theory, de Rahm theory, characteristic classes. Prerequisite(s): MATH 549.

MATH 551 Riemannian Geometry 4 hrs. Riemannian metrics and Levi-Civita connections, geodesics and completeness, curvature, first and second variation of arc length, comparison theorems. Prerequisite(s): MATH 442 and MATH 549.

MATH 552 Algebraic Geometry I 4 hrs. Basic commutative algebra, affine and projective varieties, regular and rational maps, function fields, dimension and smoothness, projective curves, schemes, sheaves, and cohomology, positive characteristic. Prerequisite(s): MATH 553.

MATH 553 Algebraic Geometry II 4 hrs. Divisors and linear systems, differentials, Riemann-Roch theorem for curves, elliptic curves, geometry of curves and surfaces. Prerequisite(s): MATH 552.

MATH 554 Complex Manifolds I 4 hrs. Holomorphic functions in several variables, Riemann surfaces, Sheaf theory, vector bundles, Stein manifolds, Cartan theorem A and B, Grauert direct-image theorem. Prerequisite(s): MATH 517 and MATH 535.

MATH 555 Complex Manifolds II 4 hrs. Dolbeault cohomology, Serre duality, Hodge theory, Kadaira vanishing and embedding theorem, Lefschitz theorem, complex tori, Kahler manifolds. Prerequisite(s): MATH 517 and MATH 535.

MATH 556 Topics in Algebraic Topology 4 hrs. Homotopy groups and fibrations. The Serre spectral sequence and its applications. Classifying spaces of classical groups. Characteristic classes of vector bundles. May be repeated. Students may register in more than one section per term. Prerequisite(s): MATH 548 or consent of the instructor.

MATH 559 Advanced Topics in Differential Topology 4 hrs. Topics from areas such as index theory, Lefschetz theory, cyclic theory, KK-theory, noncommutative geometry, 3-manifold topology, hyperbolic manifolds, geometric group theory, and knot theory. Prerequisite(s): Approval of the department.

MATH 570 Advanced Topics in Differential Geometry 4 hrs. 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. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MATH 571 Advanced Topics in Algebraic Geometry 4 hrs. 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. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MATH 574 Applied Optimal Control 4 hrs. 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(s): MATH 411 or MATH 427 or consent of the instructor.

MATH 575 Integral Equations and Applications 4 hrs. Fredholm and Volterra equations, Fredholm determinants, separable and symmetric kernels, Neumann series, transform methods, Wiener-Hopf method, Cauchy kernels, nonlinear equations, perturbation methods. Prerequisite(s): MATH 411 and MATH 417 and MATH 481; or consent of instructor.

MATH 576 Boundary Value Problems 4 hrs. Distributions, Green’s functions, alternative theorem, regular and singular Sturm-Liouville problems, spectral theory, potential theory, method of images, complex variable methods, equations of evolution. Prerequisite(s): MATH 320 and MATH 417 and MATH 481; or consent of instructor.
MATH 577 Advanced Applied Partial Differential Equations 4 hrs. Quasi-linear 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. Prerequisite(s): MATH 410 and MATH 417 and MATH 481.

MATH 578 Asymptotic Methods 4 hrs. Asymptotic series, Laplace's method, stationary phase, steepest descent method, Stokes phenomena, uniform expansions, multidimensional Laplace integrals, Euler-Maclaurin formula, irregular singular points, WKBJ method. Prerequisite(s): MATH 417 and MATH 481; or consent of instructor.

MATH 579 Singular Perturbations 4 hrs. Algebraic and transcendental equations, regular perturbation expansions of differential equations, matched asymptotic expansions, boundary layer theory, Poincare-Lindstedt, multiple scales, bifurcation theory, homogenization. Prerequisite(s): MATH 481 or consent of the instructor.

MATH 580 Mathematics of Fluid Mechanics 4 hrs. 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. Prerequisite(s): Grade of C or better in MATH 410 and MATH 548 and MATH 481 and MATH 401, or consent of instructor.

MATH 581 Special Topics in Fluid Mechanics 4 hrs. Geophysical fluids with applications to oceanography and meteorology, astrophysical fluids, magnetohydrodynamics, and plasmas. Prerequisite(s): Grade of C or better in MATH 580.

MATH 582 Wave Propagation and Scattering I 4 hrs. 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. Prerequisite(s): MATH 471 and MATH 481; or consent of the instructor.

MATH 583 Wave Propagation and Scattering II 4 hrs. Solutions of reduced wave equations for scattering of scalar, vector, and dyadic waves; separable and nonseparable problems. Representations: Green's function integrals, complex integrals, spectral representations. Various approximations. Prerequisite(s): MATH 582.

MATH 584 Applied Stochastic Models 4 hrs. Applications of stochastic models in chemistry, physics, biology, queuing, filtering, and stochastic control, diffusion approximations, Brownian motion, stochastic calculus, stochastically perturbed dynamical systems, first passage times. Prerequisite(s): MATH 471 and MATH 481 and STAT 401, or consent of the instructor.

MATH 586 Computational Finance 4 hrs. Introduction to the mathematics of financial derivative: options, asset price random walks, Black-Scholes model; partial differential techniques for option valuation, binomial models, numerical methods; exotic options, interest-rate derivatives. Prerequisite(s): Grade of C or better in MATH 220 and grade of C or better in STAT 381; or consent of the instructor.

MATH 587 Teaching and Presentation of Mathematics 2 hrs. Strategies and techniques for effective teaching in college and for mathematical consulting. Observation and evaluation, classroom management, presenting mathematics in multidisciplinary research teams. Required for teaching assistants in MSCS. No graduation credit awarded for students enrolled in the Master of Science in the Teaching of Mathematics degree program.

MATH 589 Advanced Topics in Applied Mathematics 4 hrs. 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(s): Approval of the department.

MATH 591 Seminar on Mathematics Curriculum 4 hrs. Examination of research and reports on mathematics curricula. Analysis of research in teaching and learning mathematics. Developments in using technology in mathematics teaching. Prerequisite(s): Enrollment in the Doctor of Arts program in Mathematics or consent of the instructor.

MATH 592 Seminar on Mathematics: Philosophy and Methodology 4 hrs. Problems related to teaching and learning mathematics. Analysis of work of Piaget, Gagné, Bruner, Ausubel, Freudenthal, and others and their relation to mathematics teaching. Prerequisite(s): Enrollment in the Doctor of Arts program in Mathematics or consent of instructor.

MATH 593 Graduate Student Seminar 1 hour. 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. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MATH 594 Internship in Mathematics 0 TO 8 hrs. 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. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Grade of C or better in MATH 210 and enrollment in the BS or 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.

MATH 595 Research Seminar 1 hour. Current developments in research with presentations by faculty, students, and visitors. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

MATH 596 Independent Study 1 TO 4 hrs. Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the instructor and the department.

MATH 598 Master's Thesis 0 TO 16 hrs. Research work under the supervision of a faculty member leading to the completion of a master's thesis. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Approval of the department.

MATH 599 Thesis Research 0 TO 16 hrs. Research work under the supervision of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

Mathematics Teaching

MTHT 400 Methods of Teaching Secondary Mathematics I 3 OR 4 hrs. Philosophies, issues, techniques, and styles of teaching high school mathematics. Implications of psychological models. Mathematics in the evolving curriculum. Preparation for becoming a high school mathematics classroom teacher. Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Grade of C or better in MATH 210 and enrollment in the BS or 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.

MTHT 401 Methods of Teaching Secondary Mathematics II 3 OR 4 hrs. Philosophies, issues, techniques, and styles of teaching high school mathematics. Preparation of diverse lessons. Supervised teaching experience. 3 undergraduate hours. 4 graduate hours. To be taken in year prior to student teaching. Prerequisite(s): Grade of C or better in MATH 210 and enrollment in the BS or 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.

MTHT 411 Advanced Euclidean Geometry 3 OR 4 hrs. Axioms for Euclidean geometry are developed based upon reflections. Further concepts in Euclidean geometry which arise from these axioms are explored. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 215.

MTHT 420 Computers in Secondary School Mathematics 3 OR 4 hrs. An overview of techniques, topics and tools for teaching secondary level mathematics using computers. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 210.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHT 430</td>
<td>Mathematical Analysis for Teachers I</td>
<td>3 OR 4 hrs</td>
<td>Basic properties of numbers, functions, graphs, limits, differentiation, continuity, and completeness of the system of real numbers. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 210 and grade of C or better in MATH 215.</td>
</tr>
<tr>
<td>MTHT 435</td>
<td>Abstract Algebra</td>
<td>3 OR 4 hrs</td>
<td>Sets, properties of integers, groups, rings, fields. Focus on concepts applicable to high school teaching. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): MTHT 210 and MATH 215.</td>
</tr>
<tr>
<td>MTHT 438</td>
<td>Educational Practice with Seminar I</td>
<td>6 hrs</td>
<td>The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.</td>
</tr>
<tr>
<td>MTHT 439</td>
<td>Educational Practice with Seminar II</td>
<td>6 hrs</td>
<td>The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.</td>
</tr>
<tr>
<td>MTHT 450</td>
<td>Concepts and Methods in Elementary and Middle School Mathematics I</td>
<td>3 OR 4 hrs</td>
<td>Advanced analysis of concept development and teaching methods. Sorting, classifying, counting, number tracks, addition, subtraction, group, place value, length, area, and alternative teaching strategies. 3 undergraduate hours. 4 graduate hours. For elementary school teachers. Prerequisite(s): Graduate standing and admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 460</td>
<td>Geometric Measurement and Numerical Methods I</td>
<td>3 OR 4 hrs</td>
<td>Classical problems of length, area, and volume, including numerical trigonometry, are explored using a scientific calculator. 3 undergraduate hours. 4 graduate hours. Do not purchase a calculator for the course until after the first day of class. Prerequisite(s): Admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 465</td>
<td>Teaching Algebra for Understanding</td>
<td>3 OR 4 hrs</td>
<td>Manipulators and other representations of mathematical concepts used for teaching algebra to middle grade students. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 466</td>
<td>Introduction to Calculus and the Graphing Calculator</td>
<td>4 hrs</td>
<td>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(s): Admission to the Mathematics Education Concentrators Program or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 467</td>
<td>Introduction to Number Theory with Application</td>
<td>4 hrs</td>
<td>Classical topics of elementary number theory and how they pertain to teaching the upper grades. Primes, GCF, LCM, divisibility, floor and ceiling functions, Gaussian residues, lattices. Prerequisite(s): Admission to the Mathematics Education Concentrators Program or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 468</td>
<td>Geometry with Applications for Middle Grade Teachers</td>
<td>4 hrs</td>
<td>Plane and solid figures and their properties. Polygons and polyhedra. Euler’s formula. Volume versus surface area. Spatial visualization; two-dimensional representations of three-dimensional figures. Prerequisite(s): Admission to the Mathematics Education Concentrators Program or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 469</td>
<td>Independent Study</td>
<td>1 TO 4 hrs</td>
<td>Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): May vary according to topic.</td>
</tr>
<tr>
<td>MTHT 470</td>
<td>Teaching Mathematics with Science: An Activity Approach</td>
<td>3 OR 4 hrs</td>
<td>Introduction to basic variables (length, area, volume, mass, time) and the scientific method (picture, table, graph, questions). Extensive use of TIMS project curriculum. 3 undergraduate hours. 4 graduate hours. For elementary school teachers. Prerequisite(s): Admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 480</td>
<td>Microcomputers in Elementary School Mathematics I</td>
<td>3 OR 4 hrs</td>
<td>Introduction to microcomputers and their use in elementary school mathematics. Basic microcomputer functions, educational software programs, pedagogical and curricular implications, and implementation questions. 3 undergraduate hours. 4 graduate hours. For elementary school teachers. Prerequisite(s): Admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 490</td>
<td>Topics in Teaching Secondary Mathematics I</td>
<td>1 TO 5 hrs</td>
<td>Course content is announced prior to each term in which it is given. May be repeated. Students may register in more than one section per term. Prerequisite(s): May vary according to topic.</td>
</tr>
<tr>
<td>MTHT 491</td>
<td>Topics in Teaching Elementary/Junior High School Mathematics I</td>
<td>1 TO 5 hrs</td>
<td>Course content is announced prior to each term in which it is given. May be repeated. Students may register in more than one section per term. Prerequisite(s): May vary according to topic.</td>
</tr>
<tr>
<td>MTHT 496</td>
<td>Independent Study</td>
<td>1 TO 4 hrs</td>
<td>Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the instructor and the department.</td>
</tr>
<tr>
<td>MTHT 510</td>
<td>Introduction to Higher Geometry</td>
<td>4 hrs</td>
<td>Projective geometry, as an extension of Euclidean geometry, treated synthetically and/or algebraically. Desargues’ and Pappus’ theorems, subgeometries, conics, and the underlying skew field. For graduate students in mathematics teacher education programs. Other students enroll in MATH 440. Prerequisite(s): Grade of C or better in MATH 330.</td>
</tr>
<tr>
<td>MTHT 530</td>
<td>Mathematical Analysis for Teachers II</td>
<td>4 hrs</td>
<td>Derivatives, inverse functions, Riemann integral, trigonometric functions, logarithmic and exponential functions. Prerequisite(s): Grade of C or better in MTHT 430 or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 550</td>
<td>Concepts and Methods in Elementary School Mathematics II</td>
<td>4 hrs</td>
<td>Methods of teaching middle school mathematics: concept development; focus on classroom materials to promote learning. Area, volume, rational numbers, decimals, function machines. Prerequisite(s): MTHT 450 or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 560</td>
<td>Introduction to Analytic Geometry and Calculus</td>
<td>4 hrs</td>
<td>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. For elementary school teachers. Do not purchase a calculator until after the first day of class. Prerequisite(s): MTHT 460 or consent of the instructor.</td>
</tr>
<tr>
<td>MTHT 565</td>
<td>Teaching Geometry: An Activity Approach</td>
<td>4 hrs</td>
<td>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(s): Enrollment in the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or consent of the instructor.</td>
</tr>
</tbody>
</table>
Mathematics Teaching
Course Descriptions

Principles of Probability and Statistics
4 hrs.
Probability, descriptive and inferential statistics, implications for teaching. Emphasis on collection and analysis of data, classroom activities, and software. For elementary school teachers.
Prerequisite(s): Admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) or approval of the department.

Practicum in Teaching Elementary School Mathematics
4 hrs.
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. Prerequisite(s): Admission to the MS in the Teaching of Mathematics program (Option for Elementary School Teachers) and consent of the instructor.

Topics in Teaching Secondary Mathematics
1 TO 5 hrs.
Course content is announced prior to each term in which it is given. May be repeated. Students may register in more than one section per term. Prerequisite(s): Prerequisite may vary according to topic.

Topics in Teaching Elementary/ Junior High School Mathematics
1 TO 5 hrs.
Course content is announced prior to each term in which it is given. May be repeated. Students may register in more than one section per term. Prerequisite(s): Prerequisite may vary according to topic.

Topics in Advanced Mathematics for Teachers
1 TO 5 hrs.
Course content is announced prior to each term in which it is given. May be repeated. Students may register in more than one section per term. For students in the MS in the Teaching of Mathematics program. Prerequisite(s): Prerequisite may vary according to topic.

Independent Study
1 TO 4 hrs.
Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the instructor and the department.

Mechanical Engineering

Applied Stress Analysis
3 OR 4 hrs.
Complex bending and torsion, curved flexural members, energy methods in design, theories of failure. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CME 203.

Intermediated Vibration Theory
3 OR 4 hrs.
Free and forced vibrations of multidegree of freedom linear systems. Lagrange's equation, Hamilton's principle. Equations of motion and Newton-Euler equations for rigid bodies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

Kinematics I
3 OR 4 hrs.
Kinematic synthesis of planar linkages. Higher-order, precision-point and approximate synthesis. Unified treatment of position, function, and path-angle problems. Consideration of branching and rotatability. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

Advanced Kinematics
3 OR 4 hrs.
Kinematic synthesis of planar linkages. Higher-order, precision-point and approximate synthesis. Unified treatment of position, function, and path-angle problems. Consideration of branching and rotatability. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

Mechantronics I
0 TO 4 hrs.
Elements of mechatronic systems, sensors, actuators, microcontrollers, modeling, hardware in the loop simulations, real-time software, electromechanical systems laboratory experiments. Same as IE 411. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Prerequisite(s): Senior standing or above; or approval of the department.

Dynamic Systems Analysis I
3 OR 4 hrs.
Classical control theory, concept of feedback, Laplace transform, transfer functions, control system characteristics, root locus, frequency response, compensator design. Same as IE 412. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

Dynamics of Mechanical Systems
3 OR 4 hrs.
Degrees of freedom, generalized coordinates, principle of virtual work. Euler-Lagrange's principle, Lagrange's equation, Hamilton's principle. Equations of motion and Newton-Euler equations for rigid bodies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

Theory of Gearing and Applications
3 OR 4 hrs.
Classification of gear drives. Geometry of plane and spatial gears. Analytical synthesis of gears with approximate meshing. Applications to spur, helical, worm, and bevel gear drives. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 308.

Propulsion Theory
3 OR 4 hrs.
Thermodynamics and fluid mechanics of air-breathing engines, performance of rockets, chemical and nuclear rockets. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 419 or equivalent.

Intermediate Fluid Mechanics
3 OR 4 hrs.
Development of conservation equations for Newtonian fluids: continuity, Navier-Stokes, and energy equations. Some exact and approximate solutions of highly viscous, viscous, and inviscid flows. Boundary layer flows, jets, and wakes. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 320.

Compressible Flow Theory
3 OR 4 hrs.
Conservation laws, one-dimensional flows. Normal and oblique shock waves, Prandtl-Meyer expansion, flow over airfoils. Applications to nozzle, shock tubes, wind tunnels. Flow with friction and heat addition or loss. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 320.

Intermediate Heat Transfer
3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 321 or consent of the instructor.

Heating, Ventilation, and Air-Conditioning
3 OR 4 hrs.
Refrigeration and heat pump, mass transfer in humidification, solar heat transfer in buildings, heating and cooling loads, air-conditioning computer project. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 321.

Heat Exchangers
3 OR 4 hrs.
Classification; heat transfer and pressure drop analysis, flow distribution, transient performance, surface selection and geometrical properties, codes and standards. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 211 and ME 321.

Energy Management Solutions for Industry: Theory and Practice
3 OR 4 hrs.
Emphasis on real-world applications including: understanding utility billing and identifying costs; identifying and quantifying energy savings opportunities at industrial facilities; determining investment payback scenarios and considerations. 3 undergraduate hours. 4 graduate hours. Extensive computer use required. Fieldwork required. Extensive use of Microsoft Excel. Prerequisite(s): Junior standing or above.

Second Law Analysis in Energy Engineering
3 OR 4 hrs.
Fundamentals: lost available work. Entropy generation minimization, optimal thermal design of: heat transfer augmentation devices; thermal energy storage, cryogenics, heat exchangers, thermal insulations, solar collectors. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 321.

Applied Combustion
3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 325.

Solar Engineering
3 OR 4 hrs.
Applications: solar geometry and intensities; applied heat transfer topics: flat plate and concentrating collectors; energy storage; analysis of heating and cooling systems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 321 or consent of the instructor.
ME 428 Numerical Methods in Mechanical Engineering 3 OR 4 hrs.
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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 107 or CS 108.

ME 429 Internal Combustion Engines 3 OR 4 hrs.
Introduction to engine types, characteristics, and performance. Combustion processes in spark and compression ignition engines; combustion abnormalities. Analysis of intake, exhaust, and fuel system. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 325.

ME 433 Nonequilibrium Thermal Processes 3 OR 4 hrs.
Molecular engineering. Nonequilibrium statistical mechanics. Distribution functions. Molecular excitation and de-excitation. Ionization and dissociation. Laser engineering. Nonequilibrium chemical kinetics. Surface processes. Chemisorption and physisorption. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): ME 325 or consent of the instructor.

ME 441 Optical Methods in Mechanical Engineering 0 TO 4 hrs.
Optical measurement techniques in solid mechanics and thermal-fluid engineering. Fundamentals of optics. Use of holography, interferometry, LDV, lasers, light scattering, diffraction, and other relevant techniques. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Senior standing or consent of the instructor.

ME 444 Interdisciplinary Product Development I 3 OR 4 hrs.
Cross-functional teams (w/students from AD 420/423 and MKTG 594) research and develop new product concepts. Focus on the identification of technologically appropriate product design problems. Same as IE 444, 3 undergraduate hours. 4 graduate hours. Year-long (with IE/ME 445) project course. Prerequisite(s): ME 445 or ME 444; and senior standing or above; and consent of the instructor.

ME 445 Interdisciplinary Product Development II 4 hrs.
Cross-functional teams (w/students from AD 420 and MKTG 594) research and develop new product concepts. Focus on solutions to the opportunities identified in IE/ME 444 to functional prototypes. Serves as a replacement for IE/ME 396. Same as IE 445. Year-long (with IE/ME 444) project course. Prerequisite(s): IE 444 or ME 444; and senior standing or above; and consent of the instructor.

ME 447 Introduction to Computer-Aided Design 0 TO 4 hrs.
Conventional and computer-aided assisted methods in design. Geometry manipulation. Computer-aided modeling with curves, surfaces, and solids. Design with finite-element analysis. PRO/Engineer and PRO/Mechanica. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): MATH 220 and ME 250.

ME 449 Microdevices and Micromachining Technology 0 TO 5 hrs.
Microfabrication techniques for micro sensors, microstructures, and microdevices. Selected examples of physical/chemical sensors and actuators. Simulation experiments. Laboratory. Same as IE 449. 4 undergraduate hours. 5 graduate hours. Previously listed as ECE 449. Prerequisite(s): ECE 347.

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

ME 464 Virtual Automation 3 OR 4 hrs.
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. Same as IE 464. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): IE 201; and CS 107 or CS 108.

ME 468 Virtual Manufacturing 3 OR 4 hrs.
Virtual reality applications in manufacturing systems design, manufacturing applications of networked virtual reality, virtual reality modeling of occupational safety engineering. Same as IE 468. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CS 107 or CS 108.

ME 494 Special Topics in Mechanical Engineering 3 OR 4 hrs.
Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. 3 undergraduate hours. 4 graduate hours. May be repeated. Prerequisite(s): Consent of the instructor.

ME 499 Professional Development Seminar 0 hrs.
Students are provided general information about their role as UIC Mechanical Engineering alumni in society and the role of the University in their future careers. Students provide evaluations of their educational experience in the ME department. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Open only to seniors; and approval of the department. Must be taken in the student’s last semester of study.

ME 501 Advanced Thermodynamics 4 hrs.
Thermodynamic laws of closed and open systems; exergy destruction; property relations, single phase systems, Gibbs-Duhem relations, multiphase systems, equilibrium; engineering applications. Prerequisite(s): ME 325.

ME 502 Applied Stress Analysis II 4 hrs.
Concepts from theory of elasticity, stress-raisers, such as notches and holes, mechanical behavior of materials, including yielding and fractures, thick-walled cylinders and rotating disks, thermal stresses, and plastic behavior. Prerequisite(s): ME 401.

ME 504 Computer-Aided Analysis of Multibody Systems I 4 hrs.

ME 505 Computer-Aided Analysis of Multibody Systems II 4 hrs.

ME 508 Engineering Acoustics 4 hrs.
Fundamentals of acoustic energy generation, radiation, and transmission (both aerodynamically and structurally). Theoretical, experimental, and numerical techniques. Applications spanning from 1-D plane waves to more complex 3-D problems. Prerequisite(s): ME 408 or CME 435; or approval of the department.

ME 509 Advanced Kinematics II 4 hrs.
Spatial transformation and displacements. Design for body guidance; applications to function-generators. Analyzes utilizing various operators for closure; dualization; branching; rotatability; differential kinematics; numerical solutions. Prerequisite(s): ME 409.

ME 510 Robotic Manipulators 4 hrs.
Description of robotic manipulator: gripper trajectory execution; manipulator design, degree-of-freedom, mobility, workspace, special link positions; static and dynamic force transmission. Prerequisite(s): ME 409 or ME 410 or ME 413; or consent of the instructor.

ME 511 Mechatronics II 4 hrs.
Microcontrollers used in electromechanical systems for measurement and control purposes, interface hardware, real-time software and development tools, applications in robotic motion control and factory automation. Same as IE 511. Prerequisite(s): ME 411 and consent of the instructor.

ME 512 Automatic Control of Mechanical Systems 4 hrs.
Modeling and analysis of mechanical systems. Performance specification and evaluation. Modern control system design and analysis techniques. Real-time computer control of engines, manufacturing processes, biomechanical systems. Prerequisite(s): ME 412 or consent of the instructor.

ME 514 Mechanics of Viscous Fluids 4 hrs.
ME 518 Fundamentals of Turbulence 4 hrs.
Mathematical description of turbulence field; kinetics of homogeneous turbulence; correlation and spectrum tensor; dynamic behavior of isotropic turbulence; universality; nonisotropic turbulence.
Prerequisite(s): ME 417 and ME 418.

ME 521 Heat Conduction 4 hrs.
Analysis of heat transfer in solids, including separation of variables, superpositions, Duhem’s theorem, integral transforms, similarity transformations, and approximate methods.
Prerequisite(s): ME 321 or consent of the instructor.

ME 522 Convective Heat Transfer 4 hrs.
Prerequisite(s): ME 321 or consent of the instructor.

ME 524 Thermal Radiation 4 hrs.
Fundamentals of radiative transfer; energy exchange between surfaces and in enclosures; radiative transfer in the presence of an attenuating medium; combined radiation, conduction, convection problems.
Prerequisite(s): ME 421 or consent of the instructor.

ME 525 Boiling Heat Transfer and Two-Phase Flow 4 hrs.
Homogeneous and separated two-phase flow models for pressure drop and heat transfer. Pool boiling, nucleation and bubble dynamics, stability, condensation, and engineering application problems.
Prerequisite(s): ME 421.

ME 529 Numerical Heat Transfer 4 hrs.
Numerical methods for solving conduction, convection, and radiation problems in heat transfer. Iterative methods with shooting; local nonsimilarity methods; perturbation methods; finite difference methods; grid generation. Prerequisite(s): CS 108 and ME 421 or consent of instructor.

ME 532 Advanced Internal Combustion Engines 4 hrs.
Prerequisite(s): ME 426 or ME 429.

ME 531 Thermophysics of Gas Flows 4 hrs.
Kinetic theory of gases. Transport properties, quantum mechanical analysis of atomic and molecular structures, atomic scale collision phenomena, propagation, emission, and absorption of radiation.

ME 533 Plasma Engineering 4 hrs.

ME 534 Finite Element Analysis II 4 hrs.
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. Same as CME 534. Prerequisite(s): CME 434.

ME 535 Theory of Vibrations II 4 hrs.
Harmonic vibrations; vibrations of a string; vibrations of a beam; vibrations of a membrane; periodic systems; Floquet waves; nonlinear vibrations. Same as CME 555. Prerequisite(s): CME 435 or ME 408 or the equivalent.

ME 536 Chemically Reacting Flows 4 hrs.
Nonequilibrium states; chemical thermodynamics and kinetics. Multicomponent continuum equations for flow of nonequilibrium fluids. Inversed nonequilibrium flows. Boundary layer flows with surface and gas-phase reactions. Frozen and equilibrium criteria. Waves in relaxing media. Prerequisite(s): ME 516; or CME 514 or ME 522.

ME 540 Design, Modeling, and Fabrication of Microsystems 4 hrs.
MEMS design approach, materials and mechanical properties, scaling laws, transduction methods, microfabrication techniques, modeling and simulation strategies, dynamics, domain-specific details—structures, fluids, dissipation, and system issues. Prerequisite(s): Consent of the instructor.

ME 541 Microelectronic Fabrication Techniques 4 hrs.
Current fabrication techniques of microelectronic technology: plasma and CVD processes; etching techniques, ion implantation, surface analytical methods. Same as ECE 541. Previously listed as ECECS 541. Prerequisite(s): ECE 347 or ECE 449.

Deterministic and statistical methods for modeling and optimizing engineering systems, in the broad context of product design, manufacturing process development, and designing for life cycle issues. Same as IE 542. Prerequisite(s): Programming language experience.

ME 547 Advanced Concepts in Computer-Aided Engineering 4 hrs.
Useful concepts in motion simulation of complex rigid multibody systems. Interactive computer solutions. Recursive formulation of kinematical and dynamical equations of open and constrained multibody systems.
Prerequisite(s): ME 413 and ME 447.

ME 548 Advanced Computer-Aided Manufacturing 4 hrs.
Analysis and design of computer-integrated systems for process planning, production planning and control of discrete part manufacturing activities.
Prerequisite(s): ME 417 and CME 211 and ME 211 and MATH 220; or consent of the instructor.

ME 550 Dynamics of Floating Offshore Structures 4 hrs.
Covers environmental loads and dynamics of floating structures in fluid. Same as CME 550. Prerequisite(s): ME 210 and CME 211 and ME 211 and MATH 220; or consent of the instructor.

ME 569 Advanced Virtual Manufacturing 4 hrs.
Manufacturing systems design optimization using virtual environments, optimization of manufacturing decision support using virtual reality interfaces, analysis and evaluation of virtual environments. Same as IE 569. Prerequisite(s): Consent of the instructor.

ME 594 Current Topics in Mechanical Engineering 4 hrs.
Particular topics vary from term to term depending on the interests of the students and the specialties of the instructor. May be repeated.
Prerequisite(s): Consent of the instructor.

ME 595 Seminar on Mechanical Engineering Research 1 hour.
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. Satisfactory/Unsatisfactory grading only.
Prerequisite(s): Graduate standing in mechanical engineering.

ME 596 Independent Study 1 TO 4 hrs.
Individual study under close supervision of a faculty member. May be repeated to a maximum of 4 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

ME 598 MS Thesis Research 0 TO 16 hrs.
Individual research in specialized problems under close faculty supervision. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

ME 599 PhD Thesis Research 0 TO 16 hrs.
Individual research on specialized problems under close faculty supervision. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Medical Biotechnology

MGB 501 DNA and Proteins 3 hrs.

MGB 501 Cell Biology and Human Physiology 3 hrs.
Cellular organization and cell organelles; lipid membranes; the cytoskeleton, and cell interactions signaling and cycle control. Growth factors and neurochemistry. Mechanical and electrical phenomena. Synaptic transmission. Sensory and motor neurophysiology. Recommended background: Basic undergraduate general and organic chemistry, biology, physics, and math.
Laboratory.

Course Descriptions

MBT 502 Immunotechnology, Microbiology, and Cellular Therapy 3 hrs.
Covers antibody production principals, clinical uses of antibodies, fermentation and bioremediation and protein production principals, cellular and stem cell therapies, bioterrorism control, containment, and eradication. Prerequisite(s): MBT 500 and MBT 501.

MBT 503 Pharmacology, Toxicology, and Clinical Trials 3 hrs.
Basic pharmacology, drug-receptor interactions, Basic toxicology, Drug development (preclinical work, Phase I, II, III), Design, implementation, and evaluation of clinical trials. IRB issues. Ethical conduct of clinical trials. Prerequisite(s): MBT 500 and MBT 501.

MBT 510 Ethics in Medical Biotechnology 2 hrs.
Focuses on making ethical decisions, review of existing guidelines, considerations of the use of adult and embryonic stem cells, ethical issues on animal research, conflict of interest and misconduct in research and business. Prerequisite(s): MBT 500 and MBT 501 and MBT 502 and MBT 503; or consent of the instructor.

MBT 513 Research Planning, Design, and Execution 1 hr.
Presentation of the basics of planning, designing, and executing a research plan. Students prepare a project plan and defend the plan to a faculty panel and peers. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 2 hours.

Product development and commercialization processes. Product life cycles, program management basics. Intellectual property. Regulatory affairs issues: GLP, product registration, GMP, documentation, validation, FDA inspections. Prerequisite(s): MBT 500 and MBT 501 and MBT 502 and MBT 503; or consent of the instructor.

MBT 521 Techniques and Processes in Biotechnology 3 hrs.
Preparation and isolation of antibodies, basics of cell culture, recombinant DNA techniques, techniques of protein production and engineering, and examples of cloning. Basics of GLP and practical experience in applications of GLP. Prerequisite(s): MBT 500 and MBT 501. Course schedule information: To be properly registered, students must enroll in one Discussion and one Laboratory.

MBT 522 Applied Medical Biotechnology 2 hrs.
Talents and methodologies used in commercial lab assays will be analyzed and their strengths and weaknesses discussed. An array of hospital/clinical techniques will be reviewed via lecture/demonstration in typical application venue. Prerequisite(s): MBT 500 and MBT 501 and MBT 520.

MBT 523 Biotechnology Engineering 2 hrs.
Engineering aspects of large-scale cell culture: methodologies, types of production equipment, process sensing and control, harvesting, separation and purification. Sterilization, aseptic processing, filling, and finishing steps. QA/QC, Field trips required. Prerequisite(s): Completion of the first year of the MS in Medical Biotechnology program.

MBT 591 Departmental Seminar in Medical Biotechnology 1 TO 4 hrs.
Lecture series by invited speaker or advanced students with lectures on topics of current or developing interest in medical biotechnology. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.

MBT 594 Special Topics in Medical Biotechnology 1 TO 4 hrs.
Lectures and demonstrations of new topics of significance in medical biotechnology that are not covered in existing courses. May be repeated. Prerequisite(s): Consent of the instructor.

MBT 595 Student Seminar in Medical Biotechnology 2 hrs.
Students write and present literature research/review papers on topics directly related to medical biotechnology. Satisfactory/Unsatisfactory grading only. May be repeated. Extensive computer use required. Coupled with departmental seminar.

MBT 596 Independent Study in Medical Biotechnology 1 TO 4 hrs.
Independent and individual study of a topic in medical biotechnology. Usually involves extensive literature research culminating in a review paper or hypothesis/conclusion argument paper. May be repeated to a maximum of 4 hours if topics vary. Students may register in more than one section per term. Prerequisite(s): Completion of the first year of the MS in Medical Biotechnology program, approval of the department, and approval of a faculty mentor. The student also should have completed core or elective courses in the degree sequence that introduce the topic of independent study or have verifiable outside knowledge.

MBT 597 Master's Project Research 0 TO 16 hrs.
A project-based internship at a biotechnology company or a research laboratory at the College of Medicine in Rockford. Students will gain on-the-job experience in designing and conducting experiments, evaluating results, and reporting to supervisors. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Student should have approval of the graduate committee to commence research and the agreement of faculty and industrial mentors along with a written agreement for research activity from the host company.

MBT 598 Master's Thesis Research 0 TO 16 hrs.
Master's thesis research conducted at the College of Medicine in Rockford under faculty supervision. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Completion of the first year of the program and consent of the instructor.

