

## Undergraduate Courses

Department	Course Number and Title	Course Description
AGNR	4500. Leadership Development in Extension Education	<p>Three credits. Prerequisites: Junior or senior standing or graduate student; open to students from the College of Agriculture, Health and Natural Resources, others with instructor consent. Introduces students to extension, outreach education and other forms of public engagement (governmental and nongovernmental). Intended for students interested in a career in or knowing about outreach education and public engagement. The extension mission, history, organization, programming, program development, extension teaching and delivery methods, and the involvement and use of volunteers. Team-based collaborations, informal teaching/learning methods as well as social processes and influences, organizational behavior and relationships, program evaluation and assessment, communications, ethics, and decision-making.</p>
AH	3021. Environment, Genetics and Cancer	<p>Basic principles in tumor biology will be presented including the biochemical basis of cell transformation, proliferation, and metastasis. Molecular mechanisms by which environmental chemicals interact with DNA and other cellular components will be discussed. The role of proto-oncogenes, tumor suppressor genes, and their products will be covered. Biological markers of cancer