Medical Education

MHPE 433 Principles of Evidence-Based Healthcare 2 hrs.
Qualitative and quantitative assessment of human subject research: locating, evaluating, and comparing scientific papers as bases for healthcare education and practice. Same as BHIS 433. Prerequisite(s): Graduate or professional standing and approval of the school.

MHPE 439 Writing for Scientific Publication 2 hrs.
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(s): Graduate or professional standing and consent of the instructor.

MHPE 441 Clinical Decision Making 2 hrs.
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(s): Consent of the instructor.

MHPE 494 Special Topics in Health Professions Education 1 TO 4 hrs.
Selected topics of current interest in health professions education. May be repeated with approval. Student may register in more than one section per term. Approval to repeat course granted by the department. Prerequisite(s): Prerequisites may vary by section, depending upon topic.

MHPE 501 Scholarship in Health Professions Education 4 hrs.
Introduction to methods and evaluation of scholarship in health professions education. Prerequisite(s): Graduate or professional standing and consent of the instructor.

MHPE 502 Instruction and Assessment for Health Professionals 4 hrs.
Methods and issues of effective instruction and assessment in health professions education are presented, including how effective instruction and assessment support student learning and faculty decisions. Prerequisite(s): Consent of the instructor.

MHPE 503 Curriculum Planning and Program Evaluation for Health Professionals 4 hrs.
Methods and issues in planning and evaluating educational programs in the health professions are presented, including how institutional and social forces affect planning and evaluation. Prerequisite(s): Approval of the department.

MHPE 504 Leadership in Health Professions Education 4 hrs.
Focuses on problems, issues, and practices of leadership in health professions education.

MHPE 505 Introduction to Health Professions Education: Leadership, Scholarship, and Current Issues 2 hrs.
Serves the intertwined purposes of providing an orientation to the MHPE program’s major goals and themes, its programmatic elements, and its prototypical instructional methods of active and collaborative learning. Prerequisite(s): Graduate or professional standing; and approval of the department.
MHPE 512
Ethics in Clinical Research 3 hrs.
Survey of ethical issues involved in conducting research with human subjects, including informed consent, confidentiality, access, and equity. Same as HPA 512. Extensive computer use required. Requires completion of an online course in human subjects research, to be supplemented by classroom discussion of the topics raised in that course and others. Prerequisite(s): Approval of the department. Students must be enrolled in the Master of Science in Public Health program.

MHPE 532
Qualitative Methods 2 hrs.
The course provides students with a broad overview of the epistemology, design, methods, data types, results, and reporting forms of qualitative research and helps students develop skills in qualitative data analysis. Prerequisite(s): Graduate or professional standing; and approval of the department.

MHPE 534
Research Design and Grant Writing 2 hrs.
Introduction to the skills necessary to plan a research project and write a research grant proposal using a systematic approach. Same as HPA 534. Previously listed as MHPE 431. Prerequisite(s): Graduate or professional standing; and approval of the department.

MHPE 535
Translating Research into Practice 3 hrs.
Current theory and practical reality related to the adoption and use of new scientific findings in patient care. The influence of research on public policy. Same as HPA 535. Extensive computer use required. Prerequisite(s): Graduate or professional standing; and approval of the department.

MHPE 537
Writing for Scientific Publication 2 hrs.
Students will have the opportunity to learn and practice both the skills needed to produce a research manuscript and a conceptual approach to writing that will carry over to future projects—research reports or other works of scholarship. Prerequisite(s): Graduate or professional standing; and approval of the department. Each student must bring to class a personal writing project based on a study with an already available data set that has been analyzed at least preliminarily. The topic of the study can be educational or clinical.

MHPE 596
Independent Study 1 TO 4 hrs.
Selected problems or issues in health professions education are investigated under the direction of a faculty member of the student’s choice. Satisfactory/Unsatisfactory grading only.

MHPE 597
Project Research 0 TO 6 hrs.
Selected problems or issues in health professions education are investigated under the direction of a committee of the student’s choice. Satisfactory/Unsatisfactory grading only.

MHPE 598
Thesis Research 0 TO 16 hrs.
Selected problems or issues in health professions education are investigated under the direction of a committee of the student’s choice. Satisfactory/Unsatisfactory grading only.

Medical Humanities
MHUM 494
Special Topics in Medical Humanities 1 TO 4 hrs.
Prerequisite(s): Approval of the department. Students must be enrolled in the Master of Science in Public Health program.

Study 1 TO 4 hrs.
Prerequisite(s): Graduate or professional standing; and approval of the department.

MHUM 496
Independent Study 1 TO 4 hrs.
Study on one aspect of communication, history, literature, philosophy, or ethics as it relates to healthcare.

Medical Laboratory Sciences
MLS 527
Clinical Laboratory Method Evaluation 3 hrs.
Development and comparison of clinical laboratory methods; also, statistical methods of evaluating sensitivity, specificity, precision, accuracy, predictive value, and cost-effectiveness. Satisfactory/Unsatisfactory grading only.

MLS 560
Blood Groups: Systems and Serology 3 hrs.
Focus on human blood group systems; biochemical inheritance, serologic activity, clinical significance, and disease association. Fundamentals of immunology, molecular biology, and genetics. Extensive computer use required. Taught only online. A UIC netid is required. Prerequisite(s): Consent of the instructor.

MLS 561
Clinical Immunohematology and Transfusion 3 hrs.
Transfusion medicine practice and therapy. The human circulatory system, effects of hemorrhagic shock, component therapy, hematopoietic transplantation, complications of transfusion, standards, regulations, and compliance. Extensive computer use required. Taught only online. A UIC netid is required. Prerequisite(s): MLS 560 and consent of the instructor.

MLS 562
Blood Procurement and Blood Product Manufacturing 0 TO 4 hrs.
Theoretical and practical concepts used in blood procurement and product manufacturing. Blood donor suitability, collection, testing, component preparation, labeling, storage, quality management systems. Extensive computer use required. Lecture-discussion taught only online. A UIC netid is required. Students requiring a clinical rotation component in order to meet certification requirements must register for 4 hours and participate in both laboratory and lecture-discussion; all others register for 3 hours and participate in lecture-discussion only. Prerequisite(s): Credit or concurrent registration in MLS 560 and consent of the instructor.

MLS 563
Blood Bank Service Management 0 TO 4 hrs.
Theoretical and practical concepts used in the organization and management of blood centers and transfusion services. Introduction to laboratory financial management, cost accounting, coding, staffing, ethics, and legal issues. Extensive computer use required. Lecture-discussion taught only online. A UIC netid is required. Students requiring a clinical rotation component in order to meet certification requirements must register for 4 hours and participate in both clinical practice and lecture-discussion; all others register for 3 hours and participate in lecture-discussion only. Prerequisite(s): MLS 562 and credit or concurrent registration in MLS 561 and consent of the instructor.

MLS 564
Current Trends in Immunohematology 1 hour.
Advanced studies of current trends; assigned topics in current literature read, evaluated, and discussed. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 2 hours. Extensive computer use required. Taught only online. A UIC netid is required. Prerequisite(s): General knowledge of immunohematology and consent of the instructor.

PATH 510
Physiologic Basis of Nursing Practice Across the Life Span 4 hrs.
Advanced contemporary physiologic principles and their relevance to clinical practice. Content topics will include developmental (life span) physiologic changes. Previously listed as NUMS 530. Prerequisite(s): An undergraduate physiology course or consent of the instructor.
NUMS 515 Pathophysiological Basis of Disease 3 hrs. Provides a foundation for clinical therapeutics through an understanding of mechanisms of disease. Basic concepts of pathological processes at the cellular, molecular, and systems level are examined with application of clinical disease in adults. Previously listed as NUMS 540. Prerequisite(s): NUMS 520; or the equivalent or consent of the instructor.

NUMS 520 Management of Health and Illness I: Adult Nursing 3 hrs. Advanced medical-surgical nursing covering etiology, clinical evaluation, and management of specific health problems related to cardiovascular, pulmonary, and endocrine systems. Prerequisite(s): NUMS 510, and credit or concurrent registration in NUSC 531, and credit or concurrent registration in NUSC 532, and credit or concurrent registration in NUMS 515; and graduate standing.

NUMS 521 Management of Health and Illness II: Advanced Practice in Adult Nursing 3 hrs. Advanced medical-surgical nursing covering etiology, clinical evaluation, and management of specific health problems related to neurologic, gastrointestinal, immunologic, hematologic, renal, and liver systems. Prerequisite(s): NUMS 520; and graduate standing.

NUMS 522 Nurse Practitioner Practicum I: Management of Health and Illness in Adults 4 hrs. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis, symptom management, education, and case management of adults with complex health problems that may be acute, episodic, or chronic. Prerequisite(s): NUMS 520; and graduate standing.

NUMS 523 Clinical Nurse Specialist Practicum I: Adult Health and Illness 4 hrs. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis, symptom management, education, and case management of adults with complex health problems that may be acute, episodic, or chronic. Prerequisite(s): NUMS 520; and graduate standing.

NUMS 524 Nurse Practitioner Practicum II: Management of Health and Illness in Adults 4 hrs. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis, symptom management, education, and case management of adults with complex health problems that may be acute, episodic, or chronic. Prerequisite(s): NUMS 521 and NUMS 522; and graduate standing.

NUMS 525 Clinical Nurse Specialist Practicum II: Adult Health and Illness 4 hrs. Practicum emphasizing clinical practice, education, research, and consultation related to the care of adults with acute and chronic health problems. Prerequisite(s): NUMS 521 and NUMS 523; and graduate standing.

NUMS 526 Nurse Practitioner Practicum III: Management of Health and Illness in Adults 4 hrs. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis, symptom management, education, and case management of adults with complex health problems that may be acute, episodic, or chronic. Prerequisite(s): NUMS 524; and graduate standing.

NUMS 527 Clinical Nurse Specialist Practicum III: Adult Health and Illness 3 hrs. Practicum emphasizing clinical practice, education, research, and consultation related to the care of adults with acute and chronic health problems. Prerequisite(s): NUMS 520; and graduate standing.

NUMS 528 Nurse Practitioner Practicum IV: Management of Health and Illness in Adults 4 hrs. Practicum emphasizing clinical evaluation, health promotion, differential diagnosis, symptom management, education, and case management of adults with complex health problems that may be acute, episodic, or chronic. Prerequisite(s): NUMS 526; and graduate standing.

NUMS 544 Management of Adult Health Problems Practicum 4 hrs. Preparation for advanced practice evaluation and management of acute, episodic, and chronic care of adult health problems in the primary care setting. Prerequisite(s): NUSC 530 and NUMS 530 and NUMS 540 and NUMS 540 and NUMS 540 and NUSC 552 and NUM 534.

NUMS 545 Biometrics and Applied Statistics 4 hrs. Application of recent procedures in statistical analysis. Emphasis is on design of experiments and regression analysis; use of BMDP software on mainframes/VAX computers. Prerequisite(s): NUMS 525 or the equivalent or consent of the instructor.

NUMS 546 Multivariate Analysis for Health Sciences 3 hrs. Practical applications of multivariate techniques in health sciences. Minimal involvement in mathematics provided. Prerequisite(s): NUMS 545.

NUMS 548 Management of Chronic and Complex Adult Health Problems Practicum 4 hrs. Preparation for advanced practice evaluation and management of chronic and complex care of adult health problems. Prerequisite(s): NUMS 544.

NUMS 549 Laboratory Techniques for Nursing Research 3 hrs. 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. Animals used in instruction. Prerequisite(s): NUSC 530.

NUMS 562 Quality of Life Issues in Research and Clinical Practice 3 hrs. 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(s): Consent of the instructor.

Medicinal Chemistry

MDCH 412 Pharmaceutical Applications of Genomics and Bioinformatics 2 hrs. Introduction to genomics and bioinformatics for advanced pharmacy students. Principles of gene expression, DNA sequencing in bacterial and human genomes, with emphasis on diagnostics and therapeutic applications. Same as PMPG 412. Prerequisite(s): PHAR 331 or consent of the instructor. For graduate students: one or two semesters of basic molecular biology and/or biochemistry with a grade of B or better.

MDCH 415 Pharmacological Applications of Genomics and Bioinformatics 2 hrs. Introduction to genomics and bioinformatics for advanced pharmacy students. Principles of gene expression, DNA sequencing in bacterial and human genomes, with emphasis on diagnostics and therapeutic applications. Same as PMPG 412. Prerequisite(s): PHAR 331 or consent of the instructor. For graduate students: one or two semesters of basic molecular biology and/or biochemistry with a grade of B or better.

MDCH 507 Drug Discovery, Design, and Development 3 hrs. Overview of drug development process from target identification and screening through clinical trials and FDA evaluation. Same as BPS 507 and PMPG 507.

MDCH 516 Structure Elucidation of Natural Products II 3 hrs. Employing modern computational methods in the structure elucidation and dereplication of a natural product by using real-life examples. Same as PMPG 516. May be repeated. Prerequisite(s): PMPG 515.

MDCH 553 Cancer Biology and Therapeutics 2 hrs. Fundamentals of cancer biology with emphasis on biological, hormonal, and chemotherapeutic drug therapies currently used and in development. Specific treatment approaches to breast, ovarian, prostate, and colon cancers will be explored. Same as BPS 553 and PMPG 553. Prerequisite(s): Consent of the instructor. Recommended background: Molecular and cellular biology.

MDCH 560 Organic Medicinal Chemistry I 3 hrs. Organic reactions are discussed in terms of their mechanisms and utility in the field of medicinal chemistry, particularly in the synthesis of medicinal agents. Prerequisite(s): One year of organic chemistry with laboratory.

MDCH 561 Principles of Medicinal Chemistry 4 hrs. Concerns basic chemical and physical principles necessary for an understanding of drug action. These principles are applied in the design and discovery of medicinal agents. Prerequisite(s): One year each of undergraduate organic chemistry and biochemistry. Requires concurrent registration in MDCH 592.

MDCH 562 Spectroscopy in Medicinal Chemistry 3 hrs. The fundamental principles used to determine structure and conformation in molecules, emphasizing spectroscopic methods useful in solving structural problems and in analyzing dynamic biological processes. Prerequisite(s): One year of physical chemistry or consent of the instructor.

MDCH 564 Physical Medicinal Chemistry 3 hrs. Focuses on kinetics and thermodynamics in biological systems. Applications to drug action will be emphasized. Prerequisite(s): One year of physical chemistry.
MDCH 571  Organic Medicinal Chemistry 2 hrs.  Heterocyclic chemistry foundation for bio-organic mechanisms of enzyme reactions. Enzymes involved in biosynthesis and metabolism, particularly those that are targets for drug action or involved in drug metabolism. Prerequisite(s): MDCH 460 and MDCH 561.

MDCH 572  Drug Design 2 hrs.  Quantitative structure-activity relationships, computer graphics, molecular modeling and simulation, and chemometrics as applied to drug design and discovery. Prerequisite(s): MDCH 561.

MDCH 573  Principles of Stereochemistry 1 hour.  Principles of molecular structure and stereochemistry for medicinal and natural products chemists focusing on stereochemical structures rather than synthesis. Prerequisite(s): Credit or concurrent registration in MDCH 560 and one year of organic chemistry with lab or consent of the instructor.

MDCH 585  Practical Liquid Chromatography-Mass Spectrometry 2 hrs.  Introductory-level course combining classroom discussions with laboratory demonstrations to provide basic practical knowledge and hands-on experience in the operation of liquid chromatography and mass spectrometry instrumentation. Satisfactory/Unsatisfactory grading only. Prerequisite(s): MDCH 562.

MDCH 592  Research Techniques in Medicinal Chemistry 2 hrs.  Provides an initial biweekly, informal seminar series with program faculty presenting a discussion of the ongoing research in her/his laboratory. May be repeated to a maximum of 6 hours. Lectures/discussions will be given for the first part of the semester and an intensive lab experience takes place for the remainder of the semester. To be taken fall and spring semesters of the first year of graduate study.

MDCH 594  Special Topics in Medicinal Chemistry 2 TO 4 hrs.  An advanced course covering selected topics which may include new spectroscopic, theoretical, chemicometric, and synthetic approaches to biomolecular structure and function. May be repeated to a maximum of 4 hours. Prerequisite(s): MDCH 561 and MDCH 562 and one year of physical chemistry and one semester of biochemistry or consent of the instructor.

MDCH 595  Seminar in Medicinal Chemistry 1 hour.  Presentation on a current research topic. Satisfactory/Unsatisfactory grading only.

MDCH 598  Master’s Research in Medicinal Chemistry 0 TO 16 hrs.  Thesis research to fulfill master’s degree requirements. Satisfactory/Unsatisfactory grading only.

MDCH 599  Doctoral Research in Medicinal Chemistry 0 TO 16 hrs.  Research for doctoral students. Satisfactory/Unsatisfactory grading only.

Medicinal Chemistry and Pharmacognosy

PMMP 412  Pharmaceutical Applications of Genomics and Bioinformatics 2 hrs.  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. Same as MDCH 412. Prerequisite(s): PHAR 331 and consent of the instructor. For graduate students: one or two semesters of basic molecular biology and/or biochemistry with a grade of B or better.

PMMP 460  Organic Medicinal Chemistry I 3 hrs.  Organic reactions in terms of their mechanisms and utility in the field of medicinal chemistry, particularly in the synthesis of medicinal agents. Upper-division elective taught simultaneously with MDCH 560, however, does not meet the prerequisite requirement of the medicinal chemistry graduate program. Prerequisite(s): One year of organic chemistry with laboratory.

Microbiology and Immunology

MIM 425  Fundamentals of Immunology and Microbiology 3 hrs.  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(s): Consent of the instructor or registration in the College of Medicine.

MIM 426  Microorganisms as Agents of Human Disease 3 hrs.  Fundamental aspects of bacterial, fungal, and viral pathogenesis; therapy, control, and prevention of infectious diseases. Prerequisite(s): Consent of the instructor.

MIM 455  Microbiology Laboratory Rotation 3 hrs.  Course in basic and applied methods essential for the study of nucleic acids, immunoglobulins, gene transfer, cell fusion, and virological and immunological methods. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 6 hours. Students may register in more than one section per term. Prerequisite(s): Graduate standing.

MIM 513  Structure of Biopolymers 3 hrs.  Explores the relationship between structural stability, kinetic properties, and function of biopolymers, with particular emphasis on proteins and nucleic acids. Same as BCME 513 and PMMP 513. Prerequisite(s): GCLS 501 and one year of physical chemistry, or consent of the instructor.

MIM 551  Advanced Immunology 2 hrs.  Concepts in immunonchemistry, immunogenetics, molecular immunology, cellular immunology, and immunopathology at the intermediate level. Prerequisite(s): GCLS 501, GCLS 502, GCLS 503, and GCLS 510 or consent of the instructor.

MIM 553  Molecular Biology of Viruses 2 hrs.  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(s): GCLS 501, GCLS 502, GCLS 503, and GCLS 511 or consent of the instructor.

MIM 554  Molecular Aspects of Microbiology 3 hrs.  Basic concepts of prokaryotic and eukaryotic genetics; gene structure and function; gene expression; molecular aspects of mutation and recombination; chromosome structure and function. Prerequisite(s): BCHE 460.

MIM 560  Microbial Pathogenesis 2 hrs.  Genetics, molecular biology, and physiology of pathogenic bacteria, and host-pathogen interactions. Credit is not given for MIM 560 if the student has credit for MIM 552. Prerequisite(s): GCLS 501, GCLS 502, GCLS 503, and GCLS 511 or consent of the instructor.

MIM 565  Cell Biology 4 hrs.  Functional and structural organization of the cell with emphasis on the cellular basis of physiological activity. Same as ANAT 585 and PHTH 585.

MIM 594  Special Topics in Microbiology, Immunology, and Virology 1 TO 2 hrs.  Advanced topics are covered in depth. Topics vary yearly. Prerequisite(s): BCME 460 and MIM 451 or both MIM 455 and MIM 552 and MIM 553 and consent of the instructor.

MIM 595  Seminar in Microbiology and Immunology 1 hour.  Topics of current research interest are presented by guest lecturers from outside institutions in areas of molecular biology, bacteriology, virology, and immunology. Satisfactory/Unsatisfactory grading only.

MIM 598  Research in Molecular Biology and Immunology 0 TO 16 hrs.  MS thesis research on problems in microbiology, immunology, virology, and molecular biology. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Graduate standing in Microbiology and Immunology.

MIM 599  Research in Molecular Biology and Immunology 0 TO 16 hrs.  PhD thesis research on problems in microbiology, immunology, virology, and molecular biology. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Graduate standing in Microbiology and Immunology.

Movement Sciences

Note: Beginning with the Spring 2009 semester, the Movement Sciences (MVSC) rubric will change to Kinesiology (RN).

MVSC 400  Business Principles for the Fitness Professional 3 hrs.  Provides a survey of basic business principles and the application of these principles for students pursuing careers in corporate and community fitness. Previously listed as KINE 406.  Prerequisite(s): MVSC 100; and junior standing or above.

MVSC 410  Human Aging and Physical Performance 3 hrs.  Introduction to human aging focused on the impact of aging to physical structure and function. Investigate research-based evidence of the role of activity and exercise in altering physiology, life expectancy, disease, and disability prevention. Previously listed as KINE 404.  Prerequisite(s): MVSC 252; and junior standing or above.
MVSC 435 Psychology and Physical Activity 3 hrs. Analysis and application of psychological concepts related to process and outcomes of sport and exercise programs. Previously listed as KINE 412.

MVSC 438 Exercise Adherence 3 hrs. Exercise behavior as it relates to habitual physical activity. Encompasses health outcomes, exercise adherence factors, intervention, strategies, and exercise settings. Previously listed as KINE 418.

MVSC 441 Muscle Physiology 3 hrs. Examination of skeletal muscle function during physical activity and adaptations of skeletal muscle that occur with exercise training, inactivity and aging. Prerequisite(s): MVSC 352 and junior standing or above; or consent of the instructor.

MVSC 442 Principles of ECG Interpretation 3 hrs. Introduction to the basic principles and interpretation of the electrocardiogram (ECG) as it relates to fitness programs involving the apparently healthy as well as cardiac rehabilitation patients. Prerequisite(s): Grade of C or better in MVSC 352; and junior standing or above; or consent of the instructor.

MVSC 452 Advanced Exercise Physiology 3 hrs. Review of research in exercise physiology on topics currently addressed in the research literature. The first half of the semester will address factors affecting performance. The second half will address health and disease factors. Prerequisite(s): MVSC 352; and junior standing or above and one college-level course in chemistry.

MVSC 460 Neuromechanical Basis of Human Movement 3 hrs. Biomechanics of single- and multijoint systems, and its role in neural control of movement. Mechanisms of acute adaptations, including warm-up, fatigue and potentiation, and chronic adaptations arising from reduced use or training. Previously listed as KINE 428. Prerequisite(s): MVSC 160 and MVSC 252 and junior standing or above; or consent of the instructor.

MVSC 472 Movement Neuroscience 3 hrs. 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. Previously listed as KINE 472. Prerequisite(s): MVSC 251 and MVSC 252 and MVSC 352 and MVSC 372; and junior standing or above; or consent of the instructor.

MVSC 481 Workshop in Movement Sciences 1 TO 3 hrs. Intensive study of selected activities, topics, processes, or areas in movement sciences. Topic will be announced. May be repeated if topics vary. Students may register in more than one section per term. Previously listed as KINE 481.

MVSC 489 Seminars in Movement Sciences 1 TO 3 hrs. Weekly seminars devoted to research in movement sciences and related fields, followed by a one-hour discussion. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Junior standing or above.

MVSC 490 Educational Practice with Seminar I 6 hrs. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Previously listed as KINE 490. Graduate credit only with approval of the department. Prerequisite(s): Graduate standing in a teacher education program. Consistent of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

MVSC 491 Educational Practice with Seminar II 6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Previously listed as KINE 491. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, credit or concurrent registration in MVSC 490, and approval of the department.

MVSC 496 Special Projects in Movement Sciences 1 TO 3 hrs. Independent research on special projects. Previously listed as KINE 494. Prerequisite(s): Approval by graduate faculty member and graduate director.

MVSC 500 Research and Evidence-Based Practice in Movement Sciences 3 hrs. Training in the research approaches pertaining to specific areas of study in the movement sciences. Special emphasis is placed on accessing, evaluating, and applying findings in the primary literature as critical steps in evidence-based practice. Previously listed as KINE 590.

MVSC 501 Current Research in Movement Sciences 1 hr. In-depth analysis of current original research. May be repeated to a maximum of 10 hours with approval. Approval to repeat course granted by the department. Previously listed as KINE 521. Prerequisite(s): Consent of the instructor.

MVSC 502 Movement Science 4 hrs. Synthesis of the body of knowledge in kinesiology using various diseases as a teaching model. Previously listed as KINE 522. Prerequisite(s): Consent of instructor.

MVSC 520 Disability and Physical Activity 3 hrs. 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. Same as DHD 520. Previously listed as KINE 540.

MVSC 523 Exercise Biology in Health and Disease 3 hrs. Interrelationships between exercise and various pathologic conditions. Current research focusing on molecular and cellular mechanisms in healthy and diseased states. Same as PHYB 523. Previously listed as KINE 523. Prerequisite(s): Consent of the instructor.

MVSC 527 Molecular Biology of Muscle Genes and Proteins 2 hrs. Regulatory mechanisms that govern gene expression relevant to the function of skeletal and cardiac muscle. Previously listed as KINE 527. Prerequisite(s): BIOS 524 and BIOS 525 and consent of instructor.

MVSC 528 Cellular Response to Exercise 3 hrs. Examines cellular structure/ function relationships important for acute and chronic adaptations to exercise. Emphasis on understanding cellular basis of physiological response to exercise. Previously listed as KINE 528. Prerequisite(s): BIOS 422 or consent of the instructor.

MVSC 529 Research Genomics 3 hrs. Molecular mechanisms by which cells adapt to increases and decreases in physical activity. Emphasis on understanding genomic, transcriptional, translational, and post-translational sites of control. Previously listed as KINE 529. Prerequisite(s): BCHE 460 or consent of the instructor.

MVSC 535 Nutrition and Human Performance 2 hrs. Nutrition which impacts on human performance; impaired performance due to nutritional problems; aspects relevant to the professional athlete. Same as EHN 535. Previously listed as KINE 535. Prerequisite(s): HN 410; and PHYB 541 or MVSC 532; or consent of the instructor.

MVSC 545 Advanced Exercise Programming and Assessment 3 hrs. Emphasis on current recommendations for exercise prescription and assessment methods for adult populations. Diagnostic and prescriptive procedures will be delineated. Previously listed as KINE 420. Prerequisite(s): MVSC 452 or consent of the instructor.

MVSC 570 Neural Mechanisms Underlying Motor Control 4 hrs. Neurophysiological mechanisms that underlie the control and regulation of movement. Previously listed as KINE 570. Prerequisite(s): Consent of the instructor.

MVSC 571 Biomechanics of Normal and Abnormal Movement 3 hrs. Principles of statics and dynamics exemplified by human movements. Examination of muscle mechanics, joint forces, stability, redundancy and intersegmental interactions in multijoint movements. Same as PT 571. Prerequisite(s): Consent of the instructor.
MVSC 574 Instrumentation for Motor Control Research 3 hrs. Introduction to oscilloscopes, amplifiers, filters, and transducers. Origin and processing of electromyograms. Motion capture and processing techniques. Same as PT 574. Prerequisite(s): MVSC 571 or PT 571.

MVSC 581 Exercise Leadership Field Instruction 3 hrs. Students are assigned to fitness classes where, under the supervision of a field instructor, they prepare lessons, give instruction, and administer written and physical fitness exams. Previously listed as KINE 520. Prerequisite(s): MVSC 545.

MVSC 590 Seminar in Movement Sciences 1 hour. Final experience for 40-hour MS student. Student must demonstrate ability to synthesize material obtained in program and relate it to their area of concentration. Previously listed as KINE 589. Prerequisite(s): 32 semester hours of graduate credit and consent of major advisor.

MVSC 592 Clinical Rotations in Exercise Physiology 1 TO 4 hrs. The clinical rotation serves as an avenue to introduce students to various experiences in clinical exercise physiology and as a precursor to a clinical internship. Fieldwork is required. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 4 hours. Prerequisite(s): Approval of the department.

MVSC 593 Internship in Movement Sciences 1 TO 12 hrs. Supervised internship in a laboratory or field setting. A written report is required. Normally open only to candidates in the Applied Exercise Physiology MS area of concentration. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. Credit is not given for MVSC 593 if the student has credit in MVSC 597 or MVSC 598. Fieldwork required. Prerequisite(s): Students must pass the comprehensive examination before placement at an internship site.

MVSC 594 Selected Topics in Movement Sciences 1 TO 3 hrs. Topic to be announced. Analysis of selected problems and concerns in specified concentrations. Topics vary from semester to semester, depending on the needs and interests of the graduate students. May be repeated if topics vary. Previously listed as KINE 594. Prerequisite(s): Consent of the instructor.

MVSC 596 Independent Research in Movement Sciences 1 TO 4 hrs. Topics vary. Students design, implement, and analyze a research problem in their individual area of concentration under the supervision of a faculty member. Previously listed as KINE 596. Prerequisite(s): MVSC 500.

MVSC 597 Project in Movement Sciences 0 TO 8 hrs. Supervised practicum in laboratory or field setting in which recent research findings are applied, tested, and evaluated. Satisfactory/Unsatisfactory grading only. May be repeated. Previously listed as KINE 597. Prerequisite(s): MVSC 500 and consent of advisor and director of graduate studies.

MVSC 598 Master's Thesis Research 0 TO 16 hrs. Thesis work under the supervision of a graduate advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Previously listed as KINE 598. Prerequisite(s): MVSC 500 and consent of the advisor and director of graduate studies.

MVSC 599 PhD Thesis Research 0 TO 16 hrs. Independent research by the student under the supervision of the thesis advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Previously listed as KINE 599. Prerequisite(s): Students must have passed the preliminary exam.

Music MUS 490 Music Education: Special Topics 1 TO 4 hrs. An investigation of various topics in music education pertinent to practicing music teachers. May be repeated. Prerequisite(s): Senior standing or above.

Native American Studies NAST 415 American Indian Ethnohistory 3 OR 4 hrs. Introduction to ethnohistory, an interdisciplinary approach to researching, conceptualizing, and writing American Indian history. The course is organized topically and centers on classic and current monographs and articles. Same as HIST 415, 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Junior standing or above and consent of the instructor. Recommended background: Courses in cultural anthropology, American Indian anthropology, American Indian literature.

NAST 471 Topics in Native American Literatures 3 OR 4 hrs. The history and development of literature by and about American Indians. Content varies. Same as ENGL 471. 3 undergraduate hours, 4 graduate hours. May be repeated up to 1 time(s). Prerequisite(s): Senior standing or above and 6 hours of English, African American studies, or Latin American studies or consent of the instructor.

Natural Sciences NATS 574 Advanced Study of Science Taught in Standard-Based Middle-Grade Science Curricula 3 hrs. The advanced study of concepts underlying standards-based instruction in the natural sciences (chemistry, physics, earth science, and biology) in grades 5-8 is explored in a pedagogical context. Prerequisite(s): Consent of the instructor.

Neuroscience NEUS 403 Human Neuroanatomy 3 hrs. Morphological organization of the nervous system. Functional correlations of neural structures. Same as ANAT 403. Meets eight weeks of the semester. Prerequisite(s): Graduate standing and consent of the instructor. Must be in a degree program.

NEUS 483 Neuroanatomy 4 hrs. Organization of the nervous system, with an emphasis on mammals. Same as BIOS 483 and PSCH 483. Animals used in instruction. Prerequisite(s): BIOS 272 or BIOS 325 or PSCH 267; or consent of the instructor.

NEUS 501 Foundations of Neuroscience I 3 hrs. Provides a core understanding of modern neuroscience. Focuses on topics in cell and molecular neuroscience. Taught by faculty from multiple units. Same as BIOS 584. Recommended background: Credit or concurrent registration in GCLS 503.

NEUS 502 Foundations of Neuroscience II 3 hrs. A core understanding of modern neuroscience. Focus is on topics in systems, cognitive and behavioral neuroscience. Will be taught by faculty from multiple units. Continuation of NEUS 501. Same as BIOS 585. Prerequisite(s): NEUS 501 or BIOS 584. Recommended background: Credit or concurrent registration in NEUS 403.

NEUS 506 Research Rotations in Neuroscience 3 TO 6 hrs. Research rotation course in which first-year students from the Neuroscience program will undertake research projects in laboratories affiliated with this program. May be repeated. Animals used in instruction. Prerequisite(s): Open only to PhD degree students.

NEUS 511 Biomedical Neuroscience I: Molecular Biology of Synapses 2 hrs. Molecular mechanisms of synaptic transmission. Information on the principal neurotransmitter systems, structure of ionotropic and metabotropic receptors, and their signal-transduction mechanisms. Prerequisite(s): NEUS 501.

NEUS 512 Biomedical Neuroscience II: Aspects of Brain Function in Health and Disease 2 hrs. An integrated view of brain function in health and disease; the anatomical and functional pathophysiological aspects underpinning major neurological and psychiatric disorders. Prerequisite(s): NEUS 501; or consent of the instructor.

NEUS 525 Molecular and Cellular Mechanisms of Neurodegenerative Diseases 2 hrs. Molecular, cellular, and physiological mechanisms underlying neuropathology in neurodegenerative diseases and trauma to the central and peripheral nervous system of humans. Same as ANAT 525. Recommended background: A basic course in neuroscience.

NEUS 561 Current Topics in Visual Neuroscience 2 hrs. Discussion of current research and theoretical issues in visual neuroscience by staff, students, and guest lecturers. May be repeated. Prerequisite(s): Consent of the instructor.

NEUS 582 Methods in Modern Neuroscience 2 hrs. Underlying principles and applications of techniques used to analyze nervous system organization and function. Behavioral, electrophysiological, anatomical, and biochemical approaches are considered. Same as BIOS 582. Animals used in instruction.
NEUS 588 Human Neuroscience: Functional Magnetic Resonance Imaging 3 hrs. Lectures and demonstrations present the principles of magnetic resonance imaging for understanding cognitive, sensory, and motor function of the human brain in health and disease. Extensive computer use required. Laboratory work required. Prerequisite(s): Consent of the instructor. Recommended background: PHYS 142; and MATH 181 or equivalent classroom experience in college physics and math.

NEUS 599 Human Neuroscience: Sensory-Motor and Cognitive Systems 3 hrs. Lectures and demonstrations focus on investigations of sensory-motor and cognitive systems in the human brain using neuroimaging. Extensive computer use required. Prerequisite(s): Consent of the instructor. Recommended background: NEUS 588.

NEUS 594 Seminar in Neuroscience 1 hr. 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. Satisfactory/Unsatisfactory grading only. May be repeated.

NEUS 595 Independent Study 1 TO 4 hrs. Independent study under the direction of a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

NEUS 598 Master's Thesis Research in Neuroscience 0 TO 16 hrs. Thesis research under the direction of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): NEUS 501 and NEUS 506; successful completion of first year core courses; and consent of the instructor. Open only to Master's degree students in neuroscience.

NEUS 599 Doctoral Research in Neuroscience 0 TO 16 hrs. Independent research, directed by a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): NEUS 501 and NEUS 502 and NEUS 506; successful completion of first year core courses; and consent of the instructor. Open only to PhD degree students in Neuroscience.

Nursing Sciences

NUSC 420 Pathophysiology and Pharmacotherapeutics I 3 hrs. First of two courses that provide an understanding of responses to disease and pharmacological treatments. Included are the therapeutic and toxic effects for major drug classes and basic microbiology principles. Prerequisite(s): MVSC 251 and MVSC 252 and graduate standing. Must enroll concurrently in NUSC 421.

NUSC 421 Integrated Healthcare: Concepts and Skills 8 hrs. This course will provide the basis for understanding fundamental concepts to the practice of nursing across the life span. Theoretical concepts will be integrated with skills essential to practice. Prerequisite(s): Graduate standing. Must enroll concurrently in NUSC 420.

NUSC 422 Integrated Healthcare: Community 2 hrs. Theories of community assessment, disease prevention, and health behavior are applied to promotion of health for communities and vulnerable populations. Understanding of systems and collaboration with the interdisciplinary team are emphasized. Prerequisite(s): NUSC 420 and NUSC 421; and graduate standing.

NUSC 423 Pathophysiology and Pharmacotherapeutics II 4 hrs. Second of two courses that provide an understanding of responses to disease and pharmacological treatments. Included are the therapeutic and toxic effects for major drug classes and basic microbiology principles. Prerequisite(s): Credit or concurrent registration in NUSC 420.

NUSC 424 Integrated Healthcare: Adult/Older Adult 4 hrs. This course focuses on clinical evaluation/management of common/complex problems in adults and older adults. Emphasizes pathophysiology and management strategies in context of culture and ethnicity. Prerequisite(s): NUSC 420 and NUSC 421; and graduate standing.

NUSC 425 Integrated Healthcare: Clinical Practice I 7 hrs. This course provides students with experiences across all levels of prevention. Focus is on planning and implementing care for adults and older adults. Prerequisite(s): NUSC 420 and NUSC 421; and graduate standing. Must enroll concurrently in NUSC 422 and NUSC 424.

NUSC 426 Cultural Fluency and Communication Skills 2 hrs. Course provides a foundation of communication skills, teaching and learning theory, and cultural competence for provision of nursing care. Prerequisite(s): NUSC 420 and NUSC 421; and graduate standing.

NUSC 427 Integrated Healthcare: Clinical Practice II 8 hrs. This course provides students with experiences across all levels of prevention. Focus is on planning and implementing care for women, children, and the mentally ill in a variety of settings. Students experience the systems of care from acute care to community. Satisfactory/Unsatisfactory grading only. Prerequisite(s): NUSC 425 and graduate standing. Concurrent registration in NUSC 428 and NUSC 430.

NUSC 428 Integrated Healthcare: Women, Children, and Family 4 hrs. Care for women throughout the life span, including pregnancy, birth, the postpartum and interconceptional periods, and throughout the aging process. Prerequisite(s): NUSC 420 and NUSC 421 and graduate standing.

NUSC 429 Integrated Healthcare: Clinical Synthesis 7 hrs. Focus is on synthesis of nursing knowledge and skills and on implementation of leadership and management skills, including organizing care and delegation, in the provision of care. Clinical experiences occur in their area of concentration. Satisfactory/Unsatisfactory grading only. Prerequisite(s): NUSC 427 and graduate standing. Concurrent registration in NUSC 434.

NUSC 430 Integrated Healthcare: Mental Health 2 hrs. Application and integration of biopsychosocial concepts and principles to the mental healthcare of individuals and groups across the continuum of care, including health promotion and illness prevention, maintenance and rehabilitation. Prerequisite(s): NUSC 420 and NUSC 421 and graduate standing.

NUSC 432 Bioethics 2 hrs. Examine ethical decision-making models as applied to nursing. Use ethics committees, resolution of conflict around ethical dilemmas, impact of cultural/gender influences on ethical decision-making, and nursing's role as patient advocate. Prerequisite(s): NUSC 420 and NUSC 421 and graduate standing.

NUSC 434 Leadership in Professional Practice 3 hrs. Theories of leadership/management are analyzed in relationship to the new healthcare delivery system, nursing role, evidence-based practice, future trends, and the professional education continuum. Prerequisite(s): NUSC 422 and NUSC 424 and NUSC 425 and NUSC 427 and NUSC 428 and NUSC 429 and graduate standing.

NUSC 438 Infant Feeding: Historical, Societal, and Health Policy Issues 3 hrs. Examines infant feeding practices from historical, contemporary, societal, and political dimensions. The importance of infant feeding in developing countries as well as legislation regarding infant feeding is also examined. Prerequisite(s): Consent of the instructor.

NUSC 440 Wholistic Health: Use of Self 2 hrs. Comprehensive mind, body, and spiritual healthcare. Spiritual assessment of self, individuals, and families. Self as a therapeutic agent and provider for wholistic healthcare. Prerequisite(s): Graduate standing or senior standing.

NUSC 441 Wholistic Health: Community Focus 2 hrs. Community and congregational assessment. Health beliefs and practices of faith communities and their impact on healthcare services, communities, and systems to foster planned change. Prerequisite(s): Graduate standing or senior standing.

NUSC 450 Women and Mental Health Nursing 3 hrs. Theories of female psychology; women's daily lives and mental health; gender differences in mental illness; strategies for improving women's mental health.

Same as GWS 450 and NUWH 450. Prerequisite(s): Consent of the instructor. Students enrolled in the College of Liberal Arts and Sciences must have credit in PSCH 100 and either PSCH 270 or PSCH 315 or GWS 315.
NUSC 455 Women's Health: A Primary Healthcare Approach 3 hrs. Health promotion and disease prevention in women's health. Includes community experience with community women. Primary healthcare approaches examined. Same as CHSC 456 and NUWH 455. Prerequisite(s): Consent of the instructor.

NUSC 460 Individualized Internship 1 TO 5 hrs. Intensive internship experience will consist of a practicum that will develop skills, competencies, and knowledge in a focused healthcare delivery setting. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

NUSC 494 Special Topics 1 TO 3 hrs. Discusses selected topics of current interest. Offered according to sufficient student demand and instructor availability. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

NUSC 499 Urbana Nursing Registration 0 TO 16 hrs. Special course created to accommodate College of Nursing students in Urbana. Represents UIC registration for undergraduate and graduate nursing students. Satisfactory/Unsatisfactory grading only. No graduation credit.

NUSC 500 Introduction to the Clinical Nurse Specialist Role 1 hour. Models and role competencies of the clinical nurse specialist. Prerequisite(s): NUSC 527.

NUSC 503 Evidence-Based Practice 3 hrs. Application of evidence-based practice to healthcare delivery systems and clinical issues. Emphasizes the integration of retrieved evidence with client preferences in order to design and evaluate best practices. Prerequisite(s): Admission to the Doctor of Nursing Practice program. Credit or concurrent registration in NUSC 505; and graduate-level statistics or consent of the instructor.

NUSC 511 Advanced Research Design 4 hrs. 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. Prerequisite(s): Credit or concurrent registration in NUSC 505; and graduate-level statistics or consent of the instructor.

NUSC 515 Measurement in Health Research 4 hrs. Qualitative and quantitative measurement theories; assessment of reliability, validity, and data quality. Critical analysis of measurement issues across the spectrum of measures in health research. Prerequisite(s): Credit or concurrent registration in NUSC 506 and NUSC 511 or consent of the instructor. Prerequisite(s): Consent of the instructor.

NUSC 517 Advanced Research Practicum 1 TO 4 hrs. An intensive guided research practicum in design, data collection, psychometric analysis, or specific analytic technique relevant to the student's research specialization. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 6 hours. Must be repeated for a minimum of 3 hours. Prerequisite(s): NUSC 515 and two advanced statistics courses.

NUSC 520 Dying, Loss, and Grief 3 hrs. Analysis of social, cultural, and psychological aspects of human grief, loss/death within families, and professional caregivers surrounding palliative and end-of-life care.


NUSC 524 Sociocultural and Clinical Issues in Palliative Care 3 hrs. Using an ethics theoretical framework, this course explores social, cultural, and political factors that influence palliative care for clients and families across the life span.

NUSC 525 Intermediate Statistics 3 hrs. Application and interpretation of statistical techniques appropriate for health sciences. Prepares students to think quantitatively, use computer to perform statistical analysis, and assess data critically. Prerequisite(s): An undergraduate statistics course.

NUSC 526 Nursing Inquiry I 2 hrs. 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(s): Credit or concurrent registration in NUSC 525 or the equivalent.

NUSC 527 Nursing Inquiry II 2 hrs. Continuation of NUSC 526, emphasizing the methods of theory development and theory testing in selected areas of nursing sciences. Ethical issues in research. Prerequisite(s): NUSC 526.

NUSC 528 Health, Environment, and Systems 2 hrs. Examination of international, national, and local environments for health, health systems, health policy, and their outcomes: Influence of social, cultural, and ethical factors.

NUSC 529 Issues of Advanced Practice in Nursing 1 hour. Examines advanced practice in nursing from historical, contemporary, and future dimensions. May be repeated. Students may register in more than one section per term. Only students enrolled in specific nursing concentrations are allowed to repeat course. Prerequisite(s): NUSC 528.

NUSC 531 Pharmacotherapeutics in Advanced Practice in Nursing 3 hrs. Advanced principles of pharmacotherapeutics. Includes legal issues, client adherence, and medication selection factors. Prerequisite(s): Credit or concurrent registration in NUSC 530 or credit or concurrent registration in NUSC 555 or the equivalent or consent of the instructor.

NUSC 532 Comprehensive Health Assessment for Advanced Practice 0 TO 3 hrs. Includes physical, psychosocial, developmental, occupational, sexual, and cultural assessments across the life spans, emphasizing differences between normal and abnormal. Students synthesize results in client's health status. Students register for either 2 or 3 credit hours. Students registering for three credit hours must register for two additional laboratory-discussion hours per week. Prerequisite(s): NUSC 210 or the equivalent or consent of the instructor.

NUSC 533 Applied Pharmacotherapeutics in Advanced Practice in Nursing 1 hour. Application of pharmacology principles to sub-speciality populations. May be repeated to a maximum of 2 hours. Prerequisite(s): Consent of the instructor in NUSC 531.

NUSC 535 Biological Basis of Disease 4 hrs. Provides a foundation for clinical therapeutics through an understanding of biophysical mechanisms of disease. Basic concepts of pathophysiological processes are examined with application to organ systems and across the life span. Prerequisite(s): Undergraduate physiology and pathophysiology courses.

NUSC 536 Forensic Nursing Science 3 hrs. Focuses on the background, development, and theoretical foundations of forensic nursing.

NUSC 537 Forensic Healthcare Documentation and Evidence Collection 3 hrs. Focuses on the integration of the criminal justice, social service, and legal systems into the nursing care of people affected by violence. Prerequisite(s): NUSC 536.

NUSC 538 Forensic Healthcare for Vulnerable Populations 3 hrs. Focus on the specific needs of vulnerable populations as victims of violence. Prerequisite(s): NUSC 537.
NUSC 539 Forensic Practicum 3 hrs. Completion of a practicum in a specialty practice area focusing on victims, families, and alleged perpetrators. Prerequisite(s): NUSC 538.

NUSC 540 Instructional Design and Delivery in Nursing and Health Sciences 3 hrs. Comprehensive introduction to teaching/learning theory, methods, and strategies for instruction and enhancement of learning in the classroom, clinical, and online. Prerequisite(s): Consent of the instructor.

NUSC 541 Teaching/Learning Synthesis in Nursing and Health Sciences 3 hrs. Synthesis and application of teaching/learning theories, methods, and strategies for instructional design and delivery, learner/program evaluation and assessment, curricular planning in individualized settings and contexts. Prerequisite(s): Credit or concurrent registration in NUSC 540 and credit or concurrent registration in NUSC 545; and consent of the instructor.

NUSC 542 Curriculum Processes in Nursing and Health Sciences 3 hrs. Comprehensive introduction to processes relevant to the design and implementation of a curriculum from foundational concepts through outcomes monitoring. Prerequisite(s): Consent of the instructor.

NUSC 544 Qualitative Research in Nursing 4 hrs. Major approaches to qualitative research, including design, conduct, reporting, and firsthand experience in data collection and analysis. Prerequisite(s): Consent of the instructor.

NUSC 545 Evaluation and Assessment in Nursing and Health Sciences 3 hrs. Evaluation theory and strategies for evaluating student learning, courses, and programs in multiple settings and contexts. Prerequisite(s): Consent of the instructor.

NUSC 547 Population-Focused Intervention in Primary Care 2 hrs. Population-focused assessment, program planning, and evaluation of interventions for community-based healthcare providers. Same as NUWH 547. Prerequisite(s): EPID 400.

NUSC 548 Methodological Issues for Cross-Cultural Research 3 hrs. Conceptual, methodological, and ethical issues for research with varied racial/ethnic backgrounds. Applies qualitative, translation, immersional, and health behavior issues to clinical, community, and international settings. Prerequisite(s): NUSC 511; and consent of the instructor.

NUSC 550 Issues for Research and Practice in Women’s Health 3 hrs. Analysis of gender-related definitions of health and illness in theory issues and research evaluation criteria for women’s healthcare practice are developed as a basis for research. Same as NUWH 550. Prerequisite(s): Consent of the instructor.

NUSC 552 Responsible Conduct of Research 1 hour. Overview of the major ethical issues in the conduct of research with human or animal subjects with strategies for resolving these issues. Course is required by National Institutes of Health for all students supported by a National Research Service Award. Prerequisite(s): Open only to PhD degree students or consent of the instructor.

NUSC 555 Theories and Methods in Women’s Health Nursing Research 3 hrs. Critical analysis of theoretical and methodological approaches in women’s health nursing research. Emphasis on evaluation schema useful to researchers. Same as NUWH 555. Prerequisite(s): NUSC 550 or NUWH 550, and consent of the instructor.

NUSC 556 Developing Literature Reviews 3 hrs. Prepares the student to conduct literature reviews in an area of interest and write a literature synthesis. May be repeated. Prerequisite(s): Open only to PhD degree students; or consent of the instructor.

NUSC 557 Intermediate Epidemiology for Advanced Nursing Practice 3 hrs. Provides intermediate level knowledge and skills in epidemiology for nurses and other public health practitioners. Addresses threats to validity and other issues of interpretation of designs. Same as NUWH 557. Prerequisite(s): EPID 400 or an equivalent course.

NUSC 558 Grant Writing for the Nurse Scientist 3 hrs. Prepares students to submit their first competitive grant application for National Research Service Awards (NRSA) for predoctoral (F31) and postdoctoral (F32) fellowships. This course emphasizes the practical aspects of writing the grant proposal. May be repeated. Prerequisite(s): Credit or concurrent registration in NUSC 511; or consent of the instructor. Students will be expected to work closely with their advisor during this course and are encouraged to register for at least 1 credit hour of NUSC 596 with their advisor.

NUSC 559 Grant Writing for Healthcare Services 3 hrs. Focuses on developing knowledge and application skills needed for successful health service programmatic grant writing. Same as NUWH 559. Prerequisite(s): Credit or concurrent registration in NUPH 507 or credit or concurrent registration in NUSC 507; and credit or concurrent registration in NUAS 502 or credit or concurrent registration in NUPH 511; or consent of the instructor.

NUSC 560 Theoretical Basis for Primary Healthcare 3 hrs. Students analyze the conceptual basis of primary healthcare applicable to diverse communities, and develop a primary healthcare model specific to a community of interest. Prerequisite(s): NUSC 506 and NUSC 515.

NUSC 561 Ethical Issues in Primary Healthcare 3 hrs. Examination of the ethical components of primary healthcare as a philosophy, strategy, and level of care; and explication of personal frameworks for analysis of a specific health issue. Prerequisite(s): NUSC 560 or consent of the instructor.

NUSC 562 Primary Healthcare Research Methods 3 hrs. Conceptual issues, advanced methodologies, and dissemination strategies for scientifically sound and policy-relevant global primary healthcare research. Building community relationships for primary healthcare research. Prerequisite(s): NUSC 511 and NUSC 560 or the equivalent or consent of the instructor.

NUSC 565 Advanced Research in Women’s Health 1 TO 4 hrs. Advanced seminar for doctoral students in graduate nursing concentration in women’s health. Faculty and students present and critique ongoing and developing research. Same as NUWH 565. Prerequisite(s): Consent of the instructor.

NUSC 566 Family-Focused Health Management in Primary Care 3 hrs. Assessment and management of common behavioral, lifestyle, and life-cycle issues in primary care using a family-focused approach. Same as NUWH 566. Prerequisite(s): NUSC 532; or consent of the instructor.

NUSC 570 International Dimensions in Women’s Health 3 hrs. 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. Same as NUWH 570. Prerequisite(s): Consent of the instructor.

NUSC 571 Leadership in International Health 2 hrs. Examines the trends and issues involved in leadership development of health professionals for global health and discusses strategies to make impact on healthcare outcomes in the global village. Prerequisite(s): NUSC 506 and NUSC 515.

NUSC 572 Synthesis Project Development 1 TO 4 hrs. Students design a doctoral nursing practice project related to an aggregate of individuals/selected population of interest. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program; consent of the instructor.

NUSC 574 Synthesis Project Implementation 1 TO 4 hrs. Students implement a doctoral nursing practice project related to an aggregate of individuals/selected population of interest. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program. NUSC 527 and consent of the instructor.

NUSC 575 Minority Women’s Health Nursing 3 hrs. 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. Same as NUWH 575. Prerequisite(s): Consent of the instructor.

NUSC 576 Synthesis Project Evaluation and Dissemination 1 TO 4 hrs. Students analyze and disseminate findings from the doctoral nursing practice project. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program. NUSC 574 and consent of the instructor.
NUSC 580 Health Services and Health Behavior Research: Models and Frameworks 3 hrs. Examines and critiques individual, systems, and community-level models and frameworks which guide health services delivery and health promotion behavior research. Prerequisite(s): NUSC 505 and NUSC 506; or consent of the instructor.

NUSC 581 Health Services and Health Behavior Research: Methods and Measurement 3 hrs. Critically analyses methodological and measurement issues which are important to advanced research in health services delivery and health promotion behavior. Prerequisite(s): NUSC 511 and NUSC 515 and NUSC 580; or consent of the instructor.

NUSC 582 DNP Residency I: Direct Care Role 2 TO 4 hrs. Individualized residency experience that will expand clinical expertise and specialized knowledge in the selected direct care, advanced nursing practice specialty role. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program; consent of the instructor.

NUSC 583 DNP Residency II: Direct Care Role 2 TO 4 hrs. Individualized residency experience that will facilitate development of systems-level clinical expertise in the selected direct care advanced nursing practice specialty role. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program; NUSC 586 and consent of the instructor.

NUSC 584 Conducting Human Subjects Research 1 TO 2 hrs. Topics include ethical principles that guide research, federal regulations, IRB guidelines, issues of informed consent and vulnerable populations, and other topics based on student interest. Prerequisite(s): NUSC 511.

NUSC 585 Advanced Research Seminar 1 TO 2 hrs. Integrates theory and methods for health research. Topics vary according to student interests and instructor availability. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. A minimum of 2 hours of credit is required; a maximum of 4 hours of credit may be applied toward the PhD. Prerequisite(s): Consent of the instructor. Open only to PhD degree students.

NUSC 586 DNP Residency II: Systems-Focused Role 2 TO 4 hrs. Individualized residency experience that will expand expertise and specialized knowledge in the selected systems-focused advanced nursing practice specialty role. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program; consent of the instructor.

NUSC 587 DNP Residency II: Systems-Focused Role 2 TO 4 hrs. Individualized residency experience that will expand development of systems-level expertise in the selected systems-focused advanced nursing practice specialty role. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to the Doctor of Nursing Practice program; NUSC 586 and consent of the instructor.

NUSC 588 Leadership in Scientific Careers 1 hour. Examines components of leadership in science at the national and global levels. Aims toward the development of ethical and effective leadership skills in biomedical research. Prerequisite(s): Consent of the instructor.

NUSC 589 Preliminary Exam Preparation 1 TO 12 hrs. Literature review, reading, and writing in preparation for the preliminary examination supervised by faculty research advisor. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 24 hours. Prerequisite(s): Completion of core courses and consent of the instructor.

NUSC 590 Special Topics: Advanced 1 TO 3 hrs. Discusses selected topics of current interest. Offered according to sufficient student demand and instructor availability. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

NUSC 591 Seminar in Nursing 1 TO 3 hrs. Panorama of issues related to modern nursing and nursing research. Topics vary according to student interests and instructor availability. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

NUSC 592 Independent Study: Graduate 1 TO 4 hrs. Selected problems in nursing are investigated under the direction of a graduate faculty member. Mode of investigation is determined by the nature of the nursing problem selected. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

NUSC 593 Master's Project 0 TO 16 hrs. Master's student project research. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

NUSC 595 Master's Thesis Research 0 TO 16 hrs. Master's student thesis research. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

NUSC 596 PhD Thesis Research 0 TO 16 hrs. Doctoral student thesis research. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

Ot 401 Occupational Performance in Children 4 hrs. Developmental theories concerning factors influencing the development of occupational performance in infancy, childhood, and early adolescence. Developmental assessment methods and tools. Prerequisite(s): Grade of C or better in OT 401 and grade of C or better in OT 407; and graduate standing; and consent of the instructor.

Ot 411 Occupational Performance in Children 4 hrs. Developmental theories concerning factors influencing the development of occupational performance in infancy, childhood, and early adolescence. Developmental assessment methods and tools. Prerequisite(s): Grade of C or better in OT 401 and grade of C or better in OT 407; and graduate standing; and consent of the instructor.

Ot 422 Medical Conditions 1 hour. This self-paced course reviews etiology, clinical manifestation, clinical course, and general medical and rehabilitative management of common medical conditions; emphasis on musculoskeletal, neuromuscular, cardiopulmonary, and psychiatric disorders. Satisfactory/Unsatisfactory grading only. May be repeated. Fieldwork required. Prerequisite(s): Admission to the Master of Science in Occupational Therapy program.

Ot 422 Community Practicum 1 hour. Field experience in a community agency serving an urban population. Emphasis is on service learning in context and the development of professional behaviors. Satisfactory/Unsatisfactory grading only. May be repeated. Fieldwork required. Prerequisite(s): Admission to the Master of Science in Occupational Therapy program.

Ot 422 Medical Conditions 1 hour. This self-paced course reviews etiology, clinical manifestation, clinical course, and general medical and rehabilitative management of common medical conditions; emphasis on musculoskeletal, neuromuscular, cardiopulmonary, and psychiatric disorders. Satisfactory/Unsatisfactory grading only. May be repeated. Fieldwork required. Prerequisite(s): Admission to the Master of Science in Occupational Therapy program.
OT 424
**Contexts of Occupational Therapy Practice** 2 hrs.
Trends in healthcare, 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(s): Grade of C or better in OT 407; and graduate standing.

OT 428
**Fieldwork Level I** 3 hrs.
Application of occupational therapy theory and therapeutic reasoning in a forty-hour/week fieldwork experience with the opportunity to develop beginning therapeutic skills and professional behavior. Fieldwork required. Prerequisite(s): Grade of C or better in OT 411 and grade of C or better in OT 412 and grade of C or better in OT 416; and satisfactory completion of OT 422 and graduate standing; and consent of the instructor.

OT 436
**Occupational Therapy Practice: Functional Movement and Mobility** 5 hrs.
Application of occupational therapy evaluation and intervention skills to children and adults with occupational performance deficits resulting from mobility and movement dysfunction. Prerequisite(s): Grade of C or better in OT 411 and grade of C or better in OT 412 and grade of C or better in OT 416; and satisfactory completion of OT 422 and graduate standing.

OT 457
**Occupational Therapy Practice: Cognition and Perception in Action** 4 hrs.
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. Prerequisite(s): Grade of C or better in OT 411 and grade of C or better in OT 412 and grade of C or better in OT 416; and satisfactory completion of OT 422 and graduate standing.

OT 448
**Fieldwork Level IIA** 8 hrs.
First of two supervised, full-time, twelve-week practica with emphasis on application of OT theory, development of psychomotor skills, reasoning client-related problems, and professional socialization as an entry-level occupational therapist. Satisfactory/Unsatisfactory grading only. Fieldwork required. Prerequisite(s): Grade of C or better in OT 428 and grade of C or better in OT 436 and grade of C or better in OT 437; and graduate standing; and consent of the instructor.

OT 449
**Fieldwork Level IIB** 4 hrs.
Second of two supervised, full-time practica with emphasis on application of OT theory, development of psychomotor skills, reasoning client-related problems, and professional socialization as an entry-level occupational therapist. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Fieldwork required. Scheduled full time for a six-week period. Prerequisite(s): Grade of C or better in OT 428 and grade of C or better in OT 436 and grade of C or better in OT 437; and graduate standing; and consent of the instructor.

OT 500
**Theories of Occupational Therapy** 4 hrs.
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(s): Consent of instructor.

OT 510
**Research in Occupational Therapy** 3 hrs.
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(s): Admission to the Master of Science in Occupational Therapy program, or consent of the instructor. Recommended background: Statistics and research methods background.

OT 515
**Synthesis I** 1 hour.
Integrating theory, practice, and research knowledge and skills across courses using case studies and small-group learning activities. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Grade of C or better in OT 401 and grade of C or better in OT 406 and grade of C or better in OT 407 and grade of C or better in OT 500 and grade of C or better in AHS 510.

OT 526
**Assistive Technology and the Environment** 3 hrs.
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. Prerequisite(s): Grade of C or better in OT 411 and grade of C or better in OT 412 and grade of C or better in OT 416 and grade of C or better in AHS 510.

OT 530
**Advanced Field Experience: Clinical Specialization in Occupational Therapy** 1 TO 12 hrs.
Provides opportunity for the student interested in advanced occupational therapy practice to observe a master clinician and participate in treatment and/or clinical research in a specialty area. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Prerequisite(s): Consent of the instructor.

OT 531
**Advanced Field Experience in Occupational Therapy Management** 1 TO 12 hrs.
Practicum experience working with an experienced professional to develop projects or programs in student’s area of interest such as administration, middle management, consultation, program evaluation, grantmanship, or others. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Prerequisite(s): Consent of the instructor.

OT 532
**Advanced Field Experience in Occupational Therapy Education** 1 TO 12 hrs.
Offers opportunity to observe, prepare, and present lectures/labs to occupational therapy students in technical or professional curricula as a clinical educator. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Prerequisite(s): Consent of the instructor.

OT 533
**Advanced Field Experience: Occupational Therapy Scholarship** 1 TO 12 hrs.
Practicum experience working with an experienced scholar to observe and participate in activities that generated evidence about practice, disseminate such evidence, and/or develop practice materials based on evidence. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Fieldwork required.

OT 534
**Sociocultural Aspects of Occupational Therapy** 3 hrs.
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. Prerequisite(s): Grade of C or better in OT 424 and grade of C or better in OT 428 and grade of C or better in OT 526.

OT 535
**Synthesis II** 2 hrs.
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. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Grade of C or better in OT 424 and grade of C or better in OT 428 and grade of C or better in OT 526 and satisfactory completion of OT 422.

OT 536
**Fatiguing Conditions and Disability** 3 hrs.
Empirically supported concepts related to assessment and management of fatiguing conditions. Course also explores the relationship between fatigue and disability from social, psychological, and community-based perspectives. Recommended background: Health or behavioral sciences.

OT 540
**Advanced Topics in Occupational Therapy Research and Evaluation** 4 hrs.
In-depth presentation of selected research/measurement strategies. Specific topics vary and include single-system design, survey research, ethnography, evaluation of clinical effectiveness. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

OT 541
**Advanced Human Occupations** 1 TO 12 hrs.
Prepares student to become critical reader of research design relevant to occupational therapy. Focuses on use 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. 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. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Prerequisite(s): Consent of the instructor.

OT 550
**Occupational Therapy Research** 4 hrs.
Provides opportunity to observe, prepare, and present lectures/labs to occupational therapy students in technical or professional curricula as a clinical educator. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Prerequisite(s): Consent of the instructor.

OT 555
**Occupational Therapy** 1 TO 12 hrs.
Practicum experience working with an experienced scholar to observe and participate in activities that generated evidence about practice, disseminate such evidence, and/or develop practice materials based on evidence. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register for more than one section per term. Fieldwork required.

OT 560
**Advanced Human Occuption Theory and Application** 4 hrs.
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(s): OT 400 or consent of the instructor.
Course Descriptions

OT 542 Advanced Clinical Reasoning and Therapeutic Use of Self in Occupational Therapy 2 TO 4 hrs.
Teaches occupational therapy students advanced skills in forming and maintaining ethical, empathic, and successful treatment relationships with their clients.

OT 544 Cognitive Behavioral Therapy for Persons with Chronic Illness and Disability 4 hrs.
Core concepts of cognitive behavioral therapy for individuals with chronic illnesses and disabilities from practice and theoretical perspectives. Recommended Background: Exposure to course work in therapeutic use of self, psychopathology, or in psychosocial aspects of occupational therapy.

OT 550 Disability in the Urban Environment 4 hrs.
Features of urban contexts that influence experiences of persons with disabilities are examined as they exacerbate problems or enhance resources in low-income communities.

OT 551 Computers, Communication, and Controls in Rehabilitation Technology 3 hrs.
Provides information on operation and use of alternative controls for computers, augmentative communication devices, and powered mobility. Emphasis on matching consumer's need and assistive technology. Same as DHD 551. Recommended background: Speech language pathology, occupational therapy, special education.

OT 552 Community-Based Interventions with Underserved Populations 4 hrs.
Addresses theories, ethics, and strategies of developing and providing outcomes-based clinical interventions in underserved communities. Students collaborate with a community population to implement course concepts. Prerequisite(s): Level II fieldwork or prior work experience or consent of the instructor. Recommended Background: OT 550.

OT 553 Program Evaluation: Documenting the Impact of Human Services 3 hrs.
Examines methods in program evaluation with emphasis on empowerment and participatory evaluation. Students will study quantitative and qualitative strategies, how to communicate information to stakeholders, and how to design evaluations. Recommended background: Interest in research, health, or behavioral sciences, and implementation and evaluation of community initiatives and community-based organizations.

OT 554 Applied Professional Ethics in Occupational Therapy 2 hrs.
Integrates advanced theory, practice, and research knowledge and skills from fieldwork and course work to identify and mitigate ethical dilemmas, legal concerns, and/or complex intervention problems encountered in occupational therapy practice. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Grade of C or better in OT 500 and grade of C or better in OT 510.

OT 555 Synthesis III 2 hrs.
Integrating advanced theory, practice, and research knowledge and skills from advanced fieldwork and course work using complex case studies and small-group assessment and intervention planning activities from students' fieldwork experiences. Satisfactory/Unsatisfactory grading only. Fieldwork required. Prerequisite(s): OT 448.

OT 556 Theory and Methods of Needs Assessment in Aging and Disability 4 hrs.
Introduces theories of need, models of the needs assessment process, and reviews research methods typically used in conducting needs assessments. Emphasis will be on needs assessments in health-related community agencies. Prerequisite(s): A 400–or 500–level research course such as OT 510, DHD 415, CHSC 446, or SOC 500. The prerequisite research course needs to provide students with an understanding of basic research design, sampling strategies, and an introduction to methods such as surveys and focus groups. Recommended background: Health or behavioral sciences, research methods.

OT 557 Acting on Needs Assessment Findings 3 hrs.
Follows OT 556, focusing on the translation of needs assessment findings into solution strategies. Addresses setting needs-based priorities, developing solutions, setting action plans, and working with communities to enact those plans. Prerequisite(s): Grade of C or better in OT 500 and grade of C or better in OT 510 and grade of C or better in 556; or consent of the instructor.

OT 558 Writing for Professional Publications in Occupational Therapy 1 TO 3 hrs.
Addresses processes and issues related to writing for publication in occupational therapy and related journals and magazines, including preparation and submission processes, IRB, receiving critiques, and communicating with reviewers and editors. May be repeated to a maximum of 3 hours. Prerequisite(s): Grade of C or better in OT 500 and grade of C or better in OT 510.

OT 561 Disability and Community Participation: Policy, Systems Change, and Action Research 4 hrs.
Focuses on the critical examination of disability policy, activism, and research. Emphasis on conducting participatory action research in collaboration with constituents with disabilities, community organizations, and policy makers. Depending on the research project, students may or may not need to complete IRB training. More information on the IRB process will be available at the start of the project. To be properly registered, students must enroll in one lecture/discussion and one practice. Prerequisite(s): Consent of the instructor. Recommended background: Previous course work in disability policy, disability empowerment research, and qualitative research.

OT 564 Administration and Management in Occupational Therapy 3 hrs.
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(s): OT 428 or approval of the department.

OT 565 Research Methodology and Outcomes Measures in Rehabilitation Technology 3 hrs.
Analyzes the research process in rehabilitation technology and assistsive technology and how such analysis leads to the development of a research proposal. Outcome measures related to assistive technology will be evaluated for their applicability. Same as DHD 565. Recommended background: Engineering, occupational therapy, physical therapy, special education, and speech and language pathology.

OT 567 Professional Leadership in Occupational Therapy 3 hrs.
Focuses on application of theory and evidence in administrative, managerial, and educational leadership. Examines roles and functions of leaders and application of problem solving, change management, and quality improvement in a variety of settings. Prerequisite(s): Grade of C or better in OT 500 and grade of C or better in OT 510.

OT 568 Occupational Therapy Professional Curriculum Design, Implementation, and Evaluation 4 hrs.
Didactic material and experiential learning as students explore design and implementation of a professional curriculum. Students will be exposed to student admissions, advising, student life, and accreditation. Prerequisite(s): Consent of the instructor.

OT 590 Proseminar in Occupational Therapy 1 hour.
Topics related to leadership/management, education, and advanced practice in occupational therapy. Satisfactory/Unsatisfactory grading only. May be repeated.

OT 592 Doctoral Project Research 1 TO 20 hrs.
Applied scholarship involving planning and implementation of one or more action projects based on theory and evidence, evaluation, writing a comprehensive report, dissemination, and oral presentation. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 20 hours. Prerequisite(s): Consent of the instructor.
OT 594  
Special Topics  
in Occupational Therapy  
1 TO 4 hrs.  
New course under development and selected seminar topics of current interests to faculty and students. Prerequisite(s): Consent of the instructor.

OT 595  
Seminar in Occupational Therapy  
1 hour.  
Pre-thesis seminar. Students participate in faculty-student discussion and activities related to individual areas of research/thesis. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

OT 596  
Independent Study  
1 TO 4 hrs.  
This course is for graduate students who wish to pursue independent study not related to their project/thesis research. Prerequisite(s): Consent of the instructor.

OT 597  
Project Research  
0 TO 8 hrs.  
Independent scholarship focusing on problems of application in field. Students undertake an action project, create a method for dissemination, and orally present the project. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 8 hours. Prerequisite(s): Graduate standing in the Master of Science in Occupational Therapy program and consent of the instructor.

OT 598  
Research in Occupational Therapy  
0 TO 16 hrs.  
Independent research in occupational therapy, directed by a faculty member. MS students that elect to do the thesis option must take a minimum of 8 credit hours. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Foundation courses in research methods, such as OT 510, and statistics, or consent of the instructor.

Oral and Maxillofacial Surgery  
OSUR 510  
Conscious Sedation and General Anesthesia  
3 hrs.  
Didactic lectures in all phases of pain and anxiety control supplemented with clinical experience in administration of general anesthetic and inhalation and intravenous sedatives. Satisfactory/Unsatisfactory grading only. May be repeated.

OSUR 511  
Oral Surgery Seminar  
2 hrs.  
Lecture, seminars, conferences, and journal clubs dealing with current topics of clinical and research interest. Satisfactory/Unsatisfactory grading only.

OSUR 513  
Craniomaxillofacial Deformity Seminar  
1 hour.  
Discusses the investigation, evaluation, treatment planning, and follow-up monitoring of patients with craniofacial deformities. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Admission to oral and maxillofacial surgery residency or orthodontics graduate program.

OSUR 550  
Oral and Maxillofacial Surgery Diagnostic Seminar  
2 hrs.  
A series of seminars dealing with differential diagnosis and treatment of oral lesions. Satisfactory/Unsatisfactory grading only.

OSUR 552  
Diagnosis and Treatment Planning in Orthognathic Surgery  
2 hrs.  
Nonorthognathic surgical topics of practical interest to orthodontists and their professional interrelationships with oral and maxillofacial surgeons.

OSUR 553  
Oral and Maxillofacial Surgery Literature Review  
2 hrs.  
The methodology for critical review of medical literature and discuss key articles appearing in appropriate medical journals. Satisfactory/Unsatisfactory grading only.

OSUR 561  
Physical Diagnosis  
4 hrs.  
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 424  
Oral Pathology  
4 hrs.  
Diseases of teeth, periodontium, facial bones, muscles, nerves, and mucous membranes of the oral region, and salivary glands. Introduction to clinical differential diagnosis. Prerequisite(s): ANAT 312 and BCMG 411 and HSTL 451 and PHYB 321 and PATH 421.

OMDS 503  
Graduate Oral Pathology  
2 hrs.  
Oral pathology for postgraduate students will cover the clinical and microscopic features of pathologic changes linked to oral-dental and systemic diseases. Prerequisite(s): OMDS 424 or the equivalent. Recommended background: Prior academic course work including biology, histology, and other related sciences.

OMDS 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(s): Consent of the instructor.

OMDS 527  
Oral Biology Seminar  
1 hour.  
Invited speakers present the progress of current research work in their field of interest related to oral tissues. Same as HSTL 514. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

OMDS 529  
Electron Microscopy in Dentistry  
1 hour.  
Principles, theory, and practice of transmission and scanning electron microscopy, and energy dispersive X-ray microanalysis. Processing, sectioning, staining, and examination of tissues. Same as HSTL 515. Prerequisite(s): Consent of the instructor.

OMDS 595  
Seminar in Oral Pathology  
2 hrs.  
Reviews, reports, and discussion topics are drawn from the literature and material of surgical oral pathology. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

OMDS 598  
Research in Oral Pathology  
0 TO 16 hrs.  
Independent thesis research on basic biomedical phenomena or specific oral disease(s). Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the advisor.

Oral Sciences  
OSCI 451  
Research Methodology  
1 hour.  
Designed to help the student understand, utilize, and appreciate the process of scientific inquiry. Primarily intended for students enrolled in the Master of Science in Oral Sciences degree program. Prerequisite(s): 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.

OSCI 452  
Biological Basis of Oral Diseases  
2 hrs.  
Focuses on the biological basis of oral disease and modern concepts in the biomedical sciences. Prerequisite(s): BCMG 411 and HSTL 451 or the equivalent courses, or consent of the instructor.

OSCI 534  
Dental and Medical Anthropology  
Within Human Evolution  
1 TO 3 hrs.  
Studies the biological and physical anthropology of hominid teeth and the craniofacial complex with relevant medical anthropology, ethno-pharmacology, forensic sciences, and paleopathology topics. Same as ANTH 534 and PMPG 534. Fieldwork required. A lab experience, independent study, and a research paper is required for 3 hours of credit. Prerequisite(s): Graduate standing and consent of the instructor.

OSCI 580  
Advanced Oral Sciences I  
2 hrs.  
Discussion follows presentation of faculty research. Topics include developmental and molecular biology, tissue engineering, genetics, and structural biology in tandem with cutting-edge dental technology.

OSCI 581  
Advanced Oral Sciences II  
2 hrs.  
Continuation of OSCI 580. Prerequisite(s): OSCI 580.

OSCI 583  
Research Laboratory  
Rotation  
1 TO 4 hrs.  
Students participate directly in laboratory research; learn to approach a scientific problem and to perform various experimental techniques to investigate the problem. May be repeated to a maximum of 6 hours.

OSCI 590  
Hominid Evolution, Dental Anthropology, and Human Variation  
1 hour.  
Evolution; hominid origins; organization and development of human dentition, agenesis, metric and nonmetric variation in tooth form, human growth and maturation, variation, and adaptation. Prerequisite(s): Consent of the instructor.
Course Descriptions

• Pathology • Pediatric Dentistry

Pathology

PATH 427 Clinical Pathology 4 hrs.
Prerequisite(s): PATH 424 and consent of the instructor.

PATH 506 Medical Immunology and Flow Cytometry 2 hrs.
Prerequisite(s): PATH 425 and consent of the instructor.

PATH 507 Physiological Basis of Pathology 2 hrs.
Prerequisite(s): PATH 427 and consent of the instructor.

PATH 510 General Pathology 3 hrs.
Prerequisite(s): Consent of the instructor.

PATH 511 Pathobiology of Cancer 3 hrs.
Prerequisite(s): Consent of the instructor.

PATH 512 Molecular Epidemiology and Biomarkers of Disease 3 hrs.
Prerequisite(s): Consent of the instructor.

PATH 513 Special Topics in Pathology 1 TO 4 hrs.
Prerequisite(s): Consent of the instructor.

Pathobiology of Cancer

PATH 421 General Pathology—Dental 3 hrs.
Prerequisite(s): ANAT 440 and PATH 407 and PHYB 401 or consent of instructor.

PATH 422 Systemic Pathology—Dentistry 3 hrs.
Prerequisite(s): Consent of the instructor.

PATH 425 General Pathology 3 hrs.
Prerequisite(s): Consent of the instructor.

PATH 426 Organ Pathology 5 hrs.
Prerequisite(s): Consent of the instructor.

Pediatric Dentistry

PEDD 410 Principles and Methods in Dental Research I 2 hrs.
Prerequisite(s): Consent of the instructor.

PEDD 501 Dental Pediatrics I 2 hrs.
Prerequisite(s): Consent of the instructor.

PEDD 502 Dental Pediatrics II 2 hrs.
Prerequisite(s): Consent of the instructor.
Pediatric Dentistry Seminar 2 hrs. Presentation and discussion of current literature and research in pediatric dentistry, medical and dental aspects of pulpal therapy, traumatology, fluorides, and cariology. Provides behavior guidance and application of material from other areas. Satisfactory/Unsatisfactory grading only.

Pharmacognosy

PMPG 480 Biological Evaluation of Natural Products 3 hrs. Short-term procedures useful for the discovery and characterization of natural product drugs, with related laboratory experiments, and principles of advanced drug development. Prerequisite(s): Consent of the instructor.

PMPG 499 Special Projects in Pharmacognosy 1 to 3 hrs. Special topics in pharmacognosy dealing with isolation and characterization of natural products. Prerequisite(s): PMPG 480 or consent of the instructor.

PMPG 507 Drug Discovery, Design, and Development 3 hrs. Overview of drug development process from target identification and screening through clinical trials and FDA evaluation. Same as BPS 507 and MDCH 507.

PMPG 510 Research Techniques in Pharmacognosy 3 hrs. Introduction to the techniques used in pharmacognosy.

PMPG 511 Advanced Pharmacognosy 4 hrs. 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(s): PMPG 507 or consent of the instructor.

PMPG 512 Microscopy of Natural Drug Products 3 hrs. 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(s): PMPG 517 or consent of the instructor.

PMPG 513 Structure of Biopolymers 3 hrs. Exploration of the relationship between structural stability, kinetic properties, and function of biopolymers, with particular emphasis on proteins and nucleic acids. Same as BCMG 513 and MIM 513. Prerequisite(s): Consent of the instructor.

PMPG 514 Marine Natural Products 2 hrs. Exploration of the relationship between marine biodiversity and human health. Use of spectroscopic and biological methods to identify and validate marine natural products. Prerequisite(s): Consent of the instructor.

PMPG 515 Structure Elucidation of Natural Products I 2 hrs. Learn the basic skills needed to elucidate the structure of a natural product by spectroscopic methods using real-life examples. May be repeated to a maximum of 6 hours. Prerequisite(s): Credit or concurrent registration in MDCH 562 and consent of the instructor.

PMPG 516 Structure Elucidation of Natural Products II 3 hrs. Employing modern computational methods in the structure elucidation of natural products. Prerequisite(s): Consent of the instructor.

PMPG 517 Problem-Solving in Plant Taxonomy 4 hrs. Principles and concepts in plant taxonomy, which include identification, classification, nomenclature, discussion of major recent/modern systems, family characterization, and fieldwork methods. Prerequisite(s): Consent of the instructor.

PMPG 518 Correlative Phytochemistry 2 hrs. Distributional correlation of well-defined groups of secondary plant metabolites with existing plant-classification systems as an aid in the search for biologically active natural products. Prerequisite(s): PMPG 517.

PMPG 520 Enthopharmacology Fieldwork 4 hrs. 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. Contingent on availability of funds for travel support. Prerequisite(s): PMPG 517 or consent of the instructor.

PMPG 521 Recent Advances in Pharmacognosy 2 hrs. A review of recent progress in the chemistry, biosynthesis, and biophysical properties of natural products. Prerequisite(s): PMPG 511.

PMPG 522 Laboratory Techniques in Pharmaceutical Biotechnology I 3 hrs. 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(s): Credit or concurrent registration in BCMG 460 or consent of the instructor.

PMPG 523 Laboratory Techniques in Pharmaceutical Biotechnology II 3 hrs. In continuation of PMPG 522 students will perform laboratory research rotations as assigned by the biotechnology track faculty in the laboratories of the Center for Pharmaceutical Biotechnology in the College of Pharmacy. Prerequisite(s): PMPG 522; or consent of the instructor.

PMPG 534 Dental and Medical Anthropology Within Human Evolution 1 to 3 hrs. Studies the biological and physical anthropology of hominid teeth and the craniofacial complex with relevant medical anthropology, ethnopharmacology, forensic sciences, and paleopathology topics. Same as ANTH 534 and OSCI 534. Fieldwork required. A lab experience, independent study, and a research paper are required for 3 hours of credit. Prerequisite(s): Graduate standing and consent of the instructor.

PMPG 540 Marine Natural Products 2 hrs. Exposure graduate students to field of marine natural product chemistry. Course will include examples of marine antineoplastic agents, marine toxins, and other pharmacologically relevant marine natural products from various marine organisms. May be repeated to a maximum of 6 hours. Prerequisite(s): Consent of the instructor.

PMPG 553 Cancer Biology and Therapeutics 2 hrs. Fundamentals of cancer biology with emphasis on biological, hormonal, and chemotherapeutic drug therapies currently used and in development. Specific treatment approaches to breast, ovarian, prostate, and colon cancers will be explored. Same as BPS 553 and MDCH 553. Prerequisite(s): Consent of the instructor. Recommended background: Molecular and cellular biology.

PMPG 555 Special Projects in Pharmacognosy 1 to 3 hrs. Overview of current research topics of interest in pharmacognosy: potential areas—ethnomedicine, biological evaluation, dietary supplements, taxonomy, chemotaxonomy, organism propagation, and applications of contemporary analytical techniques. May be repeated up to 3 times. Prerequisite(s): Completion of the first year of the program.

PMPG 559 Predictive Strategies in Pharmacognosy 2 hrs. Consideration of the methods employed for the selection of plants that are most likely to yield biologically active compounds. Prerequisite(s): Demonstration of competency in organic chemistry, botany, and pharmacology.

PMPG 560 Laboratory Techniques in Pharmacognosy I 2 hrs. Perform laboratory research rotations as assigned by pharmacognosy drug discovery track faculty of Program for Collaborative Research in Pharmaceutical Sciences (PCRPS). Prerequisite(s): Credit or concurrent registration in PMPG 510 or consent of the instructor.

PMPG 564 Laboratory Techniques in Pharmacognosy II 2 hrs. In continuation of PMPG 560, student will perform lab research rotations as assigned by pharmacognosy drug discovery track faculty of the Program for Collaborative Research in Pharmaceutical Sciences (PCRPS). Prerequisite(s): PMPG 559 or consent of the instructor.

PMPG 565 Seminar in Pharmacognosy 1 hour. Presentation on a current research topic. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 2 hours.

PMPG 567 Master’s Research in Pharmacognosy 0 to 16 hrs. Research for completion of master’s degree. Satisfactory/Unsatisfactory grading only.

PMPG 589 Doctoral Research in Pharmacognosy 0 to 16 hrs. Research for students in the pharmacognosy doctoral program. Satisfactory/Unsatisfactory grading only. May be repeated.
Pharmacology

PCOL 430 Principles of Toxicology 2 hrs.
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. Same as BPS 430. Credit is not given for PCOL 430 if the student has credit for EOHS 457.

PCOL 501 Medical Pharmacology I 3 hrs.
A lecture, conference, and laboratory course on human pharmacology. Drug mechanisms, toxicology, and kinetics are presented as a foundation to therapeutic application. This is a College of Medicine course that does not follow the regular academic calendar. Credit is not given for PCOL 501 if the student has credit for PCOL 425.

Prerequisite(s): Grade of C or better in GCLS 501 and grade of C or better in GCLS 503; or consent of the instructor.

PCOL 502 Medical Pharmacology II 3 hrs.
Continues PCOL 501. A lecture, conference, and laboratory course on human pharmacology. Drug mechanisms, toxicities, and kinetics are presented as a foundation to therapeutic application. Credit is not given for PCOL 502 if the student has credit for PCOL 425. College of Medicine course that does not follow the regular academic calendar. Prerequisite(s): Grade of C or better in GCLS 501 and grade of C or better in GCLS 503; or consent of the instructor.

PCOL 510 Molecular Pharmacology of Platelets, Thrombosis, and Vascular System 2 hrs.
Molecular mechanism and therapeutic approaches to: platelet functions, thrombosis, hemostasis, and vascular biology. The platelet as a model cell for molecular mechanisms of intracellular signal transduction and cell adhesion. Prerequisite(s): Credit or concurrent registration in GCLS 501 and GCLS 503; or consent of the instructor.

PCOL 530 Pharmacology and Biology of the Vessel Wall 2 hrs.
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. Prerequisite(s): Credit or concurrent registration in GCLS 501 and GCLS 503; and consent of the instructor.

PCOL 540 Ion Channels: Structure, Function, Pharmacology, and Pathology 2 hrs.
The concept of ion channels is treated from the perspectives of their molecular structures and functions. Modulation, pathological conditions (channelopathies), and pharmacological intervention will also be treated. Same as PSYB 540. Recommended background: One undergraduate course in biochemistry and one in physiology, or consent of the instructor.

PCOL 550 The Biology and Pharmacology of the Lung 2 hrs.
Covers topics in lung biology and physiology. The importance of impaired lung function in inducing lung diseases and potential therapeutics will be discussed. Prerequisite(s): Credit or concurrent registration in GCLS 501; or credit or concurrent registration in GCLS 503; or consent of the instructor.

PCOL 594 Special Topics 1 hour.
Organized presentation and discussion of rapidly developing research areas in molecular, cellular, and systems pharmacology. May be repeated. Prerequisite(s): Consent of the instructor.

PCOL 595 Pharmacology Seminar 1 hour.
Presentation of research and/or current literature by invited lecturers and students. Satisfactory/ Unsatisfactory grading only. May be repeated.

PCOL 598 MS Thesis Research 0 TO 16 hrs.
Thesis work under the supervision of a graduate advisor. Satisfactory/ Unsatisfactory grading only.

PCOL 599 PhD Thesis Research 0 TO 16 hrs.
Thesis work under the supervision of a graduate advisor. Satisfactory/ Unsatisfactory grading only.

Pharmacy

PHAR 400 Pharmacokinetics 3 hrs.
Concepts and principles in pharmacokinetics, including theories and basis for drug receptor actions, drug absorption, distribution, excretion, and biotransformation. Prerequisite(s): Credit or concurrent registration in PHAR 322 and credit or concurrent registration in PHAR 332 and credit or concurrent registration in PHYB 302.

PHAR 401 Principles of Drug Action and Therapeutics I 3 hrs.
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. Prerequisite(s): PHYB 302 and PHAR 342 and second year standing in the Doctor of Pharmacy program.

PHAR 402 Principles of Drug Action and Therapeutics II 4 hrs.
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of the autonomic nervous system, cardiology, lipid disorders, and hypertension. Prerequisite(s): PHAR 342 and PHAR 400 and second year standing in the Doctor of Pharmacy program.

PHAR 403 Principles of Drug Action and Therapeutics III 3 hrs.
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the area of infectious disease. Prerequisite(s): PHAR 352 and PHAR 401 and PHAR 402 and second year standing in the Doctor of Pharmacy program or consent of the instructor.

PHAR 404 Principles of Drug Action and Therapeutics IV 3 hrs.
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the area of infectious disease. Prerequisite(s): PHAR 352 and PHAR 401 and PHAR 402 and second year standing in the Doctor of Pharmacy program or consent of the instructor.

PHAR 405 Principles of Drug Action and Therapeutics V 3 hrs.
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of drug abuse, cerebrovascular diseases, Parkinson's and epilepsy. Prerequisite(s): PHAR 353 and PHAR 401 and PHAR 402 and third year standing in the Doctor of Pharmacy program or consent of the instructor.

PHAR 406 Principles of Drug Action and Therapeutics VI 3 hrs.
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of pain management and psychiatric disorders. Prerequisite(s): PHAR 403 and PHAR 404 and third year standing in the Doctor of Pharmacy program or consent of the instructor.

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. Prerequisite(s): PHAR 533 and PHAR 401 and PHAR 402 and third year standing in the Doctor of Pharmacy program or consent of the instructor.

PHAR 408 Principles of Drug Action and Therapeutics VIII 3 hrs.
Integration of medicinal chemistry, pharmacology, pharmacotherapeutics, pharmacokinetics, and toxicology in the areas of bones and joints, hematological disorders, and oncology. Prerequisite(s): PHAR 533 and PHAR 401 and PHAR 402 and third year standing in the Doctor of Pharmacy program or consent of the instructor.

PHAR 441 Roles, Environments, and Communications 3 hrs.
Selected factors that influence pharmacists’ practice, societal, and professional expectations, and the importance of effective communications with a variety of patients and professional audiences. Prerequisite(s): Acceptance into the Doctor of Pharmacy program.

PHAR 442 Pharmacy Law 3 hrs.
Federal and state statutes and regulations pertaining to the licensing of pharmacists, the practice of pharmacy, and distribution of drugs. Case law and the ethical dilemmas relating to the pharmacists’ standard of care are included. Prerequisite(s): PHAR 342.

PHAR 455 Drug Information and Statistics 4 hrs.
Overview of drug information, resources, and statistics used in healthcare research, including systematic approaches for critical evaluation of the literature and effective communication of information. Prerequisite(s): PHAR 341.
Pharmacy Administration

PMAD 421 Pharmaceutical Marketing 3 hrs.
Introduction to the field of marketing with specific emphasis on pharmaceuticals and the marketing of pharmacy services.

PMAD 470 Managed-Care Pharmacy 3 hrs.
Professional development in managed-care pharmacy to learn history, administrative, and policy aspects, network with operational managers and leaders in field, visit managed-care sites, and observe activities of managed-care pharmacists.

Prerequisite(s): Third year standing in the Doctor of Pharmacy program or second year standing in the Doctor of Pharmacy program with consent of the instructor, or graduate standing in Pharmacy.

PMAD 482 Professional Practice Management 3 hrs.
Managerial functions of the pharmacist in all practice environments with emphasis on the planning, organizing, staffing, directing, and controlling of resources.

PMAD 484 Systematic Reviews and Meta-Analysis 3 hrs.
The course will discuss the conceptual process and statistical methods required to perform a systematic review or meta-analysis of a large body of empirical findings. Extensive computer use required.

Prerequisite(s): EPID 400 or BSTT 400 and PHAR 355 or PMAD 502 or graduate standing or consent of the instructor.

PMAD 494 Special Topics in Pharmacy Administration 1 TO 3 hrs.
Topics will vary, including the ongoing analysis of contemporary issues associated with delivery, financing, and management of pharmaceutical products and professional services. May be repeated to a maximum of 6 hours.

PMAD 502 Research Methods in Pharmacy Administration 3 hrs.
Focuses on "how-to-do" a research project and "why-to-use" a particular technique including metaanalysis, path analysis, conceptualization, measurement, and data processing.

Prerequisite(s): SOC 500 and consent of the instructor.

PMAD 507 Pharmacy and Its Environment 2 hrs.
Factors directly influencing the practice of pharmacy. Roles of the pharmacist as affected by contemporary organizational, legislative, societal, and fiscal environments.

Prerequisite(s): Admission into the MS or PhD in Pharmacy program.
PHIL 417 Metaphysic II 3 OR 4 hrs. Effective computability and recursive functions. Peano arithmetic. Arithmetization of syntax. Incompleteness and undecidability: Godel's and Church's theorems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): PHIL 416 or consent of the instructor.

PHIL 420 Plato 3 OR 4 hrs. Careful reading of selected works. Undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): PHIL 220 or PHIL 221 or 3 courses in philosophy or consent of the instructor.

PHIL 421 Aristotle 3 OR 4 hrs. Careful reading of selected works. Undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): PHIL 220 or PHIL 221 or 3 courses in philosophy or consent of the instructor.

PHIL 425 Studies in Nineteenth-Century Philosophy 3 OR 4 hrs. Careful reading of one or more post-Kantian philosophers such as Hegel, Schelling, Fichte, Schopenhauer, Marx, J.S. Mill, Kierkegaard, and Nietzsche. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): One 200-level course in philosophy or consent of the instructor. Recommended background: Credit in a course in moral, social, or political philosophy.

PHIL 426 Analytic and Logical Empiricism 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): PHIL 210 or PHIL 226 or consent of the instructor.

PHIL 427 Continental Philosophy II: European Thought Since 1960 3 OR 4 hrs. European thought since 1960: existential Marxism, critical theory, structuralism, poststructuralism, and deconstruction. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): PHIL 227 or consent of the instructor.

PHIL 429 Special Studies in the History of Philosophy 3 OR 4 hrs. Advanced study of a historical school, period, or the development of a historical theme. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): PHIL 227 or consent of the instructor.

PHIL 430 Ethics 3 OR 4 hrs. Selected topics in moral philosophy, such as normative ethics, value theory, or meta-ethics. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): PHIL 223 or PHIL 224 or three courses in philosophy or consent of the instructor.

PHIL 431 Social/Political Philosophy 3 OR 4 hrs. Selected topics in social and political philosophy. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): One 200-level course in philosophy or consent of the instructor. Recommended background: Credit in a course in moral, social, or political philosophy.

PHIL 432 Topics in Ethics 3 OR 4 hrs. Selected topics in ethics. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): One 200-level course in philosophy or consent of the instructor. Recommended background: Credit in a course in moral, social, or political philosophy.

PHIL 433 Topics in Social/Political Philosophy 3 OR 4 hrs. Selected topics in social and political philosophy. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): One 200-level course in philosophy or consent of the instructor. Recommended background: Credit in a course in moral, social, or political philosophy.

PHIL 441 Topics in Philosophy of Religion 0 TO 4 hrs. Intensive study of one or more selected topics concerning the philosophical aspects of basic religious beliefs and concepts. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s) with approval. Approval to repeat course granted by the department. Prerequisite(s): One 200-level course in philosophy or consent of the instructor. Recommended background: Credit in a course in moral, social, or political philosophy.

PHIL 484 Neuroscience I 3 hrs. Neuroscience as an integrative discipline. Neuroanatomy of vertebrates, neural development, cellular neurobiology, action potential mechanisms, synaptic transmission, and neuropharmacology. Same as BIOS 484 and PSCH 484. Prerequisite(s): BIOS 286 or PSCH 282.

PHIL 485 Neuroscience II 3 hrs. Integrative neuroscience, continuation of BIOS/PSCH/PHIL 484. Sensory and motor systems; learning, memory, and language. Pathology of nervous systems. Philosophical perspectives, and modeling. Same as BIOS 485 and PSCH 485. Prerequisite(s): BIOS 484.

PHIL 500 Writing in Philosophy 4 hrs. 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. Required of all first-year PhD students. Prerequisite(s): Graduate standing in philosophy.

PHIL 501 Seminar: Topics in Ancient Philosophy 4 hrs. Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 503 Medieval Philosophy 4 hrs. Intensive study of special topics in medieval philosophy. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 504 Theoretical Approaches to Policy and Governance 4 hrs. Different theoretical approaches to the relationship between policy and governance and the philosophical foundations on which those approaches are based. Same as POLS 594. Prerequisite(s): Consent of the department required for nondegree graduate students.

PHIL 505 Seminar in Modern Philosophy 4 hrs. Intensive analysis of the work of a important philosopher or philosophical movement between 1600 and 1900. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 508 Nineteenth-Century Philosophy 4 hrs. Topics in nineteenth-century philosophy. May be repeated with approval. Students may register for more than one section per term. Approval to repeat course granted by the department.

PHIL 509 History of Analytic Philosophy 4 hrs. Topics in late nineteenth- and early twentieth-century Anglo American philosophy. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 510 History of Ethics and Social/Political Philosophy 4 hrs. Topics in the history of ethics or social-political philosophy. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.
PHIL 513 Topics in History of Philosophy 4 hrs.
Philosophers, philosophical schools, or intellectual trends other than those of the ancient and modern periods. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 520 Topics in Contemporary Philosophy 4 hrs.
Intensive analysis of the work of one important philosopher or philosophical movement of the twentieth century. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 522 Feminist Philosophy 4 hrs.
Topics in feminist philosophy. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 524 Continental Philosophy 4 hrs.
Topics in continental philosophy. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 526 Ethics 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 528 Social/Political Philosophy 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 530 Aesthetics 4 hrs.
Intensive study of selected topics in aesthetics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 532 Metaphysics 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 534 Philosophy of Mind 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 536 Epistemology 4 hrs.
Selected topics in the contemporary theory of knowledge. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 538 Philosophy of Language 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 540 Philosophy of Science 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 542 Philosophy of Special Sciences 4 hrs.
Intensive study of special topics in philosophy of physics, philosophy of biology, or other sciences. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 544 Philosophy of Logic 4 hrs.
Intensive study of selected topics. May be repeated with approval. Approval to repeat course granted by the department. Students may register for more than one section per term when topics vary.

PHIL 546 Philosophy of Mathematics 4 hrs.
Philosophical foundations of mathematics. May be repeated with approval. Approval to repeat course granted by the department.

PHIL 552 Mathematical Logic I 4 hrs.
First-order logic, completeness theorem, and model theory. Same as MATH 502. Prerequisite(s): MATH 430 or consent of the instructor.

PHIL 553 Mathematical Logic II 4 hrs.
Incompleteness theorems, elementary recursion theory and proof theory, and first- and second-order arithmetic. Same as MATH 503. Prerequisite(s): MATH 502 or PHIL 562.

PHIL 554 Metamathematics I 4 hrs.
Metamathematics I 4 hrs.

PHIL 555 Metamathematics II 4 hrs.

PHIL 556 Set Theory I 4 hrs.
Naive and axiomatic set theory. Independence of the continuum hypothesis and the axiom of choice. Same as MATH 504. Prerequisite(s): MATH 430 or MATH 502 or PHIL 562.

PHIL 557 Model Theory I 4 hrs.
Introduction to stability theory: categoricity, stability, forking, finite equivalence relation theorem, indiscernibles, orthogonality. Same as MATH 506. Prerequisite(s): MATH 502 or PHIL 562.

PHIL 558 Model Theory II 4 hrs.
Intermediate stability theory: dependence, prime models, isolation, regular types, dimension. Same as MATH 507. Prerequisite(s): MATH 506 or PHIL 567.

PHIL 559 Advanced Topics in Logic 4 hrs.
Advanced topics in modern logic; e.g., descriptive set theory, model theory of fields, theory of hierarchies, stable groups. Same as MATH 512. May be repeated. Students may register for more than one section per term.

PHIL 560 Research Seminar 4 hrs.
A work-in-progress seminar for graduate students at the topical, prospectus, or dissertation level. Satisfactory/Unsatisfactory grading only. May be repeated.

PHIL 561 Independent Research 2 TO 8 hrs.
Topics and plan of study must be approved by the candidate’s advisor and by the staff member who directs the work. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.

PHIL 562 Independent Study 1 TO 4 hrs.
Topics and plan of study must be approved by the candidate’s advisor and by the staff member who directs the work. May be repeated. Students may register in more than one section per term.

PHIL 563 Thesis Research 0 TO 16 hrs.
Research for the PhD thesis. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.

PHIL 564 Thesis 0 TO 16 hrs.
Research for the PhD thesis. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.

PHIL 565 Science of Physical Therapy Practice 3 hrs.
Concepts of evidence-based physical therapy practice, including practice theory, measurement, outcomes assessment, and critical evaluation of the body of literature in context of the healthcare system and health policy. Prerequisite(s): Consent of the instructor.

Psychometric characteristics of standardized tests of motor development and function. Survey of tests, test evaluation, interpretation of test scores, and application to clinical practice. Prerequisite(s): Consent of the instructor and a graduate-level course in statistics.

PT 502 Analysis of Motor Development Processes in Infancy 2 hrs.
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. Prerequisite(s): Consent of the instructor and credit or concurrent registration in a graduate-level course in statistics.

PT 503 Control of Posture and Locomotion 2 hrs.
Review and analysis of normal and developmental aspects, assessment, disorders, and rehabilitation of balance and gait disorders. Prerequisite(s): PT 562; and consent of the instructor.

PT 504 Therapeutic Intervention 3 hrs.
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(s): Consent of the instructor.

PT 511 Joint Dysfunction 3 hrs.
Principles of mechanics applied to pathology of joint components; mechanical and neurotologic implications of extremity and spinal joint dysfunction; critical review of pertinent literature. Prerequisite(s): PT 519.
PT 521 Biomechanics of Locomotor Dysfunction 3 hrs. 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(s): Consent of the instructor.

PT 580 Advanced Clinical Reasoning in Orthopedic Manual Physical Therapy I: Extremities 2 hrs. Designed to promote clinical reasoning and understanding of the research literature for enhancement of evidence-based clinical practice with an emphasis on extremitiy-joint dysfunction. Prerequisite(s): Must be a U.S. licensed physical therapist.

PT 581 Advanced Clinical Reasoning in Orthopedic Manual Therapy II: Spine 2 hrs. Designed to promote clinical reasoning and understanding of the research literature for enhancement of evidence-based clinical practice with an emphasis on spinal-joint dysfunction. Prerequisite(s): Must be a U.S. licensed physical therapist.

PT 582 Advanced Manipulation and Orthopedic Manual Physical Therapy I: Extremities 3 hrs. Designed to provide an evidence-based approach toward evaluation and management of peripheral musculoskeletal disorders, including thrust and nonthrust manipulation. Prerequisite(s): Must be a U.S. licensed physical therapist.

PT 583 Advanced Manipulation and Orthopedic Manual Physical Therapy II: Spine 3 hrs. Designed to provide an evidence-based approach toward evaluation and management of spinal musculoskeletal disorders, including thrust and nonthrust manipulation. Prerequisite(s): Must be a U.S. licensed physical therapist.

PT 584 Clinical Mentorship I: Extremities 3 hrs. Physical therapy practice under the tutelage of a mentor. Students will apply and master skills, techniques, and reasoning methods learned in the didactic course work. Emphasis is on peripheral musculoskeletal disorders. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Instructor approval required; must be a U.S. licensed physical therapist.

PT 585 Clinical Mentorship II: Spine 3 hrs. Physical therapy practice under the tutelage of a mentor. Students will apply and master skills, techniques, and reasoning methods learned in the didactic course work. Emphasis is on spinal musculoskeletal disorders. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Instructor approval required; must be a U.S. licensed physical therapist.

PT 594 Special Topics in Physical Therapy 1 TO 4 hrs. Selected topics of interest within physical therapy specialty areas. Particular attention is given to topics of cross-cutting importance to these professions, especially applications in teaching, consultation, and administration. May be repeated to a maximum of 8 hours if topics vary. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PT 595 Seminar in Physical Therapy 1 hour. Topics of current interest in physical therapy. Includes discussions of current research and important new developments in the specific disciplines. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

PHYS 411 Quantum Mechanics I 4 hrs. This is the second semester of a two-semester undergraduate-level sequence on the concepts and methods of quantum mechanics and their applications. Prerequisite(s): PHYS 411.

PHYS 421 Modern Physics: Atoms and Molecules 4 hrs. 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(s): Consent of the instructor.
PHYS 461 Thermal and Statistical Physics 4 hrs. Thermal equilibrium (zeroth law); thermodynamic states (first law); irreversibility; entropy (second law); thermodynamic potentials and properties; phase transitions; kinetics of the gas; classical statistical mechanics. Prerequisite(s): PHYS 245.

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

PHYS 471 Educational Practice with Seminar II 6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.

PHYS 481 Modern Experimental Physics I 4 hrs. Theory and experimental use of linear circuits, semiconductor devices, amplifiers, oscillators. Techniques and experiments in atomic, molecular, and solid-state physics. Prerequisite(s): PHYS 244.


PHYS 491 Special Topics in Physics 1 TO 4 hrs. Selected topics of current interest in physics. May be repeated. Prerequisite(s): PHYS 215 and sophomore standing or above; or approval of the department.

PHYS 494 Special Topics in Physics 2 TO 4 hrs. Seminar on various topics related to the teaching of physics. Subjects are announced. May be repeated. Students may register in more than one section per term. Supervised teaching practice included. Prerequisite(s): Graduate standing or approval of the department.

PHYS 499 Survey of Physics Problems 1 hour. Problem-solving techniques applied to the variety of undergraduate physics topics. May be repeated up to 1 term(s). No graduation credit for graduate students. Grade of C or better required to graduate with an undergraduate degree in Physics. Prerequisite(s): Credit or concurrent registration in PHYS 481.

PHYS 501 Electrodynamics I 4 hrs. Maxwell's equations, static and time dependent fields in material media and in vacuo. Boundary value problems, wave propagation. Classical theory of radiation. Prerequisite(s): PHYS 402 or approval of the department.


PHYS 511 Quantum Mechanics I 4 hrs. Linear operators, vector spaces. Schrödinger equation. Heisenberg formalism. Multi-identical-particle systems, approximation methods, perturbation theory, symmetry and groups, conservation laws, angular momentum, spin, Wigner-Eckart theorem. Prerequisite(s): PHYS 412 or approval of the department.

PHYS 512 Quantum Mechanics II 4 hrs. Scattering theory, partial waves, Born approximation, density matrix, interaction of radiation with matter; Klein-Gordon and Dirac equations, free-particle solutions, antiparticles, relativistic hydrogen atom. Second quantization. Prerequisite(s): PHYS 511 or approval of the department.

PHYS 513 Quantum Field Theory I 3 hrs. 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(s): PHYS 512.

PHYS 514 Quantum Field Theory II 3 hrs. Path integrals, gauge theories, Weinberg-Salam model, electroweak processes, quantum chromodynamics, non perturbative methods, topological objects in field theories, interaction processes. Prerequisite(s): PHYS 513.


PHYS 521 Molecular Physics 3 hrs. Rotational and vibrational energies of molecules, potential curves, electronic transitions, transition moments, intensity rules, thermodynamic properties. Applications. Prerequisite(s): PHYS 411 and PHYS 421; or approval of the department.

PHYS 522 Laser Physics/Quantum Electronics 3 hrs. Laser physics: population inversion; quantum theoretical calculation; modern laser systems; coherence phenomena; applications of lasers. Prerequisite(s): PHYS 521 or approval of the department.

PHYS 524 Group Theory in Physics 3 hrs. Applications of group theory and symmetry principles to problems in elementary particle, solid-state, atomic, and molecular physics. Prerequisite(s): PHYS 512 or approval of the department.


PHYS 532 Solid-State Physics II 3 hrs. Semiconductor physics, electron-electron and electron-phonon interactions, superconductivity, spin systems, diamagnetism, paramagnetism, ferromagnetism, and anti-ferromagnetism. Prerequisite(s): PHYS 531.

PHYS 533 Theory of Solids: Magnetism and Superconductivity 3 hrs. The main body problem: many-particle states; functional integrals; Green's functions; Feynman diagrams; perturbation expansions; tree diagrams. Prerequisite(s): PHYS 512 and PHYS 532.
**PHYS 594** Special Topics in Modern Physics 1-4 hrs.
Lectures on topics of current interest. Subjects are announced in the previous semester. May be repeated. Students may register in more than one section per term. **Prerequisite(s):** PHYS 512.

**PHYS 595** Graduate Seminar 1 hour.
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. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 6 hours. Students may register in more than one section per term.

**PHYS 596** Individual Study 2-4 hrs.
Special topics. Outside reading and term paper are assigned by a special arrangement with the department and faculty. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. **Prerequisite(s):** Approval of the department.

**PHYS 598** Master’s Thesis Research 0-16 hrs.
Student may elect to do thesis research to fulfill partial requirement for master’s degree. Satisfactory/Unsatisfactory grading only. **Prerequisite(s):** Approval of the department.

**PHYS 599** Thesis Research 0-16 hrs.
PhD thesis research. Satisfactory/Unsatisfactory grading only. May be repeated. **Prerequisite(s):** Approval of the department.

### Physiology and Biophysics

**PHYB 502** Physiology of Reproduction 2 hrs.
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.

**PHYB 512** Gastrointestinal Physiology 2 hrs.
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(s):** PHYS 402 or consent of the instructor.

**PHYB 516** Physiology and Biochemistry of Muscle Contraction 2 hrs.
Structure and function of myosin, actin, tropomyosin, troponin, and the sarcoplasmic reticulum; control, energetics, and mechanism of muscle contraction; gene expression.

**PHYB 518** Molecular, Cellular, and Integrative Cardiovascular Physiology 3 hrs.
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(s):** PHYB 401 or consent of the instructor.

**PHYB 523** Exercise Biology in Health and Disease 3 hrs.
Interrelationships between exercise and various pathological conditions. Current research focusing on molecular and cellular mechanisms in healthy and diseased states. Satisfactory/Unsatisfactory grading only. **Prerequisite(s):** Consent of the instructor.

**PHYB 530** Stem Cells 2 hrs.
Discussion of stem cell development into different cell types that may offer a renewable source of replacement cells to treat diseases, conditions, and disabilities. Cells from adult tissue, fetal tissue, and embryonic sources are discussed. Recommended background: Knowledge of cell biology.

**PHYB 540** Ion Channels: Structure, Function, Pharmacology, and Pathology 2 hrs.
The concept of ion channels is treated from the perspectives of their molecular structures and functions. Modulation, pathological conditions (channelopathies), and pharmacological intervention will also be treated. Satisfactory/Unsatisfactory grading only. **Prerequisite(s):** One undergraduate course in biochemistry and one in physiology, or consent of the instructor.

**PHYB 551** Human Physiology I 5 hrs.
Lectures and conferences in human physiology. Emphasis is on cellular, nerve-muscle, cardiovascular, respiratory, and renal physiology. **Prerequisite(s):** One of Mathematics, undergraduate physics, and organic chemistry; or consent of instructor. Recommended background: Course work in biological sciences.

**PHYB 552** Translational and Applied Physiology 3 hrs.
Continuation of GCLS 500—Physiology. Advanced physiological concepts emphasizing interactions of different organs and systems under normal and abnormal conditions. Review of compensatory mechanisms and clinical applications of physiology. **Prerequisite(s):** GCLS 500. Recommended background: Course work in biological sciences.

**PHYB 559** Methods in Experimental Physiology 3 hrs.
Primarily for students in physiology. Registration limited to eight. A laboratory course designed to acquaint students with advanced techniques and methodology in physiologic investigations. **Prerequisite(s):** Enrollment in the MS or PhD in Physiology and Biophysics program, and credits or concurrent registration in PHYB 401 or the equivalent; or consent of the instructor.

**PHYB 585** Cell Biology 4 hrs.
Functional and structural organization of the cell with emphasis on the cellular basis of physiological activity. Satisfactory/Unsatisfactory grading only. **Prerequisite(s):** Consent of the instructor.

**PHYB 586** Cell Physiology 3 hrs.
Advanced functional and structural organization of the cell with emphasis on the cellular basis of physiological activity. **Prerequisite(s):** PHYB 552 and GCLS 501 and GCLS 503; or consent of the instructor.

**PHYB 591** Departmental Seminar 1 hour.
Weekly seminar by staff and invited speakers. Satisfactory/Unsatisfactory grading only. May be repeated. Required of all physiology and biophysics students each fall and spring semester while enrolled in the graduate program. **Prerequisite(s):** Graduate or professional standing.

**PHYB 592** Tactics and Strategy of Research in Physiology 2 hrs.
Course presents an analysis concerning various approaches in solving current physiology problems. Emphasizes critical reading of the literature. **Prerequisite(s):** PHYB 401.

**PHYB 594** Special Topics in Physiology and Biophysics 1-4 hrs.
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. May be repeated. Students may register in more than one section per term. **Prerequisite(s):** Consent of the instructor.

**PHYB 595** Journal Club and Seminar in Physiology 1 hour.
Student presentation and discussion of assigned topics of current importance in physiology and biophysics as well as related fields. Satisfactory/Unsatisfactory grading only. **Prerequisite(s):** Consent of the instructor. Limited to degree candidates in physiology and biophysics.

**PHYB 596** Independent Study 1-4 hrs.
Individual study guided by a faculty member. The format of the course, examination, and grading to be established by the faculty member. May be repeated. Students may register in more than one section per term. **Prerequisite(s):** Consent of the instructor.

**PHYB 598** MS Thesis Research 0-16 hrs.
Thesis work under the supervision of a graduate advisor. Satisfactory/Unsatisfactory grading only. **Prerequisite(s):** Graduate standing in physiology and biophysics.

**PHYB 599** PhD Thesis Research 0-16 hrs.
Thesis work under the supervision of a graduate advisor. Satisfactory/Unsatisfactory grading only.

**POL 401** Polish Composition and Conversation III 3 OR 4 hrs.
Development of oral and writing skills: expanding vocabulary and perfecting style. 3 undergraduate hours, 4 graduate hours. **Prerequisite(s):** POL 302.

**POL 402** Polish Composition and Conversation IV 3 OR 4 hrs.
Continues POL 401. 3 undergraduate hours, 4 graduate hours. **Prerequisite(s):** POL 401 or the equivalent.
POL 410 Structure of Modern Polish 3 OR 4 hrs. A synchronic-linguistic analysis of Polish substantives, pronouns, verbs, deverbal nouns, and minor parts of speech from a syntagmatic and paradigmatic point of view. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POL 402 or the equivalent.

POL 450 Studies in Polish Drama 3 OR 4 hrs. Main trends in Polish drama, leading playwrights, their aesthetics and philosophy in the context of European drama and from the Renaissance to the present. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): Advanced undergraduate standing.

POL 460 Studies in Polish Literature 3 OR 4 hrs. Literary trends in Polish poetry and prose; their poetics, aesthetics, and philosophy in their European context. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s). Prerequisite(s): Advanced undergraduate standing.

POL 499 Independent Study 1 TO 4 hrs. Investigation of special problems under the general direction of a staff member. May be repeated to a maximum of 8 hours. Graduate students may register for more than one section per term. Prerequisite(s): Senior or graduate standing, consent of the instructor, and consent of the head of the department.

POL 510 History of the Polish Language 4 hrs. Phonological and morphological development; emphasis on lexical, syntactical, and stylistic problems. Linguistic analysis of selected texts. Prerequisite(s): POL 410 or the equivalent.

POL 515 Topics in Contemporary Polish Linguistics 4 hrs. Variable content. May be repeated to a maximum of 12 hours.

POL 520 Topics in Historical Polish Linguistics 4 hrs. Variable content. May be repeated to a maximum of 12 hours.

POL 545 Studies in Polish Medieval, Renaissance, and Baroque Literature 4 hrs. Study of a topic, genre, author, or movement. Content varies. May be repeated to a maximum of 12 hours.

POL 550 Studies in Polish Enlightenment and Romanticism 4 hrs. Study of an author, topic, genre, or movement. Content varies. May be repeated to a maximum of 12 hours.

POL 560 Studies in Polish Positivism and Social Syncretism 4 hrs. Study of an author, topic, genre, or movement. Content varies. May be repeated to a maximum of 12 hours.

POL 565 Studies in Twentieth-Century Polish Literature 4 hrs. Study of an author, topic, genre, or movement. Content varies. May be repeated up to 12 time(s). Prerequisite(s): Advanced undergraduate standing.

POL 596 Independent Study 1 TO 4 hrs. Investigation of special problems under the general direction of a staff member. May be repeated to a maximum of 8 hours. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor and consent of the head of the department.

Political Science

POLS 401 Data Analysis I 3 OR 4 hrs. Statistical inference for the social sciences. Emphasis on univariate and bivariate statistics. Same as PPA 401. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POLS 200 or equivalent or consent of the instructor. POLS 201 or graduate standing.

POLS 405 The Problem of Justice 3 OR 4 hrs. Premodern and modern views of justice and their practical utility in analyzing legislative, executive, and judicial programs for enhancing or restricting justice. Same as CLJ 405. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): CLJ 101, plus two 200-level courses in criminology, law, and justice or two 200-level courses in political science.

POLS 435 Special Topics in Bureaucracy 3 OR 4 hrs. Consideration of timely or enduring issues in policy formation and bureaucracy not available in regularly offered courses. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Prerequisite(s): POLS 460 or consent of the instructor.

POLS 451 Law and Public Policy 3 OR 4 hrs. The role of law and legal institutions in the development and implementation of public policies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Consent of the instructor.

POLS 465 Topics in Sociology of Politics 3 OR 4 hrs. Intensive examination of a specialized topic announced when the class is scheduled. Same as SOC 465. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): 6 hours of upper-division sociology or consent of the instructor.

POLS 467 Public Opinion and Political Communication 3 OR 4 hrs. 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. Same as COMM 467. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POLS 200 or the equivalent or consent of the instructor.

POLS 482 Democratic Theory 3 OR 4 hrs. Democracy as a procedure of government and value commitments associated with this form of government. Special attention paid to classical and modern democracies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POLS 290 or POLS 291 or consent of the instructor.

POLS 485 Gender and Politics 3 OR 4 hrs. Impact of gender on basic categories of western political thought. Distinctions between reason and emotion, public and private, among others, examined from feminist perspective. Same as GWS 485. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POLS 190 and one 200-level course in political theory; or consent of the instructor.

POLS 494 Topics in Political Science 3 OR 4 hrs. Selected topics in political science. Topics vary and may cover American politics, law, urban and global politics, cultural, ecological, or methodological issues. May be repeated up to 1 time(s). Prerequisite(s): POLS 190 and POLS 200; or consent of the instructor.

POLS 497 Directed Readings in Political Science 4 hrs. Intensive readings on a topic not covered in regular curriculum. May be repeated with approval. Approval of the graduate director required to repeat course. Prerequisite(s): Graduate standing and consent of the instructor.

POLS 498 Research in Political Science 2 TO 6 hrs. Research on special problems not included in course offerings. May not duplicate work done in POLS 598 or POLS 599. May be repeated with approval. Approval of the graduate director required to repeat course. Prerequisite(s): Graduate standing and consent of the instructor.

POLS 500 Introduction to Policy and Governance 4 hrs. 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. Same as PPA 500. Prerequisite(s): Consent of the department required for nondegree graduate students.

POLS 501 Data Analysis II 4 hrs. Interpretation and application of multivariate methods of analysis in the social sciences. Regression specification and diagnostics, limited dependent variable models, measurement issues. Same as PPA 501. Prerequisite(s): POLS 401 or PPA 401.

POLS 502 Time Series Analysis for Political Science 4 hrs. Single series (ARIMA) models, event history analysis, vector autoregression (VAR), panel and pooled models. Prerequisite(s): POLS 402 or consent of the instructor.

POLS 504 Theoretical Approaches to Policy and Governance 4 hrs. Different theoretical approaches to the relationship between policy and governance and the philosophical foundations on which those approaches are based. Same as PHIL 504. Prerequisite(s): Consent of the department required for nondegree graduate students.

POLS 505 Research Design and Methods 4 hrs. Overview of the methods and conduct of research in political science. Issues of inference, measurements, data collection, hypothesis testing, and ethics.

POLS 506 The Profession of Political Science 2 hrs. 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.

COMM 467. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POLS 401 or consent of the instructor.
POLS 507 Qualitative Research Methods 4 hrs. Exploring techniques, uses, strengths, and limitations of qualitative research methods, including case studies, fuzzy sets, boolean analysis, analytical narratives, and various other methods.

POLS 510 Seminar on Teaching Political Science 2 hrs. 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. Complements the Preparing Future Faculty program. The format will include guest speakers from area community and four-year colleges. Satisfactory/Unsatisfactory grading only.

POLS 541 Policy Formation, Implementation, and Evaluation 4 hrs. Introduction to political science theories of how elections, interest groups, and state structure affect the formulation of public solutions to societal problems. Same as PPA 541. Prerequisite(s): Consent of the department required for nondegree graduate students.

POLS 544 Regulatory Public Policies 4 hrs. Exploring the nature and determinants of public policy making with respect to the regulation of the economy.

POLS 549 Topics in Public Policy Analysis 4 hrs. A research seminar on some aspects of public policy analysis not otherwise covered in the regular curriculum.

POLS 551 Seminar in Urban Politics 4 hrs. Explores relationships between a private economy and public policies in American cities; causes of urban decline and uneven development; and urban redevelopment and human capital policies. Prerequisite(s): POLS 500; and consent of the instructor.

POLS 553 Urban Public Policy 4 hrs. Explores the problems of poverty, race, education, transportation policy, and housing in America’s cities, with a special emphasis on Chicago.

POLS 557 Research Topics in Urban Politics 4 hrs. Readings and original research on selected topics in urban politics. May be repeated.

POLS 558 Graduate Student Field Experience in Political Science 1 TO 8 hrs. Graduate student intern experience. Placement with government agencies, community organizations, or civic organizations, in conjunction with a seminar class and directed readings. May be repeated up to 8 time(s). Students may register in more than one section per term. Fieldwork required. Prerequisite(s): POLS 402 and POLS 500.

POLS 559 Topics in State and Local Government 4 hrs. Case analysis and research in selected problems dealing with structure, function; and administrative processes of American state and local governments. Prerequisite(s): POLS 500 and POLS 541.

POLS 560 Seminar in American Politics 4 hrs. Introduction to research literature on American policy-making institutions and processes. Prerequisite(s): POLS 500; and consent of the instructor.

POLS 562 Seminar on Legislation and Public Policy 4 hrs. Review of recent theories and research on structure and policy formation in American legislatures. Emphasis on theoretical development in this field. Prerequisite(s): POLS 541.

POLS 563 Executive Process 4 hrs. 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(s): Admission to the MA or PPA program or consent of the instructor.

POLS 564 Seminar in Judicial Process 4 hrs. 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(s): POLS 460.

POLS 566 Interest Groups 4 hrs. Pluralism: the distributive state; radical group theory; public-interest groups; collective actions; corporatism; statism; structural Marxism; social movements and interest groups.

POLS 567 Topics in Political Communication 4 hrs. Intensive study of selected topics; organizational communication in public institutions, urban political communication patterns, communication elites. Independent research using a variety of community research techniques. Same as COMM 567 and PA 567. Prerequisite(s): Consent of the instructor.

POLS 569 Research Topics in American Politics 4 hrs. A research seminar on some aspect of American political process. Topics vary. May be repeated. Prerequisite(s): POLS 560.

POLS 570 Seminar in Comparative Politics 4 hrs. Introduces students to the main tools of research and contours of debates in comparative politics. Prerequisite(s): POLS 500; and consent of the instructor.

POLS 571 Seminar in International Relations 4 hrs. State-building and challenges to state authority, democratization and regime change, political economy, environment, war, regionalism and globalization, social movements, and international governance.

POLS 572 International Political Economy 4 hrs. Exploration of competing perspectives on nation-states and economic systems. Previously listed as POLS 472.


POLS 578 Research Topics in International Relations 4 hrs. Advanced graduate seminar exploring international relations theory through readings, discussion, and original research. Prerequisite(s): POLS 571.

POLS 579 Research Topics in Comparative Politics 4 hrs. Advanced seminar on selected topics in comparative politics. Topic(s) will vary from semester to semester. May be repeated. Prerequisite(s): POLS 570; and consent of the instructor.

POLS 582 The Philosophy of the Social Sciences 4 hrs. The ontological and epistemological foundations of alternative approaches to the study of human beings. Naturalistic, hermeneutic, and critical approaches are addressed and assessed.

POLS 589 Research Topics in Political Theory 4 hrs. Detailed analysis of a political theorist or theory of political theory, especially designed to meet programmatic and graduate needs. May be repeated. Prerequisite(s): Consent of the instructor.

POLS 590 Advanced Public Policy Workshop 4 hrs. Interdisciplinary workshop on preparing a dissertation proposal for public policy analysis students. Same as PPA 590. Prerequisite(s): Advanced standing in the PhD in PPA program and completion of PPA core courses.

POLS 591 Publishing Research in Political Science 4 hrs. Interdisciplinary workshop on preparing manuscripts for submission to publishers. May be repeated. Completion of the first year of the MA or PhD in Political Science; and consent of the instructor.

POLS 593 Independent Research for Master’s Degree 2 hrs. Under the supervision of two faculty members, students will complete a major research paper that combines a review of relevant literature of a political science topic with analysis of original data or research materials. Satisfactory/Unsatisfactory grading only.

POLS 596 Advanced Readings in Political Science 1 TO 4 hrs. Intensive readings on an advanced topic not covered in the regular curriculum. May be repeated with approval. Students may register in more than one section per term. Approval to repeat course granted by the graduate director.

POLS 598 Thesis Research 0 TO 16 hrs. Individual study required of all students pursuing advanced degree in Political Science under thesis option. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor. Open only to degree candidates.
POLS 599 Dissertation Research 0 TO 16 hrs.
Graduate study required of all students pursuing PhD degree with specialization in Political Science. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor. Open only to degree candidates.

Prosthodontics

PROS 504 Advanced Dental Materials 3 hrs.
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. Prerequisite(s): REST 320, REST 321, REST 322, REST 323, REST 330 or the equivalent course work or matriculation into the Advanced Certificate in Advanced Prosthodontics program.

PROS 517 Advanced Occlusion/ TMD Disorders 2 hrs.
A lecture and seminar discussion of the advanced concepts of occlusion, articulation, occlusal analysis, diagnosis, and treatment of functional disturbances. Prerequisite(s): 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 500 Group Dynamics, Behavior, and Intervention 2 TO 3 hrs.
Concepts, theories, and research pertaining to group dynamics and to interventions carried out in groups. Analysis of videotaped group experience. Previously listed as NUPS 400. Master of Science degree-seeking students in the Mental Health Nursing concentration must register for 3 hours of credit. Prerequisite(s): Consent of the instructor.

NUPS 515 Developmental, Behavioral Health and Interventions with Youth 3 hrs.
Nurturative and atypical developmental processes. Applications emphasize developmentally and culturally sensitive nursing assessment and intervention in children's lives to improve mental health outcomes. Prerequisite(s): NUSC 527 or consent of the instructor.

NUPS 516 Behavioral Healthcare I 3 hrs.
Common mental health problems presented in primary and community care settings. Focus on psychopharmacology, assessment and brief counseling interventions: crisis intervention and triage; emergency care. Prerequisite(s): Consent of the instructor.

NUPS 517 Behavioral Healthcare II 3 hrs.
Common 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(s): NUPS 516.

NUPS 518 Family Behavioral Health 2 hrs.
Theories of family development and behavior; functional and dysfunctional communication and behavioral patterns. Theories and strategies for family assessment and intervention. Prerequisite(s): Consent of the instructor.

NUPS 521 Clinical Practicum in Behavioral Health I 3 TO 6 hrs.
Advanced nursing management of common mental health problems. Emphasis on primary care and community settings. Assessment, triage, case management, emergencies, and brief interventions. May be repeated. Prerequisite(s): Credit or concurrent registration in NUPS 517.

NUPS 522 Clinical Practicum in Behavioral Health II 3 TO 8 hrs.
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. May be repeated. Prerequisite(s): NUPS 521.

NUPS 523 Clinical Practicum in Behavioral Health III 2 TO 5 hrs.
Development of mental health nurse practitioner role to deliver mental health services and impact policies affecting a selected population. May be repeated. Prerequisite(s): NUPS 522 or consent of the instructor.

NUPS 547 Substance Misuse and Dependence 2 hrs.
Theories, research trends, treatment perspectives, ethical and social issues related to alcohol, and other drug misuse and dependence. Prerequisite(s): Consent of the instructor.

Psychology

PSCH 411 Stereotyping, Prejudice, and Racism 3 hrs.
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(s): Graduate standing in Psychology or consent of the instructor.

PSCH 415 Social Bases of Health Behavior 3 hrs.
Psychological theory and research concerning the coronary-prone personality, pain management, controlling adherence to medical regimens, biofeedback, smoking, and weight control. Prerequisite(s): PSCH 270 and consent of the instructor, or graduate standing.

PSCH 417 Psychology and Law 3 hrs.
Application of psychological theories to the development, operation and effects of law; evaluation of different and similar approaches of law and psychology. Prerequisite(s): PSCH 312 or consent of instructor.

PSCH 420 Social Development of Urban Children 3 OR 4 hrs.
General principles of social development and socialization during childhood and the factors common to urban children that illustrate and modify these principles. Same as PSY 420. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Admission to a graduate program in Education or Psychology, or consent of the instructor.

PSCH 422 Advanced Developmental Psychology and Educational Processes 3 hrs.
Focuses on cognitive and social development from birth to adolescence. Examines relations between development, learning, and educational processes. Same as ED 422. Prerequisite(s): PSCH 100 and any one from ED 210, PSCH 259, PSCH 320; or graduate standing and consent of the instructor.

PSCH 423 Characteristics of Early Adolescence 3 hrs.
Physiological, social, emotional, and cognitive development of early adolescence. The relationship between these developmental characteristics and success in the middle grades. Same as EPSY 466. Prerequisite(s): ED 210 or ED 421 or ED 422 or PSCH 422 or the equivalent, and approval of the College of Education; or admission to the PhD in Psychology program; or consent of the instructor.

PSCH 428 Approaches to Development: Piaget and Vygotsky 3 OR 4 hrs.
Piaget's and Vygotsky's theories of development of knowledge. Empirical and logico-mathematical forms of knowledge. Thought and action. Thought and language. Same as EPSY 429. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): ED 422 or PSCH 422 or the equivalent and graduate standing in Education or graduate standing in Psychology or consent of the instructor.

PSCH 433 Advanced Statistics 3 hrs.
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(s): PSCH 345.

PSCH 434 Cognitive Psychology of Language 3 hrs.
A survey of empirical research and theories concerning the human memory system and the encoding, retention, retrieval of information in that system and research on theories of attention. Prerequisite(s): Graduate standing; or PSCH 352 and consent of the instructor.

PSCH 454 Cognitive Psychology of Thinking 3 hrs.
Introduces students to research and theory concerning higher mental processes, including problem solving, reasoning, judgment, and decision making. Prerequisite(s): Graduate standing; or PSCH 352 and consent of the instructor.

PSCH 457 Cognitive Psychology of Skill and Knowledge Acquisition 3 hrs.
The course approaches learning from a variety of cognitive perspectives. The instruction is organized around discussions of original research articles. Prerequisite(s): Previous knowledge of cognitive psychology (with at least an undergraduate survey course) or admittance into the Cognitive Division graduate program.
PSCH 459 Cognitive Methods 3 hrs. Hands-on training in the methods of cognitive psychology, especially computational modeling and the analysis of verbal protocols and other types of trace data. Prerequisite(s): Graduate standing or consent of the instructor.

PSCH 460 Advanced Learning 3 hrs. Methods, results, and interpretation of experimental studies of basic learning processes in animal and human subjects. Prerequisite(s): Graduate standing; or PSCH 360 and PSCH 361 and consent of the instructor.

PSCH 462 Neural Basis of Learning and Memory 3 hrs. Theory and research on the anatomical, electrophysiological, and chemical bases of learning and memory in humans and other animals. Prerequisite(s): Graduate standing; or PSCH 262 and consent of the instructor.

PSCH 465 Neural Basis of Perception 3 hrs. Psychophysical and physiological studies of sensory systems and processes. Primary emphasis on the early processing of visual stimuli. Prerequisite(s): Graduate standing; or PSCH 351 and consent of the instructor.

PSCH 466 Neural Basis of Motivation 3 hrs. Review of empirical data and theories concerning the physiological basis of motivational processes in animals and humans. Prerequisite(s): Graduate standing; or PSCH 262 and consent of the instructor.

PSCH 467 Fundamentals of Neuroscience 3 hrs. Basic principles of neurophysiology and neuropharmacology, including logic bases of nerve action, chemistry of synapses, and actions of pharmacological agents. Prerequisite(s): Graduate standing; or PSCH 262 or graduate standing.

PSCH 481 Interviewing 1 hour. Lecture on the theory and practice of clinical interviewing with supervised experience. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Graduate standing in psychology and consent of the instructor.

PSCH 483 Neuroanatomy 4 hrs. Organization of the nervous system, with an emphasis on mammals. Same as BIOS 483 and NEUS 483. Animals used in instruction. Prerequisite(s): BIOS 272 or BIOS 286 or BIOS 325 or PSCH 262; or consent of the instructor.

PSCH 484 Neuroscience I 3 hrs. Neuroscience as an integrative discipline. Neuroanatomy of vertebrates, neural development, cellular neurobiology, action potential mechanisms, synaptic transmission, and neuropharmacology. Same as BIOS 484 and PHIL 484. Prerequisite(s): BIOS 286 or PSCH 262.

PSCH 485 Neuroscience II 3 hrs. Integrative neuroscience, continuation of BIOS/PSCH/PHIL 484. Sensory and motor systems; learning, memory, and language. Pathology of nervous systems. Philosophical perspectives, and modeling. Same as BIOS 485 and PHIL 485. Prerequisite(s): BIOS 484.

PSCH 494 Special Topics in Psychology 1 TO 4 hrs. Advanced treatment of an announced topic. May be repeated. Students may register in more than one section per term. Prerequisite(s): Graduate standing or consent of the instructor.

PSCH 495 Seminar in Psychology 1 TO 3 hrs. Seminar devoted to special topics in psychology. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 9 hours. Students may register in more than one section per term. Prerequisite(s): Graduate standing or consent of the instructor.

PSCH 504 Rating Scale and Questionnaire Design and Analysis 4 hrs. Development and administration of rating scales and questionnaires, analysis of data, and reporting of results. The focus is on rating scales. Same as EPSY 504. Prerequisite(s): ED 501, and ED 503 or EPSY 503 or the equivalents or consent of the instructor.

PSCH 505 Advanced History of Psychology 3 hrs. The history of scientific psychology, with an emphasis on the forerunners of major contemporary research problems. Prerequisite(s): Graduate standing.

PSCH 506 Item Response Theory/Rasch Measurement 4 hrs. Statistical inference with item response theory models, useful to measure an individual's performance on a test or questionnaire. Models include parametric, nonparametric, unidimensional, multidimensional, and cognitive. Same as EPSY 506. May be repeated to a maximum of 8 hours. Extensive computer use required. Prerequisite(s): ED 501 and EPSY 503 and EPSY 546 or the equivalent. Appropriate score on the department placement test. Graduate or professional standing required or consent of the instructor.

PSCH 507 Emerging Research Issues 1 hour. Weekly seminar that introduces PhD students in psychology to the current research of each faculty member in the department of psychology. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 2 hours. Prerequisite(s): Consent of the instructor.

PSCH 508 Colloquium on the Teaching of Psychology 1 hour. Required training to prepare graduate students for contact teaching in the Department of Psychology. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

PSCH 512 Attitudes and Social Cognition 3 hrs. Survey of theory and research in social psychology, including attitudes and social cognition. Prerequisite(s): Consent of the instructor.

PSCH 513 Interpersonal Relations and Group Processes 3 hrs. Survey of theory and research in social psychology, including interpersonal relations and group processes. Prerequisite(s): Consent of the instructor.

PSCH 515 Psychology of Women and Gender 3 hrs. Critical examination of psychological theories and research on women and gender, including biological, psychoanalytic, socialization, power, and social-constructionist perspectives. Same as GWS 515. Prerequisite(s): Graduate standing in Psychology; or PSCH 315 or GWS 315, and consent of the instructor.

PSCH 516 Research Methods in Social Psychology 3 hrs. Critical analysis of current theories in social psychology. Prerequisite(s): PSCH 512 and PSCH 513 and PSCH 514; or consent of the instructor.

PSCH 517 Social Psychology of Education 4 hrs. Social psychological factors influencing academic and social outcomes in schools. Achievement motivation, peer relations, social values in relation to student characteristics and school practice. Same as EPSY 502. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program; or consent of the instructor.

PSCH 518 Seminar in Social and Personality Psychology 1 TO 4 hrs. Critical discussion of selected topics, such as helping and altruism, social judgment, group processes, attitude formation and change. Content varies. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PSCH 520 Development in Infancy and Early Childhood 4 hrs. Consideration of development in the preschool years. Stress on theory, research, individual child study, and educational implications. Same as EPSY 526. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 521 Violence Against Women 4 hrs. Examines the causes, consequences, and impact of sexual assault, intimate partner violence (e.g., domestic violence, dating violence), and sexual harassment, and considers the impact of culture and community on violence and its victims. Same as GWS 521. Prerequisite(s): Consent of the instructor.

PSCH 525 Achievement Motivation 4 hrs. The psychology of achievement motivation will be explored from the perspectives of personality, social, and educational psychology. Same as EPSY 530. Prerequisite(s): Graduate standing in Education or Psychology or consent of the instructor.

PSCH 526 Developmental Psychopathology 3 hrs. Major sources and manifestations of maladjustment in childhood with an emphasis on emotional and intellectual handicaps. Prerequisite(s): Consent of the instructor.
Course Descriptions

PSCH 527 Seminar in Moral Development, Character Formation, and Education 4 hrs.
Philosophical assumptions, psychology research, and theory underlying current approaches to moral development and character education. Cultural and developmental factors in value formation. Same as EPSY 527. Prerequisite(s): ED 422 or PSCH 422 or the equivalent, or admission to the PhD in Education program, PhD in Psychology program, or PhD in Social Work program, or consent of the instructor.

PSCH 531 Community Research 3 hrs.
Introduction to research design for community and action research; data-collection techniques; perspectives on the relationship between researchers and communities: ethical issues; and philosophies of science informing community-based research.

PSCH 532 Community Intervention 3 hrs.
Theory, research, and practice of community interventions in public, nonprofit, and voluntary settings, such as disability organizations; intervention types and effectiveness; role of community intervenor. Same as DHD 532. Prerequisite(s): Consent of the instructor.

PSCH 533 Advanced Community and Prevention Research 3 hrs.
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(s): Graduate standing in Psychology or consent of the instructor.

PSCH 534 Prevention Research, Theory, and Practice 3 hrs.
Emphasizes issues related to the conceptualization, design, implementation, and evaluation of prevention and competence-promotion programming. Prerequisite(s): Consent of the instructor.

PSCH 537 Seminar in Action Research 3 hrs.
Supervised action research in community settings, including entry, data collection, ethics, feedback, and report preparation. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Graduate standing in the Community and Prevention Research Specialization of the PhD in Psychology program or consent of the instructor.

PSCH 538 Seminar in Community and Prevention Research 1 TO 4 hrs.
Examination of a selected topic in community and prevention research. May be repeated. Prerequisite(s): Consent of instructor in more than one section per term. Prerequisite(s): Consent of the instructor.

PSCH 539 Current Topics in Community and Prevention Research 1 hour.
Ongoing seminar with faculty and graduate students to discuss contemporary issues in community and prevention research. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 540 Research with Diverse Groups 3 hrs.
Highlights some of the issues relevant to doing research with diverse groups, such as race/ethnicity, gender, social class, age, disability.

PSCH 541 Introduction to Computing in Psychology 1 hour.
An introduction to applications of computing in psychological research. Several projects are required. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

PSCH 543 Research Design and Analysis 4 hrs.
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(s): Graduate standing in psychology or consent of the instructor.

PSCH 544 Latent Variable Models 3 hrs.
Statistical methods and practical issues relevant to latent variable models with special emphasis on factor analysis and structural equation modeling. Prerequisite(s): PSCH 545.

PSCH 545 Multivariate Analysis 3 hrs.
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. Prerequisite(s): PSCH 543, and graduate standing in Psychology or consent of the instructor.

PSCH 546 Theory and Practice in Program Evaluation 3 hrs.
Introduction to theory, design and practice of program evaluation. Emphasis will be on theories of social programming, selecting appropriate methods, and politics of evaluation. Prerequisite(s): PSCH 531 or the equivalent and PSCH 543 and PSCH 545; or consent of the instructor.

PSCH 548 Seminar in Methods and Measurement 1 TO 4 hrs.
Seminar on a preannounced topic in methodology, measurement, or mathematical psychology. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PSCH 549 Current Topics in Psychology and Law 1 hour.
Discussion of recently published research and ongoing research in psychology and law by department faculty, graduate students, and outside speakers. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 550 Proseminar in Educational Psychology 2 hrs.
Interdisciplinary colloquia on selected topics in educational psychology. Serves as introduction to faculty research foci. Same as EPSY 550. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program, or consent of the instructor.

PSCH 551 Cognition and Instruction 4 hrs.
Current research on relations among cognitive processes, learning, and instruction. Same as EPSY 551. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program, or consent of the instructor.

PSCH 552 Cognition and Instruction: Advanced Constructivist Approaches 4 hrs.
Fusert and Vygotsky’s theories of knowledge development. Emphasis on competing approaches concerning the relation of thought to action, to language, and to social relations. Same as EPSY 529. Prerequisite(s): EPSY 429 or PSCH 429 or the equivalent, and admission into a PhD program in the College of Education or Psychology or consent of the instructor.

PSCH 553 Community Research 3 hrs.
Introduction to research design for community and action research; data-collection techniques; perspectives on the relationship between researchers and communities: ethical issues; and philosophies of science informing community-based research.

PSCH 554 Research with Diverse Groups 3 hrs.
Highlights some of the issues relevant to doing research with diverse groups, such as race/ethnicity, gender, social class, age, disability.

PSCH 555 Introduction to Computing in Psychology 1 hour.
An introduction to applications of computing in psychological research. Several projects are required. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

PSCH 556 Research Design and Analysis 4 hrs.
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(s): Graduate standing in psychology or consent of the instructor.

PSCH 557 Seminar in Action Research 3 hrs.
Supervised action research in community settings, including entry, data collection, ethics, feedback, and report preparation. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Graduate standing in the Community and Prevention Research Specialization of the PhD in Psychology program or consent of the instructor.

PSCH 558 Seminar in Cognitive Psychology 1 TO 4 hrs.
Detailed review of selected topics in cognitive psychology: emphasis on current research and theoretical developments. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

PSCH 559 Current Topics in Cognitive Psychology 1 hour.
Discussion of current research and theoretical issues in broad areas of cognitive psychology. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 561 Current Topics in Biopsychology 3 hrs.
Behavioral, cognitive, and biological effects of psychotropic drugs in psychiatric populations. Theoretical, methodological, and empirical issues related to the pharmacological treatment of psychopathology. Prerequisite(s): Consent of the instructor.

PSCH 562 Seminar in Biopsychology 1 TO 4 hrs.
Current research issues and studies in biopsychology are discussed in terms of methodology and theory. Topic to be announced each semester. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 563 Current Topics in Biopsychology 1 hour.
Presentation of current research projects by staff and students. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 564 Personality Psychology 3 hrs.
Contemporary research in personality psychology and a review of theoretical approaches to the study of personality structure and processes. Prerequisite(s): Consent of the instructor.

PSCH 568 Seminar in Biopsychology 1 TO 4 hrs.
Current research issues and studies in biopsychology are discussed in terms of methodology and theory. Topic to be announced each semester. May be repeated. Prerequisite(s): Consent of the instructor.

PSCH 569 Personality Psychology 3 hrs.
Contemporary research in personality psychology and a review of theoretical approaches to the study of personality structure and processes. Prerequisite(s): Consent of the instructor.

PSCH 570 Psychopathology 3 hrs.
Contemporary research in psychopathology. Serves as introduction to faculty research foci. Same as EPSY 570. Prerequisite(s): Admission to the PhD in Education program or the PhD in Psychology program, or consent of the instructor.

PSCH 571 Psychopathology 3 hrs.
Detailed consideration of disorders of behavior, including description, etiology, prognosis, and treatment. Experimental and clinical research; consideration of development and functions of classification systems of abnormal behavior and their relation to clinical decision making. Prerequisite(s): PSCH 570 and consent of the instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSCH 573</td>
<td>Cognitive and Behavioral Assessment</td>
<td>3 hrs</td>
<td>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. Prerequisite(s): PSCH 572 and consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 574</td>
<td>Techniques of Psychological Intervention</td>
<td>3 hrs</td>
<td>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. May be repeated. Students may register in more than one section per term. Prerequisite(s): PSCH 571 and consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 575</td>
<td>Psychotherapy Theory and Research</td>
<td>3 hrs</td>
<td>Research methods and theory related to psychotherapy and behavior change, with an emphasis on design, evaluation, and results of empirically based psychotherapy studies. Prerequisite(s): PSCH 571 and consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 577</td>
<td>Ethics and Professional Development</td>
<td>3 hrs</td>
<td>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(s): Graduate standing in psychology or consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 578</td>
<td>Seminar in Clinical Psychology</td>
<td>1 TO 4 hrs</td>
<td>In-depth coverage of selected current topics in clinical psychology. Emphasis is on current research. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 579</td>
<td>Current Topics in Clinical Psychology</td>
<td>1 hour</td>
<td>Research and case presentations in clinical psychology. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 581</td>
<td>Practicum in Interviewing</td>
<td>1 hour</td>
<td>Interviewing practicum through the Office of Applied Psychological Services. Students observe and conduct clinical interviews under supervision. Satisfactory/Unsatisfactory grading only. Prerequisite(s): PSCH 481 and consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 582</td>
<td>Practicum in Psychological Assessment</td>
<td>4 hrs</td>
<td>Supervised practice in psychodiagnostic testing in various facilities associated with the graduate training program in clinical psychology. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): PSCH 573 and consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 583</td>
<td>Practicum in Clinical Intervention</td>
<td>4 hrs</td>
<td>Instruction and supervision in the practice of psychological intervention, application of basic psychological principles to varied patient populations. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): PSCH 574 and consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 584</td>
<td>Practicum for Clinical Trainees in Assessment, Intervention, and Research</td>
<td>0 TO 3 hrs</td>
<td>Presentation and discussion of trainee assessment, intervention, and research projects. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Acceptance into either an NIMH- or OAPS-sponsored training program.</td>
</tr>
<tr>
<td>PSCH 587</td>
<td>Practicum in Instruction in Psychology</td>
<td>0 TO 9 hrs</td>
<td>Seminar on course planning and supervised teaching of an undergraduate course. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Students register for 2 to 9 hours. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 591</td>
<td>Research Apprenticeship</td>
<td>2 TO 3 hrs</td>
<td>Directed training in conducting research in specific areas of psychology and in developing skills related to the research. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 5 hours. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 594</td>
<td>Advanced Special Topics in Psychology</td>
<td>1 TO 4 hrs</td>
<td>Advanced treatment of an announced topic. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 595</td>
<td>Methods and Measurement in Clinical Psychology</td>
<td>2 hrs</td>
<td>Provides students with an overview of research methods, process concerns, ethics, and issues that are relevant to the field of clinical psychology. May be repeated. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 596</td>
<td>Independent Study</td>
<td>1 TO 12 hrs</td>
<td>Research on or study of topics not included in regular classes or thesis and dissertation research. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 598</td>
<td>Thesis Research</td>
<td>0 TO 16 hrs</td>
<td>Research on the topic of the master's thesis. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PSCH 599</td>
<td>Dissertation Research</td>
<td>0 TO 16 hrs</td>
<td>Research on the topic of the doctoral dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.</td>
</tr>
<tr>
<td>PA 400</td>
<td>Public Administration Theory</td>
<td>3 OR 4 hrs</td>
<td>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 net versus bureaucratic alternatives. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Admission to the MPA program or consent of the instructor.</td>
</tr>
<tr>
<td>PA 447</td>
<td>Survey Planning and Design</td>
<td>3 hrs</td>
<td>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. Same as CHSC 447.</td>
</tr>
<tr>
<td>PA 460</td>
<td>Data Management</td>
<td>4 hrs</td>
<td>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(s): Admission to the MPA program or consent of the instructor.</td>
</tr>
<tr>
<td>PA 461</td>
<td>Management of Information Technology in Government</td>
<td>4 hrs</td>
<td>Concepts and methods of planning, implementing, and managing new information technology or modifying existing technology. Prerequisite(s): Admission to the MPA program or consent of the instructor.</td>
</tr>
</tbody>
</table>
PA 463 The Internet and Public Administration 4 hrs. Application of the Internet for public management. Web-based service delivery, online governance, the technological divide, and the changing role of public managers. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 464 Technology and Innovation Theory 4 hrs. The course focuses on theories surrounding the creation, development, transfer, and use of technology. Prerequisite(s): Admission to the PhD in Public Administration program or consent of the instructor.

PA 466 Science, Technology and Public Policy 4 hrs. This course addresses the relationships among public policy, science, and technology in the United States. Prerequisite(s): Admission to the BA in Urban and Public Administration program or consent of the instructor.

PA 490 Field Experience in Public Administration 4 hrs. Students work in an organization, such as a government community group, or nonprofit organization. Students are required to submit written work and meet with their professor on a periodic basis to review work experience. Satisfactory/Unsatisfactory grading only. May be repeated. A maximum of 4 hours of credit may be applied to the Master of Public Administration program. Fieldwork required. Students who have no prior work experience in the public or nonprofit sectors are strongly recommended to register for this course. Prerequisite(s): Graduate standing required; and admission to the MPA program or consent of the instructor.

PA 493 Topics in Urban and Public Affairs and Administration 3 hrs. In-depth study of selected issues on urban and public affairs. Same as UPA 493. May be repeated to a maximum of 6 hours. Students may register for more than one section per term. Prerequisite(s): Admission to the BA in Urban and Public Affairs program or consent of the instructor.

PA 494 Special Topics in Public Administration 3 or 4 hrs. Consideration of timely or enduring issues in public administration not available in regularly offered courses. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 502 The Legal Context of Public Administration 4 hrs. Legal basis and statutory framework for administrative agencies and actions in government. Relationship between courts and public agencies, rule making and adjudicative powers of public agencies, and impact of specific laws on government. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 503 Public Personnel Management 4 hrs. 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(s): Admission to the MPA program or consent of the instructor.

PA 504 Budgeting for Public Administration 4 hrs. 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, role of budgeting in management. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 506 Policy Development and Analysis for Public Administrators 4 hrs. Examines the process by which public policies are formulated, decided on, implemented, and evaluated. Techniques of analysis appropriate for various policy issues, and substantive policy issues facing us today. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 510 Organization Theory and Behavior in Public Administration Research 4 hrs. Analysis of major analytical models of organizations: decision making; control and accountability; change and development; interorganizational relations; the organization-environment interface. Prerequisite(s): Admission to the PhD in Public Administration program or approval of the program director.

PA 511 The History and Development of Public Administration Research and Theory 4 hrs. 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(s): Admission to the PhD in Public Administration program or approval of the program director.

PA 515 The Bureaucracy and the Policy Process 4 hrs. Theories and research issues concerning the role of administrators in policy formation. Case studies and research on federal, state, and local agencies. Prerequisite(s): Admission to the PhD in Public Administration program or approval of the program director.

PA 521 Strategic Management: Planning and Measurement 4 hrs. This course addresses strategies and issues relating to the strategic management of public and quasi-public organizations. It addresses strategic planning and performance measurement processes within organizations. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 522 Ethics and Accountability 4 hrs. 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. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 523 Intergovernmental Management 4 hrs. Relationships between federal, state, and local governments focusing on management of overlapping programmatic, regulatory, and fiscal responsibilities. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 524 Leadership in Public Sector Organizations 4 hrs. Examines theories and practices of leadership in public sector organizations. Global, political, social, and organizational contexts of public sector leaders and interface among administrators, appointees, elected officials. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 526 Public Decision Analysis 4 hrs. Provides an introductory treatment of decision analysis. The intended participants are students who want to learn more about decision making under uncertainty and tools that can be used to support it. Prerequisite(s): PA 407 or consent of the instructor.

PA 527 Public Management Theory 4 hrs. Addresses the development of the public management subfield within the field of public administration. It covers the development of public management theory from its early stages to current questions and theoretical approaches. Prerequisite(s): Admission to the PhD in Public Administration program or consent of the instructor.

PA 528 Public Program Evaluation 4 hrs. Theory and procedures for evaluating the effectiveness of programs administered by public and nonprofit organizations. Includes application of research design, quantitative, and qualitative methodologies. Prerequisite(s): PA 542 or equivalent; and admission to the PhD in Public Administration program or consent of the instructor.

PA 529 Change and Reform in Public Organizations 4 hrs. Examines how large, bureaucratic organizations change how they do business. Can improved efficiency and effectiveness result from such change? What techniques are being applied by public organizations to achieve such change? Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 532 Labor Management Relations in the Public Sector 4 hrs. 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, collective bargaining, nondiscriminatory, and equal opportunity. Prerequisite(s): PA 503; and admission to the MPA program or consent of the instructor.

PA 533 Managing Workplace Diversity 4 hrs. Examines discrimination and diversity in public sector workplaces along several dimensions, including race, ethnicity, sex, age, sexual preference, and physical ability. Prerequisite(s): PA 503; and admission to the MPA program or consent of the instructor.
PA 534 Human Resource Development and Management in Public Administration 4 hrs.
Topics in public personnel administration; work motivation, performance appraisal, high-performance work systems, equal employment opportunity, affirmative action, strategic human resource management, and representative bureaucracy. Prerequisite(s): Admission to a PhD program or consent of the instructor.

PA 537 Local Government Management 4 hrs.
Issues in the management of local government, including the metropolitan and regional context, the evolving role of managers and special considerations in finance, reform, service delivery, economic development, and democracy at the local level. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 538 Nonprofit Management 4 hrs.
Examines management in nonprofit organizations; volunteer management, membership, fundraising, faith-based organizations, grant management, service delivery, philanthropies and missions, finance and reporting requirements, and performance. Prerequisite(s): Admission to the MPA program or consent of the instructor.

PA 540 Research Design for Public Administration 4 hrs.
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(s): Admission to the PhD in Public Administration program or approval of the program director.

PA 541 Advanced Data Analysis I 4 hrs.
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(s): Graduate standing; and PA 540 or equivalent or approval of the instructor.

PA 542 Advanced Data Analysis II 4 hrs.
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(s): Graduate standing; and PA 541 or equivalent or approval of the instructor.

PA 544 Qualitative Research Methods in Public Administration 4 hrs.
The uses, strengths, and limitations of qualitative methods of research and analysis, including case studies, participant-observer, and ethnography will be explored. Prerequisite(s): Graduate or professional standing; PA 540 or equivalent; or consent of the instructor.

PA 545 Research Topics in Public Administration I 2 hrs.
Provides PhD students with a better understanding of current research topics in PA. Students will read current working papers and published articles so as to develop the tools needed for critical analysis of current research. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Admission to the PhD program in Public Administration and advanced standing or consent of the instructor.

PA 546 Research Topics in Public Administration II 2 hrs.
Continuation of PA 545. Students critically analyze current research and will develop a research topic of their own focusing on the elements needed to write a quality research paper. Satisfactory/Unsatisfactory grading only. Prerequisite(s): PA 545; and admission to the PhD program in Public Administration with advanced standing or consent of the instructor.

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(s): PA 540; and admission to the MPA program or consent of the instructor.

PA 551 Governmental Accounting 4 hrs.
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(s): PA 540; and admission to the MPA program or consent of the instructor.

PA 552 Public Capital Budgeting and Finance 4 hrs.
Examines governmental capital budgeting processes, linkages between the capital budget and capital improvement plan, and methods and technique of financing capital projects, including debt financing. Prerequisite(s): PA 504; and admission to the MPA program or consent of the instructor.

PA 553 State and Local Public Finance 4 hrs.
Analyses expenditures and revenues of state and local governments and public sector responses to market failures. Examines state and local revenue sources and discusses governmental provision of services. Prerequisite(s): PA 504; and admission in the MPA program or consent of the instructor.

PA 554 Financial Management in Public Administration 4 hrs.
Principles of financial management and applications in various institutional and programmatic settings. Forecasting techniques, computer applications, innovations in public borrowing, and debt management. Prerequisite(s): Graduate or professional standing; and PA 410 and PA 504 or equivalents; or consent of the instructor.

PA 555 Topics in Political Communication 4 hrs.
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. Same as COMM 567 and POLS 567. Prerequisite(s): Consent of the instructor.

PA 557 Survey Questionnaire Design 3 hrs.
Concepts and strategies for developing survey questionnaires for various modes of survey data collection. Students develop and present questionnaires related to their individual interests. Same as CHSC 577. Prerequisite(s): CHSC 446 or CHSC 447; or consent of the instructor.

PA 558 Surveys, Public Opinion, and Public Policy 4 hrs.
Addresses the nature of the relationship between public policy and public opinion and the role that surveys play in that relationship. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 559 Practicum in Survey Methodology 2 TO 6 hrs.
Students learn about survey research by participating in the process of conducting a survey or surveys. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 560 Survey Nonresponse 2 hrs.
Provides an overview of current problems in survey nonresponse and related questions of impact on data quality. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 561 Cross-Cultural Survey Research Methods 2 hrs.
Provides graduate students with a clear understanding of the methodological issues involved in collecting survey data across multiple cultural groups and best practices when conducting cross-cultural research. Recommended background: Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 562 Survey Data Collection Methods 2 hrs.
This course will address the impact of data collection methods on survey responses and data quality. Prerequisite(s): Graduate or professional standing or consent of the instructor.

Introduces students to one approach to survey methodology—the examination of the psychological processes through which survey respondents answer questions. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 564 Internet Surveys 2 hrs.
Examines current developments in the collection of survey data via the Internet, including both the methodological strengths and weaknesses of this approach, as well as current standards for best practice. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 565 Survey Research Ethics 2 hrs.
Students will be exposed to survey research ethical issues. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.
PA 586 The History of Survey Methodology 2 hrs. Examines the history of surveys, their development and change over time. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 587 Seminar on Special Topics in Survey Methodology 2 hrs. This seminar is for special topics in survey methodology not covered in the other elective courses. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 588 Survey Data Reduction and Analysis 2 hrs. Provides an in-depth overview of available procedures and standards for survey data reduction and data analysis activities. Prerequisite(s): Admission to the MPA or PhD in Public Administration program or consent of the instructor.

PA 590 Public Administration Capstone 4 hrs. Integration of classroom learning with practical experience. Students will work in groups to solve real problems for public and nonprofit organizations. Extensive collaboration required among group members outside of class time. Students should expect significant fieldwork at their assigned organizations. Students are responsible to the course professor and to the project supervisor in their assigned organizations. Because the course work is team-based, students are not allowed to drop this course once teams are created. Prerequisite(s): Consent of the instructor and enrollment in the MPA program. Course must be taken in the last two semesters in the MPA program or consent of the instructor.

PA 593 Independent Research in Public Administration 1 TO 8 hrs. Advanced study and analysis of a topic selected by a student under the supervision of a faculty member. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the director of graduate studies and consent of the instructor.

PA 594 Special Topics in Public Administration 1 TO 4 hrs. Advanced study of an announced topic. May be repeated. Students may register in more than one section per term. Prerequisite(s): Admission to the PhD in Public Administration program or consent of the instructor.

PA 596 Independent Study in Public Administration 1 TO 4 hrs. Advanced study and analysis of a topic under guidance of select faculty. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the director of graduate studies and consent of the instructor.

PA 599 PhD Thesis Research 0 TO 16 hrs. Individual study and research. Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Open only to degree candidates, upon approval of topic by dissertation committee.

Public Health Nursing

NUPH 501 Education: Perspectives in School Health 4 hrs. The scientific knowledge base of child development and educational psychology. Will explore the implications for classroom practice. Prerequisite(s): Consent of the instructor.

NUPH 502 School Nursing Theory and Trends 3 hrs. Explores population-focused frameworks, health needs, and legal mandates that impact school community. School nursing practice models are studied as relevant to developing leadership and management. Prerequisite(s): Consent of the instructor.

NUPH 504 Occupational Health Nursing 2 hrs. Theoretical bases for application of public health nursing practice to working populations in occupational settings. Previously listed as NUPH 400. Prerequisite(s): Consent of the instructor.

NUPH 505 Nursing Systems Operations Management 3 hrs. Nursing systems operations management of health services. Examines the managerial role at individual, program, work unit, department, and organizational levels. Includes focus on the interaction of the organization and environment. Same as NUPS 505. Prerequisite(s): Consent of the instructor.


NUPH 509 Population-Focused Assessment 3 hrs. Explores population-focused assessment in community and integrated healthcare systems emphasizing the application of assessment models used in health service delivery and market analysis. Prerequisite(s): Credit or concurrent registration in EPID 400 and credit or concurrent registration in NUSC 525 and credit or concurrent registration in NUSC 526.

NUPH 511 Planning and Evaluation for Advanced Nursing Practice 3 hrs. Explores strategic and program planning applications. Focuses on evaluation as a measure of quality, performance, and impact of health services. Emphasizes interdisciplinary perspective and addresses integrated quality improvement systems. Prerequisite(s): NUPH 509 and NUSC 525 and NUSC 526. Requires concurrent registration in NUSC 527.

NUPH 512 Healthcare Human Resources Management 3 hrs. Focuses on the development of a strategic human resource plan to support the mission of the healthcare organization. Current human resources management and organizational performance research findings are explored. Same as NUAS 512. Prerequisite(s): Consent of the instructor.

NUPH 517 Financial Resource Management for Nursing Decision Makers 3 hrs. Provides the clinical decision maker with state-of-the-art tools to plan, implement, and evaluate the financial viability of healthcare programs and initiatives. Same as NUAS 517. Prerequisite(s): Consent of the instructor; knowledge of Excel is required.

NUPH 519 School Nursing Internship 1 TO 3 hrs. Concepts and principles and best practices of school nursing applied within the school community. Clinical experience with an emphasis on development of a coordinated school health program. May be repeated. Prerequisite(s): Credit or concurrent registration in NUPH 502.

NUPH 520 Internship in Advanced Nursing 1 TO 3 hrs. Intensive field study for advanced nursing practice with emphasis on integration of graduate course work. Same as NUAS 520. May be repeated. Prerequisite(s): Consent of the instructor.

NUPH 528 Advanced Clinical Practice in Primary Care Nursing 1 TO 5 hrs. Healthcare issues, advanced clinical skills, and supervised practicum experiences specific to students’ selected practice area or population group in rural, urban, or international settings. Satisfactory/Unsatisfactory grading only. Prerequisite(s): NUPH 525.

NUPH 529 Advanced Clinical Practice in Occupational Health Nursing 1 TO 5 hrs. 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. Prerequisite(s): NUPH 504 and credit or concurrent registration in EOHS 421 and credit or concurrent registration in EOHS 482 and credit or concurrent registration in EOHS 551. Corequisite(s): Must enroll concurrently in NUPH 545.

NUPH 535 Seminar in Advanced Public Health Nursing Leadership 3 hrs. Focuses on development and application of advanced population-focused nursing leadership skills needed to successfully advocate for underserved, medically disadvantaged, and vulnerable populations. May be repeated.

NUPH 539 Health Management in Primary Care I 3 hrs. First of a three-course sequence in evidence-based health promotion, health maintenance, and health restoration using a life span developmental framework. Emphasis on wellness care. Prerequisite(s): NUSC 532.

NUPH 540 Clinical Practice in Primary Care I 3 hrs. Practicum emphasizing evidence-based clinical practice, including data gathering, differential diagnosis, health promotion, disease prevention, and management of common health problems across the life span. Prerequisite(s): NUSC 532 and credit or concurrent registration in NUPH 539.

NUPH 541 Clinical Practice in Primary Care II 2 hrs. Practicum emphasizing evidence-based clinical practice, including data gathering, differential diagnosis, health promotion, disease prevention, and management of common health problems across the life span. Prerequisite(s): NUPH 539 and NUPH 540.
NUPH 542 Health Management in Primary Care I 3 hrs. Second in a three-course sequence in evidence-based health promotion, health maintenance, and health restoration using a life span developmental framework. Emphasizes common acute and chronic health problems. Prerequisite(s): NUPH 539.

NUPH 543 Advanced Clinical Practice in Primary Care I 4 hrs. Practicum emphasizing evidence-based clinical evaluation, differential diagnosis, health promotion, disease prevention, and management of common to complex health problems across the life span. Prerequisite(s): NUPH 541 and credit or concurrent registration in NUPH 542.

NUPH 544 Health Management in Primary Care III 3 hrs. Last in a three-course sequence in evidence-based health promotion, health maintenance, and health restoration using a life span developmental framework. Emphasizes common chronic health problems and co-morbidities. Prerequisite(s): NUPH 542.

NUPH 545 Advanced Clinical Practice in Primary Care II 2 TO 4 hrs. Practicum emphasizing evidence-based clinical evaluation, differential diagnosis, health promotion, disease prevention, and management of common to complex health problems and co-morbidities across the life span. Prerequisite(s): NUPH 543 and credit or concurrent registration in NUPH 544.

NUPH 547 Population-Focused Interventions in Primary Care 2 hrs. Population-focused assessment, program planning, and evaluation of interventions for community-based healthcare providers. Same as NUSC 547. Prerequisite(s): EPID 400.

NUPH 548 Practicum in Population-Focused Interventions in Primary Care 1 hour. Supervised practicum experience in population-focused assessment, program planning, and evaluation. Prerequisite(s): Credit or concurrent registration in NUPH 547.

NUPH 557 Intermediate Epidemiology for Advanced Nursing Practice 3 hrs. Provides intermediate-level knowledge and skills in epidemiology for nurses and other public health practitioners. Addresses threats to validity and other issues of interpretation of findings. Same as NUSC 557. Prerequisite(s): EPID 400 or an equivalent course.

NUPH 559 Grant Writing for Healthcare Services 3 hrs. Focuses on developing knowledge and application skills needed for successful health service programmatic grant writing. Same as NUSC 559. Prerequisite(s): Credit or concurrent registration in NUPH 507 or credit or concurrent registration in NUSC 507; and credit or concurrent registration in NUSC 502 or credit or concurrent registration in NUPH 511; or consent of the instructor.

NUPH 566 Family-Focused Health Management in Primary Care 3 hrs. Assessment and management of common behavioral, lifestyle, and life cycle issues in primary care using a family-focused approach. Same as NUSC 566. Prerequisite(s): NUSC 532; or consent of the instructor.

NUPH 567 Issues in Population-Focused Nursing 2 hrs. Provides introduction to leadership in population-focused nursing: philosophy, theory, roles, competencies, and interventions. Prerequisite(s): NUSC 532.

NUPH 568 Practicum in Population-Focused Nursing Interventions 2 hrs. Advanced nursing practice experiences to develop beginning competency in the design and implementation of evidence-based interventions with populations and aggregates. Prerequisite(s): Credit or concurrent registration in NUSC 507.

NUPH 570 Public Policy Analysis 3 OR 4 hrs. Statistical inference for the social sciences. Emphasis on univariate and bivariate statistics. Same as POLS 401. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): POLS 200 and POLS 391; or graduate standing.

PPA 500 Introduction to Policy and Government 4 hrs. 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. Same as POLS 500. Consent of the department required for nondegree graduate students.

PPA 501 Data Analysis I 3 OR 4 hrs. Interpretation and application of multivariate methods of analysis in the social sciences. Regression specification and diagnostics, limited dependent variable models, measurement issues. Same as POLS 501. Prerequisite(s): POLS 401 or PPA 401.

PPA 541 Policy Formation, Implementation, and Evaluation 4 hrs. Introduction to political science theories of how elections, interest groups, and state structure affect the formulation of public solutions to societal problems. Same as POLS 541. Prerequisite(s): Consent of the department required for nondegree graduate students.

PPA 584 Methods of Policy Analysis 4 hrs. Analytic, allocative, and evaluative techniques in public policy analysis. Preparation of case studies in problem analysis and policy recommendation. Same as UPP 584. Prerequisite(s): Consent of the instructor.

PPA 590 Advanced Public Policy Workshop 4 hrs. Interdisciplinary workshop on preparing a dissertation proposal for public policy analysis students. Same as POLS 590. Prerequisite(s): Advanced standing in the PhD in Public Policy Analysis program and completion of core PPA courses.

RELS 446 Race, Ethnicity, and Gender in American Religion 3 OR 4 hrs. 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. Same as SOC 446. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 100 and junior standing or above; or consent of instructor.
RUSS 499 Independent Study 1 TO 4 hrs.
Investigation of special problems under the general direction of a staff member. May be repeated to a maximum of 8 hours. Graduate students may register for more than one section per term. Prerequisite(s): Senior or graduate standing, consent of the instructor and the head of the department.

RUSS 510 History of the Russian Language 4 hrs.
Formation and development of standard Russian to the end of the eighteenth century. Analysis of selected texts. Prerequisite(s): RUSS 410 or SLAV 505 or the equivalent.

RUSS 515 Topics in Contemporary Russian Linguistics 4 hrs.
Specific topics are announced each term. May be repeated to a maximum of 12 hours.

RUSS 520 Topics in Historical Russian Linguistics 4 hrs.
Specific topics are announced each term. May be repeated to a maximum of 12 hours.

RUSS 525 Studies in Russian Realism 4 hrs.
Study of a topic, author, or movement. Content varies. May be repeated to a maximum of 12 hours.

RUSS 535 Studies in Russian Neo-realism and Modernism 4 hrs.
Study of a topic, author, or movement. Content varies. May be repeated to a maximum of 12 hours.

RUSS 542 Studies in Slavic and Baltic Languages and Literatures

SLAV 405 Problems in Slavic Grammars 3 OR 4 hrs.
Systematic review of important topics in grammar and syntax. Content varies. Required for department undergraduate majors in Slavic programs. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): SLAV 104 or the equivalent of consent of the instructor.

SLAV 410 Structure of Modern Serbian 3 OR 4 hrs.
A synchronic linguistic analysis of Serbian phonology and morphology, with fundamentals of syntax. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): SLAV 104 or the equivalent of consent of the instructor.

SLAV 433 Topics in Eastern European History 3 OR 4 hrs.
Specific topics are announced each term. Same as HIST 433. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): SLAV 104 or the equivalent of consent of the instructor.

SLAV 460 Studies in East European Literatures and Culture 3 OR 4 hrs.
Study of a topic, author, genre, or movement. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): 24 hours of Slavic or Baltic or consent of the instructor.

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

SLAV 505 Old Church Slavonic 4 hrs.
Phonology, morphology, and basic elements of syntax. Readings in selected texts. Prerequisite(s): Three years of a Slavic language or consent of the instructor.

SLAV 515 Topics in Contemporary Serbian Linguistics 4 hrs.
Specific topics of the Serbian short story and novel are announced each term. May be repeated to a maximum of 12 hours.

SLAV 525 Topics in Slavic Linguistics 4 hrs.
Variable content. May be repeated to a maximum of 12 hours. Prerequisite(s): SLAV 410.

SLAV 536 Topics in Comparative Slavic Literatures 4 hrs.
Comparative study of a literary topic or movement. Content varies. May be repeated to a maximum of 12 hours.

SLAV 542 Studies in Serbian Poetry 4 hrs.
Specific topics are announced each semester. May be repeated to a maximum of 12 hours.

SLAV 550 Studies in Yugoslav Literary Historiography and Criticism 4 hrs.
Major concepts and movements in the South Slavic literary history. May be repeated to a maximum of 12 hours.

SLAV 560 Studies in Ukrainian Renaissance and Baroque Literature 4 hrs.
Ukrainian prose, poetry, and drama of the sixteenth, seventeenth, and eighteenth centuries.

SLAV 562 Studies in Ukrainian Romantic and Postromantic Poetry 4 hrs.
Study of a period or movement in the nineteenth and early twentieth-century Ukrainian poetry. Content varies. May be repeated to a maximum of 12 hours.

SLAV 563 Studies in Twentieth-Century Ukrainian Poetry 4 hrs.
Study of a period or movement. Content varies. May be repeated to a maximum of 12 hours.

SLAV 565 Studies in Nineteenth-Century Ukrainian Prose 4 hrs.
Studying of a genre, topic, period, movement, or author. Content varies. May be repeated to a maximum of 12 hours.

SLAV 566 Studies in Twentieth-Century Ukrainian Prose 4 hrs.
Study of a period or movement. Content varies. May be repeated to a maximum of 12 hours.

SLAV 568 Studies in Ukrainian Drama 4 hrs.
Study of a period, movement, or author. Content varies. May be repeated to a maximum of 12 hours.
SOCW 411 Social Work in a Multicultural Society 3 hrs.
Place of social work in a multicultural society; focus on racial and ethnic minority groups, particularly African Americans, Latinos, Asian Americans, and Native Americans. Credit is not given for SOCW 411 if the student has credit for SOCW 537.
Prerequisite(s): Admission to MSW program.

Social work history; structure and development of current policies; policy analysis and policy advocacy skills for social and economic justice. Credit is not given for SOCW 420 if the student has credit for SOCW 550.
Prerequisite(s): Admission to MSW program.

SOCW 430 Practice I: Generalist Practice with Individuals, Families, and Groups 3 hrs.
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. Credit is not given for SOCW 430 if the student has credit for SOCW 501.
Prerequisite(s): Admission to the MSW program.

SOCW 431 Practice II: Generalist Practice with Task Groups, Organizations, and Communities 3 hrs.
Generalist practice principles applied to task groups, organizations, and communities, including focus on community context and the poor, oppressed, and other urban vulnerable communities. Credit is not given for SOCW 431 if the student has credit for SOCW 502.
Prerequisite(s): SOCW 430 and graduate standing.

SOCW 460 Research I: Social Work Research 3 hrs.
Research methodology basics applied to social work problem formulation, design, measurement, sampling, data analysis, computerization, ethics, qualitative and quantitative methodologies. Credit is not given for SOCW 460 if the student has credit for SOCW 560.
Prerequisite(s): Admission to MSW program.

Ecological and strengths-based interventions in urban school systems. Prerequisite(s): Admission to the post-MSW Type 73 program and graduate standing.

SOCW 503 Family Practice in Urban Communities 3 hrs.
Empowering at-risk urban families using strengths-based intervention; brief treatment models; attention to diversity, community, poor, and other urban at-risk populations. Prerequisite(s): SOCW 430.

SOCW 504 Group Theory and Practice 3 hrs.
Theory and practice of social work with empower groups in both clinical and large system settings; diversity and equity issues. Prerequisite(s): SOCW 430.

SOCW 508 Models of Social Work Scholarship and Knowledge Development I 3 hrs.
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(s): Admission to the PhD in Social Work program or consent of the instructor.

SOCW 509 Models of Social Work Scholarship and Knowledge Development II 3 hrs.
Functions and processes of research in social work, knowledge-building methodologies and the contributions of multiple research models to the growth of knowledge for the profession. Extensive computer use required. Prerequisite(s): SOCW 508.

SOCW 511 Practice With Children 3 hrs.
Direct treatment with urban at-risk children, including situations involving homelessness, substance-abuse, violence, treatment modalities emphasizing family, community, culture. Prerequisite(s): SOCW 430.

SOCW 517 Practice with Family Violence, Neglect, and Abuse 3 hrs.
Ecological approach to family violence; physical, psychological, and sexual abuse of children, women, and elders at practice and policy levels; urban vulnerable population. Prerequisite(s): SOCW 430 or consent of the instructor.

SOCW 519 Practice IV: Community Health and Urban Development 3 hrs.
Advanced, integrated practice with urban communities at levels of individuals, families, groups, organizations, and communities. Emphasis in diversity, strengths, capacity-building, and small systems. Prerequisite(s): Grade of C or better in SOCW 431.

SOCW 520 Practice IV: Community Health and Urban Development 3 hrs.
Advanced, integrated practice with urban communities with emphasis on diversity, strengths, capacity-building, and large systems. Prerequisite(s): Grade of C or better in SOCW 519.

SOCW 521 Aging Populations: Social Work Response 3 hrs.
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(s): SOCW 410; or consent of the instructor.

SOCW 522 Crisis Intervention 3 hrs.
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. Prerequisite(s): SOCW 430.

SOCW 523 Drug and Alcohol Abuse and Social Work 3 hrs.
History and pharmacology of alcohol and other drugs; etiology of abuse and dependence; assessment and treatment models; practice in multidisciplinary settings: emphasis on urban systems. Prerequisite(s): SOCW 430.

SOCW 525 Social Work with Women 3 hrs.
Research, policy, and practice approaches to working with women in diverse urban settings; empowerment and diversity perspectives. Same as GWS 525; Prerequisite(s): SOCW 410; or consent of the instructor.

SOCW 527 Topics in Social Services 3 hrs.
Critical review of selected areas of social work, social services, and social welfare. Prerequisite(s): Consent of the instructor and admission to MSW program.

SOCW 530 Leadership and Professional Development 3 hrs.
Social work leadership and professional development, including writing for publication, communication skills, personal leadership plan development, theory and practice of leadership at individual agency and community levels. Prerequisite(s): SOCW 410.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Description</th>
<th>Prerequisite(s)</th>
<th>Consent of the instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCW 531</td>
<td>Policy II: Community Health and Urban Development</td>
<td>3 hrs. Advanced policy content for urban communities, including health disparities, discrimination, urban poverty, and social dislocation. Analytical and policy practice skills addressed.</td>
<td>Prerequisite(s):</td>
<td>Req. Grade of C or better in SOCW 420.</td>
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<tr>
<td>SOCW 532</td>
<td>Social Work in Corrections</td>
<td>3 hrs. Policy and practice roles of social workers in correctional settings with emphasis on race, ethnicity, gender, sexual orientation, and poverty factors.</td>
<td>Prerequisite(s): SOCW 410</td>
<td>Consent of the instructor</td>
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<tr>
<td>SOCW 533</td>
<td>Mental Health Issues with Children and Adolescents</td>
<td>3 hrs. Critical, strengths-based understanding of current classification and diagnostic systems for assessment and treatment planning with children and adolescents.</td>
<td>Prerequisite(s): SOCW 410</td>
<td>Consent of the instructor</td>
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<tr>
<td>SOCW 534</td>
<td>Independent Study in Practice</td>
<td>1 TO 3 hrs. Independent study in practice area not covered by existing course offerings. May be repeated to a maximum of 6 hours.</td>
<td>Prerequisite(s): Consent of the instructor and approval of the college.</td>
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<tr>
<td>SOCW 539</td>
<td>Mental Health Issues with Children and Adolescents</td>
<td>3 hrs. Critical, strengths-based understanding of current classification and diagnostic systems for assessment and treatment planning with children and adolescents.</td>
<td>Prerequisite(s): SOCW 410</td>
<td>Consent of the instructor</td>
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<tr>
<td>SOCW 540</td>
<td>Mental Health Issues with Adults</td>
<td>3 hrs. Critical, strengths-based understanding of current classification and diagnostic systems for assessment and treatment planning with adults.</td>
<td>Prerequisite(s): SOCW 410</td>
<td>Consent of the instructor</td>
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<tr>
<td>SOCW 541</td>
<td>Policy II: School Social Work Policy</td>
<td>3 hrs. Critical analysis of federal, state, and local policies relevant to social work practice in urban school systems.</td>
<td>Prerequisite(s): SOCW 420</td>
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<tr>
<td>SOCW 542</td>
<td>Policy II: Child and Family Policy</td>
<td>3 hrs. 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.</td>
<td>Prerequisite(s): SOCW 420</td>
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<tr>
<td>SOCW 543</td>
<td>Policy II: Healthcare Systems &amp; Policies</td>
<td>3 hrs. Critical analysis of current healthcare programs and policies, including policy change skills; content on urban poor and at-risk populations.</td>
<td>Prerequisite(s): SOCW 420</td>
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<tr>
<td>SOCW 544</td>
<td>Policy II: Community Health Systems &amp; Policies</td>
<td>3 hrs. Critical analysis of current healthcare programs and policies, including policy change skills; content on urban poor and at-risk populations.</td>
<td>Prerequisite(s): SOCW 420</td>
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<tr>
<td>SOCW 545</td>
<td>Policy II: Mental Health Policy</td>
<td>3 hrs. Critical analysis of policies and structures in mental health delivery system with focus on urban and chronically mentally ill populations.</td>
<td>Prerequisite(s): SOCW 420</td>
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<tr>
<td>SOCW 546</td>
<td>Public Health Aspects of I and Adolescent Health</td>
<td>3 hrs. Overview of critical health/developmental issues in adolescence; youth participation in health initiatives. Cross-cutting perspectives of social identity, gender, culture, and social class will be essential to any topic discussion/assignment. Same as CHSC 544.</td>
<td>Prerequisite(s): CHSC 446 or consent of the instructor. Recommended background: Research, policy, and/ or practice and interest in adolescence and in community development and intervention studies; ethnic/minority studies; education; health and social/ human service professions.</td>
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<tr>
<td>SOCW 547</td>
<td>Independent Study in Human Behavior and the Social Environment</td>
<td>1 TO 3 hrs. Independent study in human behavior and social environment areas not covered by existing course offerings. May be repeated to a maximum of 6 hours.</td>
<td>Prerequisite(s): Consent of the instructor and approval of the college.</td>
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<tr>
<td>SOCW 549</td>
<td>Research Seminars: Social Service Issues</td>
<td>3 hrs. 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.</td>
<td>Prerequisite(s): SOCW 460 or consent of the instructor.</td>
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<tr>
<td>SOCW 550</td>
<td>Instruction II</td>
<td>2 TO 4 hrs. Practicum experiences in approved social agencies/organizations where students carry selected cases and apply knowledge to skill applications under the supervision of an agency field instructor.</td>
<td>Prerequisite(s): Consent of the instructor and approval of the college.</td>
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<tr>
<td>SOCW 551</td>
<td>Instruction I</td>
<td>5 hrs. Practicum experiences in research methodology or areas not covered by existing course offerings. May be repeated to a maximum of 6 hours.</td>
<td>Prerequisite(s): Consent of the instructor and approval of the college.</td>
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<tr>
<td>SOCW 552</td>
<td>Special Studies</td>
<td>8 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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<tr>
<td>SOCW 553</td>
<td>Special Studies</td>
<td>5 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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<tr>
<td>SOCW 554</td>
<td>Special Studies</td>
<td>3 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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<tr>
<td>SOCW 555</td>
<td>Special Studies</td>
<td>5 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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<tr>
<td>SOCW 556</td>
<td>Special Studies</td>
<td>3 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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<tr>
<td>SOCW 557</td>
<td>Special Studies</td>
<td>3 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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<tr>
<td>SOCW 558</td>
<td>Special Studies</td>
<td>3 hrs. 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.</td>
<td>Prerequisite(s): Consent of the instructor.</td>
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SOCW 577 Social Welfare History 3 hrs. Social welfare history in context of political, economic, and social developments; focus on gender, class, and race; critical application of theoretical models.

Prerequisite(s): Admission to the PhD in Social Work program or consent of the instructor.

SOCW 579 Integrative Seminar 2 hrs. 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. May be repeated to a maximum of 4 hours.

Prerequisite(s): Concurrent registration in SOCW 575 and consent of the instructor.

SOCW 580 Practice III: Community and Administrative Practice 3 hrs. Management of human service organizations; resource acquisition and management; planning; community relations; focus on urban, community-based agencies.

Prerequisite(s): SOCW 580.

SOCW 581 Practice IV: Community and Administrative Practice 3 hrs. Advanced urban community building and developing; emphasis on poor, at-risk communities.

Prerequisite(s): SOCW 581.

SOCW 582 Practice III: Practice with Children and Families 3 hrs. Ecological and strengths-based practice with urban children and families; special focus on child welfare.

Prerequisite(s): SOCW 582.

SOCW 583 Practice IV: Practice with Children and Families 3 hrs. 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(s): SOCW 583.

SOCW 584 Practice III: Healthcare 3 hrs. Theoretical basis and skills for health social work in diverse settings; biopsychosocial understanding of health and disease; emphasis on direct practice with urban clients and families.

Prerequisite(s): SOCW 431.

SOCW 585 Practice IV: Healthcare 3 hrs. Advanced knowledge and skills in healthcare settings; specific populations, including urban poor and at-risk populations; emphasis on urban community and organizational levels.

Prerequisite(s): SOCW 584.

SOCW 586 Practice III: Mental Health 3 hrs. Strengths-based assessment and treatment planning in urban settings; diversity issues; managed care settings; critical use of current mental health diagnostic and classification systems.

Prerequisite(s): SOCW 431.

SOCW 587 Practice IV: Mental Health 3 hrs. 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(s): SOCW 586.

SOCW 588 Practice III: School Social Work 3 hrs. Ecological and strengths-based perspectives on development of basic competencies for urban school social work; diversity issues.

Prerequisite(s): SOCW 431.

SOCW 589 Practice IV: School Social Work 3 hrs. Advanced interventions in urban school systems; use of groups, consultation, classroom interventions, family empowerment, conflict resolution, and community interventions; diversity issues.

Prerequisite(s): SOCW 588.

SOCW 590 Analysis of Social Work Practice Approaches 3 hrs. 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(s): Admission to the PhD in Social Work program or consent of the instructor.

SOCW 591 Social Welfare Policy Analysis and Development 3 hrs. 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(s): Admission to the PhD in Social Work program or consent of the instructor.

SOCW 592 Social Work Research 3 hrs. 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(s): Admission to the PhD in Social Work program or consent of the instructor.

SOCW 593 Quantitative Methods in Social Work Research 3 hrs. Covers general linear models emphasizing regression, analysis of variance and covariance, simple structural equation models, simple categorical methods, and elementary matrix algebra.

Prerequisite(s): SOC 401.

SOCW 594 Dissertation 2 TO 4 hrs. Preparation in development of dissertation focus and planning of dissertation research. Readings are assigned and discussed in class. Emphasis on ideas for dissertation topic, its formulation, operationalization, and research design.

Prerequisite(s): SOCW 592 and SOCW 593.

SOCW 595 Seminar in Social Work Education 3 hrs. 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. Students must participate in a teaching laboratory.

Prerequisite(s): Admission to the PhD in Social Work program.

SOCW 596 Proseminar on Selected Topics and Issues in Social Work 2 TO 4 hrs. Review and critique of selected areas of social work content, theory, or practice. State of current knowledge and needed research stressed. May be repeated.

Prerequisite(s): Admission to the PhD in Social Work program.

SOCW 599 PhD Thesis Research 0 TO 16 hrs. Individual research, under faculty direction, on social work doctoral dissertation. Satisfactory/Unsatisfactory grading only. May be repeated.

Prerequisite(s): Consent of the instructor.

Sociology


Prerequisite(s): SOC 201 and two additional 200-level sociology electives; or graduate standing; or consent of the instructor.
SOC 426 Topics in Race, Ethnicity, and Gender 3 OR 4 hrs. Intensive examination of a specialized topic in race, ethnicity, and gender. The specific topic of the course varies depending on the faculty offering it and undergraduate hours. 4 graduate hours. May be repeated up to 2 times. Students may register in more than one section per term. Prerequisite(s): SOC 224; or SOC 225; and junior standing or above and an additional 200- or 300-level elective in sociology; or consent of the instructor.

SOC 428 Asian/Asian American Women in the Global Economy 3 OR 4 hrs. Examines the racialization and feminization of a global division of labor and focuses primarily on Asian and Asian American women's participation and incorporation as workers and key actors in the development of the global economy. Same as ASAM 428 and GWS 428. 3 undergraduate hours; 4 graduate hours. Prerequisite(s): ASAM 125 or ENGL 125 or SOC 125 or AAST 225 or LALS 225 or SOC 225 or ASAM 228 or ASST 228 or SOC 228 or ASAM 290 or two 200-level courses in either SOC, GWS, or ASAM, or a combination of these.

SOC 440 Topics in Organizations and Institutions 3 OR 4 hrs. Intensive examination of a specialized topic announced when the class is scheduled. Same as ASAM 440 and GWS 440. 3 undergraduate hours; 4 graduate hours. May be repeated up to 2 times. Students may register in more than one section per term. Prerequisite(s): SOC 241 or MGMT 340, and an additional 200-level elective, and junior standing or consent of the instructor.

SOC 441 Social Stratification 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 241 and an additional 200- or 300-level elective in sociology; and junior standing or above; or consent of the instructor.

SOC 445 Sociology of the Family 3 OR 4 hrs. Varieties and change in family patterns; family formation and breakup; parents' and children's effects on each other; influences of culture and political economy; and intergroup relations for other institutions. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 224, or SOC 245 and an additional 200- or 300-level sociology elective; and junior standing or above; or consent of the instructor.

SOC 447 Organizations 3 OR 4 hrs. Characteristics of business, government, and not-for-profit organizations: approaches used to study organizations; theoretical and empirical analysis of organizational processes. Same as MGMT 447. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 241 or MGMT 340 or SOC 224 and an additional 200- or 300-level elective in sociology; and junior standing or above; or consent of the instructor.

SOC 448 Sociology of Development 3 OR 4 hrs. Historical, economic, political, social, and geographic factors shaping national and international development expected as and outcomes. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): 6 hours of upper-division social science courses or consent of the instructor.

SOC 451 Medical Sociology 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): 6 hours of upper-division sociology or consent of the instructor.

SOC 455 Topics in Medical Sociology 3 OR 4 hrs. Intensive examination of a specialized topic announced when the class is scheduled. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): SOC 451 or consent of the instructor.

SOC 465 Topics in Sociology of Politics 3 OR 4 hrs. Intensive examination of a specialized topic announced when the class is scheduled. Same as POLS 465, 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): 6 hours of upper-division sociology or consent of the instructor.

SOC 471 Population 3 OR 4 hrs. 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. Same as EPID 471. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 201 and an additional 200- or 300-level course in Sociology; and junior standing or above; or consent of the instructor.

SOC 473 Cities and Regions 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 201 and an additional 200- or 300-level course in sociology; and junior standing or above; or consent of the instructor.

SOC 476 Topics in Urban Sociology 3 OR 4 hrs. Intensive examination of a specialized topic announced when the class is scheduled. 3 undergraduate hours. 4 graduate hours. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): 6 hours of upper-division sociology or consent of the instructor.

SOC 485 Classical Social Theory 3 OR 4 hrs. Survey and analysis of classical European and American social theory. Examination of how theorists such as Marx, Weber, Durkheim, Veblen, and Park defined and described society within their own social contexts and how we derive meaning from these theories. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 385; and senior standing or above; or consent of the instructor.

SOC 487 Current Social Theory 3 OR 4 hrs. Recent and evaluation of major currents in sociological theory since the 1940s. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SOC 385; and senior standing or above; or consent of the instructor.

SOC 490 Senior Research Experience 1 TO 9 hrs. The course integrates theory, methods, and analytical skills to a substantive area of sociology. Students will gain hands-on experience by collecting data, analyzing data, writing up their findings, and presenting their projects to the class. May be repeated to a maximum of 8 hours, with approval of the department. Students may register for more than one section per term. Previously listed at SOC 400. Prerequisite(s): SOC 300 and SOC 385; and senior standing or above and one 400-level elective in sociology and consent of the instructor.

SOC 496 Independent Study or Research 1 TO 9 hrs. Extensive readings in specialized areas of sociology or empirical research for advanced undergraduate or graduate students. May be repeated with approval. Students may register in more than one section per term. Approval to repeat course granted by the department. Undergraduate students may repeat course for maximum of 9 hours of credit. Prerequisite(s): 18 hours of sociology, excluding SOC 296 and SOC 299, consent of the instructor, and approval of the department.

SOC 499 Senior Thesis 1 TO 4 hrs. Individual study for students working on a senior thesis under the supervision of a faculty advisor. This course is required for students graduating with highest departmental distinction. May be repeated to a maximum of 8 hours, with approval of the department. Students may register for more than one section per term. Previously listed as SOC 299. Prerequisite(s): SOC 490; and senior standing or above; and consent of the instructor.
SOC 500  Sociological Research Methods I  4 hrs.
Introduction to research design, data gathering, and data reduction; logic of problem formulation, units of analysis, measurement, data analysis.

SOC 501  Sociological Research Methods II  4 hrs.
Evaluating sociological research, data analysis, and reporting; proposal writing and evaluation; professional issues, including research ethics; student presentation of master's research proposals. May be repeated to a maximum of 1/2 hours.
Prerequisite(s): SOC 500.

SOC 509  Seminar: Sociological Research Methods  0 TO 4 hrs.
Research practicum of specialized social science research methods. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Students register for 1 to 7 hours.
Prerequisite(s): SOC 500 and SOC 501.

SOC 520  Seminar: Race, Ethnicity, and Gender  4 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

SOC 524  Gender  4 hrs.
Review of a wide range of theories that explain the development and maintenance of gender, focusing on how gender stratification has developed historically and how and why individuals “do gender” in their daily lives. Consent of the instructor.

SOC 525  Sociology of Race and Ethnicity  4 hrs.
A survey of classical and contemporary research on “race” and “ethnicity” focusing on how their meaning is both ascribed and achieved and the relationship of these categories to individual and collective life chances. Consent of the instructor.

SOC 528  Societal Analysis of Aging, Health, and Healthcare  3 hrs.
Analysis of aging, health, and healthcare issues mainly from sociological and public health perspectives. Review and application of appropriate concepts, theories, and methods. Same as CHSC 528.
Prerequisite(s): CHSC 425 or consent of instructor.

SOC 540  Seminar: Social Institutions  4 hrs.
Intensive analysis of specialized topics in social institutions. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

SOC 541  Sociology of Social Stratification  4 hrs.
Provides students with an overview of sociological research on social stratification, emphasizing individual and structural elements. Consent of the instructor.

SOC 547  Seminar: Social Organization  4 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

SOC 550  Seminar: Comparative Societies  1 TO 7 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term.

SOC 555  Seminar: Sociology of Health and Medicine  1 TO 7 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

SOC 559  Thesis Research  0 TO 16 hrs.
Supervised dissertation research. Satisfactory/Unsatisfactory grading only. May be repeated.

SOC 561  Comparative Sociology  4 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

SOC 565  Seminar: Political Sociology  1 TO 7 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term.

SOC 571  Seminar: Population and Human Ecology  1 TO 7 hrs.
Intensive analysis of specialized topics. May be repeated to a maximum of 12 hours. Students may register in more than one section per term.

SOC 572  Sociology of Education  4 hrs.
Education as a social institution in interaction with other social systems, such as the economy. Topics include the emergence of national systems of education, purposes of education, inequality, and educational reform. Same as EDPS 572. Consent of the instructor.

SOC 575  Classical Sociological Theory  4 hrs.
Examines of how sociologists have defined and described society within their own social contexts and how we derive meaning from these theories. Consent of the instructor.

SOC 576  Sociological Theory  4 hrs.
Sociological theory since World War II. Course content will be both “substantive,” covering widely divergent schools of thought, and “methodological,” analyzing and constructing theories as explanatory systems. Consent of the instructor.

SOC 578  Contemporary Sociological Theory  4 hrs.
Sociological theory since World War II. Course content will be both “substantive,” covering widely divergent schools of thought, and “methodological,” analyzing and constructing theories as explanatory systems. Consent of the instructor.

SOC 579  Seminar: Sociology of Education  1 TO 7 hrs.
Research practicum of specialized social science research methods. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

SOC 593  Colloquium on College Teaching of Sociology  4 hrs.
Covers strategies and techniques for contemporary university teaching and for the teaching of sociology at the college level. May be repeated.

SOC 595  Proseminar  1 hour.
Presentation and discussion of issues of professional concern to sociologists, including current research, consulting, teaching, and applied sociology. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.

SOC 596  Independent Study  1 TO 12 hrs.
Research on special problems not included in the graduate thesis. May be repeated. Students may register in more than one section per term. Consent of the instructor and approval of the department.

SOC 597  Master's Project Research  1 TO 4 hrs.
Supervised writing and research on topic of the master's paper. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 12 hours.

Spanish

SPAN 400  History of the Spanish Language  3 OR 4 hrs.
Origins and development of Spanish; phonological, morphological, syntactic development of the language; foreign influences: origin of dialects. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 401  Intensive Introduction to Hispanic Linguistics  4 hrs.
An intensive introduction to phonetics/phonology, syntax, and semantics of Spanish. Consent of the instructor.

SPAN 402  Spanish Syntax  3 OR 4 hrs.
Introduction to the generative approach to Spanish syntax. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 403  Advanced Spanish Syntax  3 OR 4 hrs.
In-depth examination of current theoretical issues in Spanish syntax. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 404  Spanish Phonology and Morphology  3 OR 4 hrs.
Analysis of the phonological and morphological structure of Spanish. Emphasis on the production and mental representation of sounds. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 405  Advanced Spanish Phonology and Morphology  3 OR 4 hrs.
Advanced and detailed study of the phonological and morphological structure of Spanish. Emphasis on current theories. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 406  Spanish Sociolinguistics  3 OR 4 hrs.
Past and current theoretical and empirical sociolinguistics as applied to the study of variation within Spanish and U.S. Hispanic communities. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 407  College Teaching  4 hrs.
Teaching and for the teaching of sociology within the college setting. May be repeated. Students may register in more than one section per term.

SPAN 409  Seminar: Sociological Research Methods  0 TO 4 hrs.
Research practicum of specialized social science research methods. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Students register for 1 to 7 hours.
Prerequisite(s): SOC 500 and SOC 501.

SPAN 410  Graduate standing.

SPAN 411  Advanced Spanish Syntax  3 OR 4 hrs.
In-depth examination of current theoretical issues in Spanish syntax. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 412  Spanish Phonology and Morphology  3 OR 4 hrs.
Advanced and detailed study of the phonological and morphological structure of Spanish. Emphasis on current theories. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 415  Spanish Sociolinguistics  3 OR 4 hrs.
Past and current theoretical and empirical sociolinguistics as applied to the study of variation within Spanish and U.S. Hispanic communities. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 417  Intensive introduction to Hispanic Linguistics  4 hrs.
An intensive introduction to phonetics/phonology, syntax, and semantics of Spanish. Consent of the instructor.

SPAN 418  Spanish Syntax  3 OR 4 hrs.
Introduction to the generative approach to Spanish syntax. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 419  Advanced Spanish Syntax  3 OR 4 hrs.
In-depth examination of current theoretical issues in Spanish syntax. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 420  Spanish Phonology and Morphology  3 OR 4 hrs.
Analysis of the phonological and morphological structure of Spanish. Emphasis on the production and mental representation of sounds. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.

SPAN 421  Spanish Sociolinguistics  3 OR 4 hrs.
Past and current theoretical and empirical sociolinguistics as applied to the study of variation within Spanish and U.S. Hispanic communities. 3 undergraduate hours, 4 graduate hours. Consent of the instructor.
SPAN 407 Methods of Literary and Cultural Analysis 3 OR 4 hrs. Introduction to basic tools and critical vocabulary to conduct advanced work in Hispanic literatures. 3 undergraduate hours. 4 graduate hours. Taught in Spanish or English. 
Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 408 Hispanic Dialectology 3 OR 4 hrs. Descriptive and historical analysis of the most salient linguistic phenomena of the leading American Spanish dialects. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SPAN 362 or SPAN 401; or consent of the instructor.

SPAN 409 Semantics/Pragmatics in Span 3 OR 4 hrs. Introduction to the study of meaning in language with a focus on Spanish. Includes formal/compositional semantics and an introduction to pragmatics. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): SPAN 365 or SPAN 401; or consent of the instructor.

SPAN 411 Topics in Medieval and Early Modern Spanish Literature and Culture 3 OR 4 hrs. Exploration of topics and theoretical approaches to the literature and culture of medieval and early modern Spain. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above. Completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 414 Topics in Cortesians’ Don Quijote 3 OR 4 hrs. Examination of current critical and theoretical approaches to Cervantes’ Don Quijote, including questions of gender, class, historiography, and ideology. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 418 Topics in 18th and 19th Century Spanish Literature and Culture 3 OR 4 hrs. Exploration of topics and theoretical approaches to Peninsular literature and culture from the neoclassical period through the generation of 1898. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 421 Topics in Latin American Letters from Modernismo to the Early 1970’s 3 OR 4 hrs. Emergence of new literary and cultural trends from the beginning of the 20th century to the end of the so-called Latin American Boom. It may include fiction, poetry, film, theater, as well as less traditional genres. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 422 Topics in 20th and 21st Century Latin American and Latino Culture 3 OR 4 hrs. Exploration of topics: sociological and historical approaches to the literature and culture from the various movements of the early 20th century through the present day. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 427 Studies in Language Policy and Cultural Identity 3 OR 4 hrs. Examines the development, articulation, and effects of language policies on identity formation and culture. Focuses on the United States and the Spanish language, although other countries and language communities will also be included. Same as LALS 427, 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above. Reading and writing knowledge of Spanish.

SPAN 430 Topics in Colonial History, Literature, and Culture 3 OR 4 hrs. Topics in colonial literature, history, and culture intended to introduce students to the main methodologies, paradigms, issues, and critical approaches to colonial studies. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 431 Topics in Latin American Letters from the Revolutionary Era to Independence 3 OR 4 hrs. Nineteenth-century literary trends from the beginnings of the novel through romanticism and realism to urban naturalism. Prose and poetry. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 434 Topics in Latin American Letters from Modernismo to the Early 1970’s 3 OR 4 hrs. Emergence of new literary and cultural trends from the beginning of the 20th century to the end of the so-called Latin American Boom. It may include fiction, poetry, film, theater, as well as less traditional genres. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 435 Topics in Contemporary Urban Latin American and Latino Culture, Literature, and the Arts 3 OR 4 hrs. Study of particular cultural, artistic, or literary phenomena in urban Latin American and Latino culture, literature, or the arts. Focus on cultural studies and/or literary analysis. Critical writing is an important component of the course. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Junior standing or above and completion of two 300-level courses in Spanish literature or consent of the instructor.

SPAN 436 Special Topics in the Teaching of Spanish 1 TO 4 hrs. Course content is announced prior to each term in which course is given. May be repeated. Students are registered in more than one section per term. Taught in English. Some semesters may be taught in Spanish. Prerequisite(s): Approval of the department.

SPAN 448 Foundations of Second Language Teaching 3 OR 4 hrs. Provides an introduction to second language acquisition research and its implications for communicative language teaching. Emphasis is on creating activities to develop high school students’ communicative abilities in speaking and listening. Same as GER 448 and GER 448. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above and consent of the instructor and three courses at the 200- and 300-levels.

SPAN 449 Teaching Second Language Literacy and Cultural Awareness 3 OR 4 hrs. Examines the nature of literacy as a reciprocal relationship between readers, writers, texts, and culture. Students learn the practical and theoretical foundations of classroom teaching of second language reading and writing skills. Same as FR 449 and GER 449. 3 undergraduate hours. 4 graduate hours. Taught in English. Prerequisite(s): Junior standing or above and consent of the instructor and three courses at the 200- and 300-levels.

SPAN 451 Educational Practice with Seminar I 6 hrs. The first half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): Good academic standing in a teacher education program, completion of 100 clock hours of pre-student-teaching field experiences, and approval of the department.

SPAN 452 Educational Practice with Seminar II 6 hrs. The second half of a two-segment sequence of practice teaching, including seminar, to meet certification requirements for teaching in grades six through twelve. Graduate credit only with approval of the department. Prerequisite(s): 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.

SPAN 457 Computer Assisted Language Learning 3 OR 4 hrs. An introduction to computer assisted language learning (CALL): the use of computer technology in second language reading and research. The effectiveness of CALL technology is assessed based on SLA theory and research studies. Same as GER 487 and LING 487. 3 undergraduate hours. 4 graduate hours. Taught in English. Extensive computer use required. Prerequisite(s): LING 483 or CI 483 or GER 448 or FR 448 or SPAN 448 or GER 449 or FR 449 or SPAN 449; or SPAN 502 or FR 502; or the equivalent; and senior standing or above.

SPAN 494 Special Topics 3 OR 4 hrs. Topics will vary from term to term and may cover such areas as literary theory or culture. Same as FR 494 and ITAL 494. 3 undergraduate hours. 4 graduate hours. May be repeated. Students may register in more than one section per term. Taught in English. Prerequisite(s): Junior standing or above; and approval of the department.

SPAN 502 Theoretical and Research Foundations of Communicative Language Teaching 4 hrs. Introduces students to contemporary theory and research on second language acquisition. Emphasis is on understanding the research and examining classroom practice. Same as FR 502. Credit is not given for FR 502/SPAN 502 if the student has credit for SPAN 450 or FR 450 or GER 407. Taught in English. Prerequisite(s): Appointment as a teaching assistant. For students outside the department: Consent of the instructor.

SPAN 503 Professional Development Workshop I 1 hour. Introduction to the academic profession for students of foreign languages and literatures. Focus on the development of research and writing skills. Satisfactory/Unsatisfactory grading only.
SPAN 504 Professional Development Workshop II 1 hour.
Introduction to the academic profession for students of foreign languages and literatures. Focus on presentational skills and preparation for the job market. Satisfactory/Ungraded grading only. Recommended for first year, second semester students.
Prerequisite(s): Graduate standing.

SPAN 505 Seminar in Spanish Theoretical and Descriptive Linguistics 4 hrs.
Topics in phonology, morphology, syntax, semantics, pragmatics, or dialectology of Spanish. May be repeated to a maximum of 8 hours.
Prerequisite(s): One 400-level Spanish course from among SPAN 402, SPAN 404, SPAN 408, SPAN 409; or consent of the instructor.

SPAN 507 Seminar in Second Language Acquisition and Bilingualism 4 hrs.
Current theoretical and research directions of bilingualism and second language acquisition by nonnatives. May include original empirical research projects. May be repeated to a maximum of 8 hours.

SPAN 515 Advanced Seminar in Medieval and Early Modern Spanish Literature and Culture 4 hrs.
Examination of topics using selected literary, historical and philosophical readings from medieval and early modern Spain. May be repeated up to 1 time(s). May be taught in English or Spanish. Recommended background: Credit or concurrent registration in SPAN 409 and SPAN 411.

SPAN 520 Advanced Seminar on Modern and/or Contemporary Spanish Literature and Culture 4 hrs.
Particular areas, genres, works, or figures in 19th, 20th, or 21st century Spanish literature and culture. May be repeated to a maximum of 8 hours. May be taught in English or Spanish.

SPAN 522 Advanced Seminar on Hispanic Colonial and Postcolonial Letters and Culture 4 hrs.
An in-depth examination of problems and issues that concern the study of colonial and postcolonial cultures and societies. May be repeated to a maximum of 8 hours. May be taught in English or Spanish.

SPAN 523 Advanced Seminar on Postmodern Latin American Literature, Film, and Culture 4 hrs.
An in-depth examination of issues, trends, and problems that concern contemporary and Latin American culture, film, and other art forms. May be repeated to a maximum of 8 hours. May be taught in English or Spanish.

SPAN 525 Advanced Seminar on Trans-American, Transatlantic, and/or U.S. Latino Studies 4 hrs.
Intensive study of relevant issues in comparative transatlantic, trans-American, and/or U.S. Latino literatures and cultures. May be repeated up to 1 time(s). May be taught in English or Spanish.

SPAN 535 Concepts and Methodologies in Hispanic Interdisciplinary Studies 4 hrs.
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. May be repeated to a maximum of 8 hours.

SPAN 540 Seminar on Language in Context 4 hrs.
Past and current theoretical and empirical directions as applied to the study of oral and written discourse and its social context.
Prerequisite(s): One 400-level Spanish course and two from SPAN 402, SPAN 404, SPAN 406, and SPAN 408.

SPAN 551 Research Practicum in Sociolinguistics 4 hrs.
Strategies and methods for studying language use in communities: participant observation, interviewing, elicitation, using public-domain data, note taking vs. tape recording, and issues of transcription and ethics. Same as LING 551. May be repeated to a maximum of 12 hours.
Prerequisite(s): LING 480; or consent of the instructor.

SPAN 556 Second Language Learning 4 hrs.
An introduction to research findings and methods in second language learning. Same as LING 556. Prerequisite(s): Consent of the instructor.

SPAN 557 Theories in Second Language Acquisition 4 hrs.
Review of current linguistic, cognitive, and sociocultural theories with the following in mind: What do these theories purport to explain? What methodologies are used by researchers working within the theories? Taught in English. Recommended background: LING 556.

SPAN 567 Discourse Analysis 4 hrs.
Discourse analysis addresses issues of intentional communication, inference, the structure of texts or talk-in-interaction, and the interactive construction of social actions or identities in discourse.
Same as ENGL 567 and LING 567.

SPAN 570 Seminar in Literary Theory and Criticism 4 hrs.
Theories of literary production and reception; their application to the practice of literary criticism. Specific themes and topics vary. Same as FR 570. May be repeated to a maximum of 8 hours with approval. Approval to repeat course granted by the instructor. Taught in English.

SPAN 594 Special Topics in Hispanic Studies 4 hrs.
Topics that involve multiple approaches to problems in linguistics and literature, or that cross the chronological and geographical boundaries established in the seminars. May be repeated to a maximum of 8 hours.

SPAN 596 Independent Study 1 TO 4 hrs.
Provides for areas of study not regularly covered by departmental offerings. Study proposals must conform to departmental guidelines. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

SPAN 598 MA Thesis Research 0 TO 16 hrs.
Students involved in thesis research and writing are assigned to the course at the discretion of the graduate committee. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Approval of the graduate committee.

SPAN 599 PhD Thesis Research 0 TO 16 hrs.
The writing of a PhD thesis based on original research in the area of the candidate’s major specialization (Literature, Linguistics, or Culture). Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 24 hours. Prerequisite(s): Admission to candidacy for the doctoral degree and consent of the director of graduate studies.

Special Education
SPED 410 Survey of Characteristics of Learners with Disabilities 3 hrs.
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(s): ED 210 or ED 421 and consent of the instructor.

SPED 415 Characteristics of Exceptional Learners 3 hrs.
Provides a foundational understanding of the exceptional learner in an inclusive environment. No graduation credit for students enrolled in a secondary education, social work, or any graduate degree program.
Prerequisite(s): Junior standing or above and admission to the Bachelor of Arts in Elementary Education program or consent of the instructor.

SPED 416 Methods of Instruction for Exceptional Learners 2 hrs.
The purpose of this course is to address issues of instruction for individuals with special needs. Topics include effective instructional and accommodative practices and strategies in multiple areas (math, literacy, science, social studies, art). Junior standing or above and admission to the Bachelor of Arts in Elementary Education program. Successful completion of SPED 415.

SPED 423 Assessment of Monolingual and LEP Children with Disabilities 4 hrs.
Psycholinguistic 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(s): Graduate standing; and SPED 410 or the equivalent.
SPED 424 Assessment of Students with Special Needs 3 OR 4 hrs. Theoretical basis and practical application of standardized and alternative testing of children with learning and behavior difficulties. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): SPED 410

SPED 426 Curricular/Behavioral Considerations for Learners with Special Needs 3 OR 4 hrs. Instructional practices related to academics, classroom management, individualized and group instruction for students with special needs. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): SPED 424 or the equivalent or consent of the instructor.

SPED 427 Curricular and Behavioral Considerations for LEP Learners with Special Needs 4 hrs. Exploration of best practice instruction and behavior management for limited English proficient students with learning disabilities, behavioral disabilities, and/or mild cognitive delays. Prerequisite(s): Graduate standing; and SPED 410 or the equivalent or consent of the instructor.

SPED 442 Language, Development and Disorders 3 OR 4 hrs. Theory and research on the acquisition of phonology, syntax, semantics, and pragmatics in children with and without disabilities. Models for language assessment and intervention. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): SPED 410

SPED 444 Assistive Technology for Literacy, Learning, and Participation in Pre-K Through High School 3 hrs. Use of communication systems, computers, adapted equipment, and strategies to foster participation and inclusion of students in preschool through high school. Same as DHD 444.

SPED 448 Topics in Special Education 1 TO 4 hrs. Course or workshop on preannounced topic on the education of handicapped children, adolescents, or adults. May be repeated. Students may register in more than one section per term. Prerequisite(s): SPED 410 and consent of the instructor.


SPED 461 Political and Sociocultural Perspectives on Special Education 3 hrs. Students will examine issues of access and equity through legislation, litigation, and sociocultural perspectives and be introduced to major theoretical frameworks that influence special education programs. Same as ED 461. Fieldwork required.

SPED 462 Assessment of Individuals with Disabilities 3 hrs. To prepare students in the use of formal and informal assessment in making decisions regarding placement, instructional planning, and evaluation of students with disabilities. Fieldwork required. Prerequisite(s): ED 461 or SPED 461 or the equivalent or consent of the instructor.

SPED 463 Instructional Adaptations in Reading and Writing I 3 hrs. Emphasizes the components of designing, implementing, and assessing reading and writing instruction for individuals with disabilities at the elementary level. Fieldwork required. Prerequisite(s): ED 461 or SPED 461 or the equivalent or consent of the instructor.

SPED 465 Cognitive Development and Disabilities 3 hrs. 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. Same as EPSY 465. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

SPED 466 Language Development, Diversity, and Disabilities 3 hrs. Theory and research on language development in children with disabilities, in the context of typical development. Models for language assessment and intervention. Same as EPSY 466. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

SPED 467 Social and Emotional Development and Disabilities 3 hrs. 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. Same as EPSY 467. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

SPED 471 Curricular Adaptations for Learners with Significant Disabilities 3 hrs. Addresses methods of instruction, assessment, planning for instruction, development and evaluation of learning environments, and instructional delivery for students with significant disabilities. Fieldwork required. Prerequisite(s): SPED 465 and SPED 466 and SPED 467; or consent of the instructor.

SPED 472 Promoting Academic and Prosocial Behavior I 3 hrs. The importance of school-wide and classroom structure and climate in the educational process. Strategies to promote academic success and desired social behavior. Same as ED 472. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

SPED 473 Teaching Math and Science with Adaptations 3 hrs. Provides prospective teachers with assessment strategies and a range of adaptations, modifications, and interventions in math and science for students with disabilities. Same as ED 473. Fieldwork required. Prerequisite(s): SPED 461 or ED 461 or the equivalent or consent of the instructor.

SPED 480 Technology and Multimedia: Learning Tools in the Classroom 3 OR 4 hrs. New technologies to support teaching and learning in pre-college classrooms. Same as ED 480. 3 undergraduate hours, 4 graduate hours.

SPED 481 Theoretical Foundations of Bilingual/English as a Second Language Special Education 4 hrs. 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(s): Graduate standing; and SPED 410 or the equivalent or consent of the instructor.

SPED 500 Research Methods in Special Education 4 hrs. Research strategies and statistical methods for the assessment of applied and theoretical research studies in special education. Prerequisite(s): SPED 410 or consent of the instructor.

SPED 506 Characteristics and Assessment of Young Children with Disabilities 4 hrs. Biological and environmental factors in infancy may cause developmental disabilities. Impact of such factors on child development will be reviewed. Appropriate assessment techniques reviewed. Fieldwork required.

SPED 507 Children with Disabilities and the Family 4 hrs. 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(s): SPED 506 or SPED 511 or SPED 515 or SPED 516.

SPED 508 Methods of Instruction & Assessment of Young Children with Disabilities 4 hrs. Intervention and assessment methods for infants and young children at risk for or showing developmental delays. Systems perspective on utilizing family and community to support intervention. Fieldwork required. Prerequisite(s): Grade of B or better in SPED 506; or consent of the instructor.

SPED 511 Characteristics of Learning Disabilities 3 hrs. Characteristics of and educational implications for cognitive, language, academic, and social-emotional development in students with learning disabilities. Fieldwork required. Prerequisite(s): SPED 500.

SPED 512 Instructional Methods for Students with Learning Disabilities 3 hrs. Development and evaluation of individualized educational programs for learning-disabled students, including instructional methods and materials. Fieldwork required. Prerequisite(s): SPED 511.

SPED 513 Characteristics of Mental Retardation 3 hrs. The nature, characteristics, and educational implications for the cognitive, social, and physical development of persons with mental retardation. Fieldwork required. Prerequisite(s): SPED 500.
SPED 514 Instructional Methods for Students with Mild Mental Retardation 2 hrs. Instructional theory, methods, and techniques; and behavioral and academic objectives for students with mild mental retardation. Field experience. Prerequisite(s): SPED 513 and concurrent registration in SPED 515.

SPED 515 Instructional Methods for Students with Moderate to Profound Mental Retardation 2 hrs. Instructional theory and techniques, instructional methods and materials, and behavioral and academic objectives for moderate, severe, and profound mental retardation. Fieldwork required. Prerequisite(s): SPED 513 and concurrent registration in SPED 514.

SPED 516 Characteristics of Students with Emotional and Behavioral Disorders 3 hrs. Exploration of the risk factors and different theoretical approaches associated with the development and prevention of serious emotional and behavioral disorders. Fieldwork required. Prerequisite(s): SPED 524 and SPED 540.

SPED 517 Instructional Methods for Students with Emotional and Behavioral Disorders 3 hrs. Instructional programming for the academic and social development of students with serious emotional and behavioral disorders. Strategies for effective classroom and behavioral management. Fieldwork required. Prerequisite(s): SPED 516.

SPED 518 Special Educator as Consultant 4 hrs. 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(s): SPED 410 or the equivalent or consent of the instructor.

SPED 519 Special Education Practicum 6 TO 12 hrs. 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. Prerequisite(s): 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.

SPED 520 Teaching Internship in Special Education 1 TO 9 hrs. Clinical, research, or field-based internship experiences for special education majors. May be repeated. Students may register in more than one section per term. Prerequisite(s): SPED 424 and SPED 426 and SPED 500 and consent of the instructor one semester prior to enrollment.

SPED 522 Proseminar in Special Education 4 hrs. Various areas of special education research are reviewed. Topics include areas of faculty research. Prerequisite(s): SPED 500 or consent of the instructor; and admission to PhD in Special Education program.

SPED 527 Promoting Academic and Prosocial Behavior I 2 hrs. 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. Fieldwork required. Prerequisite(s): SPED 517 or consent of the instructor.

SPED 528 Understanding Research in Special Education 3 hrs. Overview of research methodology appropriate for teachers of special populations with emphasis on developing skills in critically reading research reports. Prerequisite(s): ED 461 or SPED 461 or the equivalent or consent of the instructor.

SPED 529 Internship in Assessment 3 hrs. Internship experiences in an assessment clinic for special education majors. Fieldwork required. Prerequisite(s): SPED 462 or the equivalent or consent of the instructor.

SPED 530 Classroom-Based Inquiry Internship 3 hrs. Field-based internship experiences in special education classrooms. Fieldwork required. Prerequisite(s): Approval of the program faculty.

SPED 531 Research Internship 3 hrs. Students work on specific research project under the direction of a faculty member. Fieldwork required. Prerequisite(s): SPED 573 or the equivalent and consent of the instructor.

SPED 532 Student Teaching in Special Education 6 hrs. Practice teaching in the field of special education. Fieldwork required. Prerequisite(s): SPED 463 and SPED 471 and SPED 473 and SPED 572 and SPED 573 and SPED 576 and SPED 577 and approval of the program faculty.

SPED 533 Forcing Collaborations with Family and Community 3 hrs. Develops skills necessary to work in partnership with the families of children with disabilities, and community members. Same as EPSY 582. Prerequisite(s): ED 461 or SPED 461 or the equivalent or consent of the instructor.

SPED 534 Instructional Adaptations in Reading and Writing II 3 hrs. Students learn advanced strategies for designing, implementing, and assessing reading and writing instruction for individuals with disabilities at the middle school and secondary level. Fieldwork required. Prerequisite(s): ED 461 or SPED 461; and SPED 463; or consent of the instructor.

SPED 535 Seminar on Theory and Research in Special Education 4 hrs. Systematic in-depth review of theory and research on selected topics in special education. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Prerequisite(s): SPED 500 and consent of the instructor.

SPED 536 Thesis Research 0 TO 16 hrs. Research on the topic of the student's dissertation. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the dissertation advisor.

Statistics

STAT 401 Introduction to Probability 3 OR 4 hrs. Probability spaces, random variables, and their distributions, conditional distribution and stochastic independence, special distributions, sampling distributions, limit theorems. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 210.

STAT 411 Statistical Theory 3 OR 4 hrs. Estimation, tests of statistical hypotheses, best tests, sufficient statistics, Rao-Cramer inequality, sequential probability ratio tests, the multivariate normal distribution, nonparametric methods. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 401.

STAT 416 Nonparametric Statistical Methods 3 OR 4 hrs. 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. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 381 or STAT 411.

STAT 431 Introduction to Survey Sampling 3 OR 4 hrs. Simple random sampling; sampling proportions; estimation of sample size; stratified random sampling; ratio estimators; regression estimators; systematic and cluster sampling. 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 411 or STAT 481.

STAT 461 Applied Probability Models I 3 OR 4 hrs. Computing probabilities and expectations by conditioning, Markov chains, Chapman-Kolmogorov equations, branching processes, Poison processes and exponential distribution, continuous-time Markov chains, reversibility, uniformization, 3 undergraduate hours. 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 401.
STAT 462 Applied Probability Models II 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 461.

STAT 471 Linear and Nonlinear Programming 3 OR 4 hrs.
Linear programming, simplex algorithm, degeneracy, duality, theorem sensitivity analysis, convexity, network simplex methods, assignment problems. Constrained and unconstrained minimax. Quasi-Newton methods, Ellipsoidal methods of Kachian. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 310.

STAT 473 Game Theory 3 OR 4 hrs.
Games in extensive and normal form. Minimax theorem. Solving matrix games via linear programming. Nash equilibrium for nonzero-sum games, Shapley value, bargaining models. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in MATH 310 or STAT 401.

STAT 477 Introduction to Reliability Theory 3 OR 4 hrs.
Structural and probabilistic properties of coherent systems, notions of aging and classes of life distributions, preservation properties, dependent components, optimal allocation models. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 401 or consent of the instructor.

STAT 481 Applied Statistical Methods II 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 481.

STAT 486 Statistical Consulting 3 OR 4 hrs.
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. 3 undergraduate hours, 4 graduate hours. Prerequisite(s): Grade of C or better in STAT 411 or STAT 481.

STAT 494 Special Topics in Statistics, Probability, and Operations Research 3 OR 4 hrs.
Course content 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; biostatistics; environmental sampling. 3 undergraduate hours, 4 graduate hours. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

STAT 496 Independent Study 1 TO 4 hrs.
Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the instructor and approval of the department.

STAT 501 Probability Theory I 4 hrs.
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(s): MATH 534 or consent of the instructor.

STAT 502 Probability Theory II 4 hrs.
Radon-Nikodým theorem, conditional expectations, martingales, stationary processes, ergodic theorem, stationary Gaussian processes, Markov chains, introduction to stochastic processes, Brownian motions. Prerequisite(s): STAT 501.

STAT 511 Advanced Statistical Theory I 4 hrs.
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(s): STAT 411.

STAT 512 Advanced Statistical Theory II 4 hrs.
Basic concepts in decision theory, prior and posterior distributions, Bayesian decision theory, hierarchical models, robustness, minimax analysis, invariance principle, sequential analysis, completeness. Prerequisite(s): STAT 511.

STAT 521 Linear Statistical Inference 4 hrs.
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(s): STAT 411.

STAT 522 Multivariate Statistical Analysis 4 hrs.
Multivariate normal distribution, estimation of mean vector and covariance matrix, T-square statistic, discriminant analysis, general linear hypothesis, principal components, canonical correlations, factor analysis. Prerequisite(s): STAT 521.

STAT 531 Sampling Theory I 4 hrs.
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(s): STAT 411.

STAT 532 Sampling Theory II 4 hrs.
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(s): STAT 531.

STAT 535 Optimal Design Theory I 4 hrs.
Gauss-Markov theorem, optimality criteria, optimal designs for 1-way, 2-way elimination of heterogeneity models, repeated measurements, treatment-control; equivalence theorem, approximate designs for polynomial regression. Prerequisite(s): STAT 521.

STAT 536 Optimal Design Theory II 4 hrs.
Construction of optimal designs: BIB, Latin square and generalized Youden, repeated measurements, treatment-control studies; construction of factorial designs, including orthogonal arrays. Prerequisite(s): STAT 535 or consent of the instructor.

STAT 571 Noncooperative Games 4 hrs.

STAT 572 Cooperative Game Theory 4 hrs.
Utility theory. Games with side payments, stable sets, core, bargaining sets, Shapley value, nucleolus. Market games. NTU value. Multilinear extensions, nonatomic games. Prerequisite(s): STAT 571 or consent of the instructor.

STAT 577 Reliability Theory 4 hrs.
Coherent structures, paths and cuts, modules, shape and properties of reliability function, association, classes of life distributions based on aging, dependence, multivariate models. Prerequisite(s): STAT 461.

Special topics. Topics drawn from areas such as: data analysis; Bayesian inference; nonlinear models; time series; computer-aided design; reliability models; game theory. May be repeated. Prerequisite(s): Approval of the department.

STAT 593 Graduate Student Seminar 1 hour.
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. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

STAT 595 Research Seminar 1 hour.
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. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the department.

STAT 596 Independent Study 1 TO 4 hrs.
Reading course supervised by a faculty member. May be repeated. Students may register in more than one section per term. Prerequisite(s): Approval of the instructor and the department.

STAT 598 Master’s Thesis 0 TO 16 hrs.
Research work under the supervision of a faculty member leading to the completion of a master’s thesis. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Approval of the department.
STAT 599  Doctoral Thesis
Research 0 TO 16 hrs.
Research work under the supervision of a faculty member leading to the completion of a doctoral thesis. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Approval of the department.

SURG 597  Project
Research 0 TO 16 hrs.
Research investigation of problems in surgery. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

SURG 598  Master's Thesis
Research 0 TO 16 hrs.
Research investigation of problems in surgery. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Consent of the instructor.

Theatre

THTR 410  Movement for Stage III 3 OR 4 hrs.
Specialized topics in movement-based performance skills, such as stage combat, circus techniques, and mask work. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of B or better in THTR 310 and advanced physical performance experience; or graduate standing in theatre.

THTR 423  Playwriting 3 OR 4 hrs.
The development of scripts for stage performance. Same as ENGL 495; 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Junior standing or above; and approval of the department and submission and approval of a playwriting sample or dialog-centered fiction prior to registration.

THTR 444  Drama in Its Cultural Context I 3 OR 4 hrs.
Drama in its social and cultural context, through the seventeenth century. 3 undergraduate hours. 4 graduate hours.

THTR 445  Drama in Its Cultural Context II 3 OR 4 hrs.
Drama in its social and cultural context, eighteenth to twentieth centuries. 3 undergraduate hours. 4 graduate hours.

THTR 452  Acting: Greeks and Shakespeare 3 OR 4 hrs.
Techniques of performing Greek and Shakespearean drama. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of B or better in THTR 261 and grade of B or better in THTR 262 or graduate standing in Theatre.

THTR 455  Acting: Comedy 3 OR 4 hrs.
Techniques of performing classic comedy. Emphasis on the "Commedia dell'Arte" and improvisational comedy. Topics vary. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of B or better in THTR 262 or graduate standing in Theatre.

THTR 458  Acting: Ibsen and Chekhov 3 OR 4 hrs.
Techniques of performing Ibsen, Chekhov, and their contemporaries. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of B or better in THTR 262 or graduate standing in Theatre.

THTR 462  Voice for Stage 3 OR 4 hrs.
Advanced techniques in the integration of voice, speech, diction, and other text-related vocal performance skills. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of B or better in THTR 261 or graduate standing in Theatre.

THTR 464  Special Projects in Theatrical Design 3 OR 4 hrs.
Twentieth-century styles: design for the contemporary stage. Problems in conceptualization, realization, and execution. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s).
Prerequisite(s): THTR 250 or THTR 256; or THTR 257 and THTR 259; or graduate standing in Theatre.

THTR 465  Stage Direction 3 OR 4 hrs.
Exploration of conceptual planning and implementation skills for the stage director, ranging from script interpretation to rehearsal and performance. Performance projects required. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): THTR 210 and THTR 250 and THTR 256 and THTR 257 or graduate standing in Theatre.

THTR 466  Special Projects in Performance Training 3 OR 4 hrs.
Training in advanced techniques of performance. 3 undergraduate hours. 4 graduate hours. May be repeated up to 2 time(s).
Prerequisite(s): THTR 262; or for graduate students, consent of the instructor.

THTR 470  Contemporary Performance Techniques 3 OR 4 hrs.
The relationship of contemporary theatre and performance techniques with attention to both text-and non-text-based forms. Topics vary. Performance projects required. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s).
Prerequisite(s): Grade of B or better in THTR 262; or graduate standing in Theatre.

THTR 472  Investigative Collaboration 3 OR 4 hrs.
Collaboration as the primary means for theatrical creation. Production teams assigned to joint-production projects. Topics vary. 3 undergraduate hours. 4 graduate hours. May be repeated up to 1 time(s).
Prerequisite(s): Grade of B or better in THTR 262; or graduate standing in Theatre.

THTR 474  Internship 3 TO 8 hrs.
Students work in an approved professional setting. Individual projects developed through conferences with a faculty member and a field supervisor. May be repeated. Only three hours may be applied toward Theatre major requirements. Prerequisite(s): 12 hours of upper-division courses in theatre, 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.

THTR 475  Audition Technique 3 OR 4 hrs.
Selection and staging of audition pieces from both classical and modern drama. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Grade of B or better in THTR 261 and grade of B or better in THTR 452 and grade of B or better in THTR 210; or graduate standing.

THTR 491  Study Abroad in Theatre 0 TO 16 hrs.
Study abroad within an approved foreign exchange program or department-sponsored program. May be repeated with approval. Approval to repeat course granted by the department. Prerequisite(s): Approval of the department.

THTR 492  Contemporary 1 TO 4 hrs.
Study of contemporary theatre and performance. May be repeated to a maximum of 6 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the director of graduate studies.

THTR 493  Thesis Production 0 TO 8 hrs.
Under the 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. Satisfactory/Unsatisfactory grading only. Prerequisite(s): Approval of faculty thesis production committee.

THTR 598  Thesis Research 0 TO 16 hrs.
Under the guidance of an advisor and committee, the student develops and conducts a research project addressing a theatre problem of a basic or applied nature. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term.
Prerequisite(s): Approval of faculty thesis research committee.

Urban Planning and Policy

UPP 403  Introduction to Urban Planning 3 OR 4 hrs.
Patterns of city growth, physical, socioeconomic, and environmental issues. Contemporary planning issues. Future of cities. 3 undergraduate hours. 4 graduate hours.
Prerequisite(s): Advanced undergraduate standing or consent of the instructor.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisite(s)</th>
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<tbody>
<tr>
<td>UPP 420</td>
<td>Great Cities: London and Chicago</td>
<td>1 TO 8 hrs. Comparative investigation of urban, economic, social, and political issues in the two global cities. Includes classes, study, and living in London. Fieldwork required. Consent of the instructor.</td>
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<tr>
<td>UPP 470</td>
<td>Cohort Srt Seminar for Urban Developers</td>
<td>3 OR 4 hrs. Application of the financial calculator, use of spreadsheets, and other tools commonly used in real estate-based urban development projects. 3 undergraduate hours. Consent of the instructor.</td>
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<tr>
<td>UPP 471</td>
<td>Housing and Community Development</td>
<td>3 OR 4 hrs. Housing policy at federal, state, and local levels affecting urban housing markets. Emphasis on assessment of market conditions affecting community development decisions. 3 undergraduate hours. Consent of the instructor.</td>
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<tr>
<td>UPP 472</td>
<td>Development Finance For Urban Developers</td>
<td>3 OR 4 hrs. Key financial principles of real estate development, particularly those related to the financing of affordable housing. How to develop a real estate pro forma. 3 undergraduate hours. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 473</td>
<td>Organizational Essentials for Urban Developers</td>
<td>3 OR 4 hrs. Theory and practice of management in public and nonprofit settings. Focus on developing communication, leadership, and legal skills for each step in development. 3 undergraduate hours. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 474</td>
<td>Community Development Process for Urban Developers</td>
<td>3 OR 4 hrs. Developing affordable housing: development team, acquisition strategy, legal issues, construction management and project sustainability, as it pertains to different types of housing developments. 3 undergraduate hours. 4 graduate hours. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 475</td>
<td>Sustaining the Housing for Urban Developers</td>
<td>3 OR 4 hrs. 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. 3 graduate hours. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 492</td>
<td>Topics in Urban and Public Affairs</td>
<td>3 hrs. In-depth study of selected issues of urban and public affairs. Same as UPP 492. May be repeated to a maximum of 6 hours. Students may register for more than one section per term. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 493</td>
<td>Topics in Urban Planning and Policy</td>
<td>1 TO 4 hrs. Intensive analysis of selected planning problems or policy issues. May be repeated to a maximum of 12 hours. Students may register for more than one section per term. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 500</td>
<td>History and Theory of Urban Planning</td>
<td>4 hrs. Course surveys the history and theory of the planning profession and introduces major currents of thought and innovation that have guided and continue to shape theoretical and practical planning problems. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 501</td>
<td>Urban Space, Place, and Institutions</td>
<td>4 hrs. Students will learn to use a variety of social science disciplines to explain and interpret the form and function of urban space, including urbanization, suburbanization, regionalism, globalization, and sustainability. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 502</td>
<td>Planning Skills: Computers, Methods, and Communication</td>
<td>4 hrs. Introduction to methods for collecting, analyzing, and presenting socioeconomic and spatial data with a focus on computer-based methods and an emphasis on effective communication of findings and dispute resolution strategies. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 504</td>
<td>Plan Making</td>
<td>4 hrs. Lecture to instruct students on making plans. Students learn to combine knowledge, skills, and values in each of three major areas of plan making: framing problems, composing alternatives, and devising implementation strategy. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 506</td>
<td>Plan-Making Studio</td>
<td>4 hrs. Instructs students on making plans. Students learn to combine knowledge, skills, and values in each of these major areas of plan making: framing problems, composing alternatives, and devising implementation strategy. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 507</td>
<td>Computer Topics in Urban Planning and Policy</td>
<td>4 hrs. Specialized computational abilities for various planning areas, including data base, project scheduling, statistics, graphics, and simulations. Topics will vary each semester. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 508</td>
<td>Geographic Information Systems for Planning</td>
<td>4 hrs. Applications of geographic information systems to urban planning and policy making. Same as GEOG 589. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 509</td>
<td>Data Analysis for Planning and Management I</td>
<td>4 hrs. Basic introduction to data analysis techniques most commonly used in urban planning. Addresses issues of decision making based on limited or imperfect information. Previously listed as UPP 503. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 510</td>
<td>Analysis of Planning and Management I</td>
<td>4 hrs. Basic introduction to data analysis techniques most commonly used in urban planning. Addresses issues of decision making based on limited or imperfect information. Previously listed as UPP 503. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 511</td>
<td>Economic Analysis for Planning and Management</td>
<td>4 hrs. 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. Previously listed as UPP 504. Consent of the instructor.</td>
</tr>
<tr>
<td>UPP 512</td>
<td>Economic Development I</td>
<td>4 hrs. Overview of development strategies, including financing, business development, industry retention, and human resources; implementation and evaluation. Consent of the instructor.</td>
</tr>
</tbody>
</table>
UPP 533 Development
Finance Analysis 4 hrs.
Prerequisite(s): UPP 504.

UPP 535 Economic Development: Special Topics 1 TO 4 hrs.
Special topics selected for intensive analysis in economic development. May be repeated to a maximum of 8 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

UPP 536 Urban Employment Planning 4 hrs.
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(s): UPP 504 or consent of the instructor.

UPP 537 Economic and Environmental Planning 4 hrs.
Analytical and economic methods for environmental planning and management. Applications to selected problems.
Prerequisite(s): UPP 504 or UPP 554.

UPP 540 Community Development I: Theory 4 hrs.
Critically examines community development as a field of practice, policy intervention, implementation, and analysis; emphasis on community and social dynamics of disadvantaged groups.
Prerequisite(s): Admission to the Urban Planning and Policy program or consent of the UPP program director.

UPP 541 Community Development II: Practice 4 hrs.
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(s): Consent of the instructor.

UPP 542 Metropolitan Housing Planning 4 hrs.
Urban housing market structure and dynamics; impacts of government housing policy on market; development of local housing plans.
Prerequisite(s): UPP 504 or consent of the instructor.

UPP 543 Planning for Healthy Cities 4 hrs.
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.

UPP 544 Urban Revitalization and Gentrification 4 hrs.
Urban change in U.S. cities since World War II that is associated with socioeconomic restructuring under globalization. The course examines substructure under the new global order and its impact on cities and urban planning and different social groups.

UPP 545 Community Development: Special Topics 1 TO 4 hrs.
Special topics selected for intensive analysis in community development. May be repeated to a maximum of 8 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

UPP 546 Community Organization Practice 4 hrs.
Critically examines the context, development, status, and problematic of organizing groups within communities of place, conditions, and interest at various levels of analysis, relative to public formation, implementation, and evaluation.
Prerequisite(s): UPP 540 and UPP 541 and consent of the advisor and the instructor.

UPP 548 Community Development Methods and Techniques 4 hrs.
Community development methods, including needs assessment, asset mapping, capacity building, resources mobilization, project planning, and program evaluation. Includes fieldwork.
Prerequisite(s): Credit or concurrent registration in UPP 540 and credit or concurrent registration in UPP 541 and consent of the instructor.

Physical form, economic characteristics, social qualities, and government structure of cities, suburbs, and regions; theories of urban spatial organization and planning.
Prerequisite(s): Admission to the Urban Planning and Policy program or consent of the UPP program director.

UPP 551 Physical Planning II: Methods 4 hrs.
Fundamentals of construction and infrastructure of cities and regions, including site engineering and landscape architecture, natural environmental factors, utilities and infrastructure, cost/benefit analysis, context of local government, and planning process.
Prerequisite(s): UPP 550.

UPP 552 Physical Planning III: Studio 4 hrs.
Analysis, evaluation, and development of land use and urban design plans for selected projects and clients.
Prerequisite(s): UPP 551.

UPP 553 Land Use Law 4 hrs.
Legal constraints on land use control; constitutional and statutory principles and judicial review.
Prerequisite(s): Graduate standing or consent of instructor.

UPP 554 Environmental Planning 4 hrs.
The relationship of federal and state environmental policies and legislation to urban and regional planning efforts.
Prerequisite(s): Consent of the instructor.

UPP 555 Environmental Planning: Special Topics 1 TO 4 hrs.
Special topics selected for intensive analysis in such areas as housing and urban design. May be repeated to a maximum of 8 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

UPP 556 Urban Design Studio 8 hrs.
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(s): Consent of the instructor.

UPP 557 Site Planning 4 hrs.
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.

UPP 558 Land Use Planning 4 hrs.
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(s): Consent of the instructor.

UPP 560 Urban Transportation I: Introduction 4 hrs.
Transportation planning and linkages between it and urban land use and regional economic development. Recent trends, traditional problems, and emerging issues.

UPP 561 Urban Transportation II: Policy and Methods 4 hrs.
Formation and implementation of transportation policy at the national, regional, and local level. Students will prepare an in-depth study of a major policy issue.
Prerequisite(s): UPP 560 or consent of the instructor.

UPP 562 Urban Transportation III: Laboratory 4 hrs.
Software packages for urban transportation planning, transportation GIS and air-quality modeling. Heavy reliance on case studies.
Prerequisite(s): UPP 561 or consent of the instructor.

UPP 563 Transportation Management 4 hrs.
Transit system planning, scheduling, pricing policy, and management; traffic control techniques and demand management; paratransit alternatives.
Prerequisite(s): UPP 560.

UPP 565 Transportation: Special Topics 1 TO 4 hrs.
Examination of specific and current problems in urban and regional transportation. Topics to be determined at the time the course is offered. May be repeated to a maximum of 8 hours. Students may register in more than one section per term.
Prerequisite(s): Consent of the instructor.

UPP 569 Infrastructure Management 4 hrs.
Integrated approach to the management of infrastructure systems: design, construction, operations, maintenance, and rehabilitation of facilities. Performance of facilities, approaches to management, and available tools and developing technologies.
Prerequisite(s): IE 201 or equivalent or consent of instructor.
Recommended background: Familiarity with computer spreadsheets.
UPP 580  Dissertation Proposal Workshop 1 hour. Faculty-led workshop to assist students writing dissertation proposals identify their relevant literature, select appropriate methods, and demonstrate the significance of their original research. Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 2 hours. 

UPP 582  Independent Research in Urban Planning and Policy 1 to 8 hrs. Advanced study and analysis of a topic selected by a student under the guidance of a faculty advisor. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Consent of the instructor.


UPP 586  Topics in Urban Planning Research 4 hrs. Course highlights research activities and opportunities related to research centers. May be repeated.

UPP 587  Planning and Policy Research Practicum 4 hrs. PhD students work with a faculty member engaged on research related to their discipline. The topic and scope is determined by mutual agreement. Consent of the instructor. Open only to PhD degree students.


UPP 589  Data Analysis for Planning and Management II 4 hrs. Advanced topics in data analysis and model building, including specific models used in urban planning. Consent of the instructor. 

UPP 590  Professional Practice Experience 4 hrs. 300 hours of practical experience through an internship placement approved by the Urban Planning and Policy program. Satisfactory/Unsatisfactory grading only. Fieldwork required. Consent of the instructor. 

UPP 591  Professional Practice 1 hour. Reviews issues and problems in professional practice; analyzes theorems for rational, strategic, and ethical planning; considers career options; and defines professional goals. Consent of the instructor. 

UPP 593  Independent Research in Urban Planning and Policy 1 to 4 hrs. Intensive analysis of selected planning problems or policy issues. May be repeated to a maximum of 12 hours. Students may register in more than one section per term. Consent of the instructor.

UPP 599  PhD Thesis Research 0 to 16 hrs. Individual study and research. Satisfactory/Unsatisfactory grading only. May be repeated. Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Consent of the instructor.

NUWH 450  Women and Mental Health Nursing 3 hrs. Theories of female psychology; women's daily lives and mental health; gender differences in mental illness; strategies for improving women's mental health. Same as GWS 450 and NUSC 450. Consent of the instructor. Students enrolled in the College of Liberal Arts and Sciences must have credit in PSCH 100 and either PSCH 270 or PSCH 315 or GWS 315.

NUWH 545  Women's Health: A Primary Healthcare Approach 3 hrs. Health promotion and disease prevention in women's health. Includes community experience with community women. Primary healthcare approaches examined. Consent of the instructor. Students enrolled in the College of Liberal Arts and Sciences must have credit in PSCH 100 and either PSCH 270 or PSCH 315 or GWS 315.

NUWH 550  Research in Women's Health 1 TO 2 hrs. Analysis of gender-related definitions of health and illness in theory issues and research evaluation criteria for women's healthcare practice are developed as a basis for research. Same as NUSC 550. Consent of the instructor.

NUWH 555  Theories and Methods in Women's Health Nursing Research 3 hrs. Critical analysis of theoretical and methodological approaches in women's health research. Emphasis on evaluation schema useful to researchers. Same as NUSC 555. Consent of the instructor. Students enrolled in the College of Liberal Arts and Sciences must have credit in PSCH 100 and either PSCH 270 or PSCH 315 or GWS 315.

NUWH 556  Advanced Research in Women's Health 1 TO 2 hrs. Advanced seminar for doctoral students in graduate nursing concentration in women's health. Faculty and students present and critique on-going and developing research. Same as NUSC 556. Consent of the instructor.

NUWH 570  International Dimensions in Women's Health 3 hrs. 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. Consent of the instructor. 

NUWH 575  Minority Women's Health Nursing 3 hrs. 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. Same as NUSC 557. Consent of the instructor.

NUWH 579  Healthcare of Women I 4 hrs. Healthcare of women through the life span with an emphasis on gynecologic and primary care. Same as NUMC 519. Consent of the instructor. 

NUWH 585  Minority Women's Health Nursing 3 hrs. 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. Same as NUSC 557. Consent of the instructor.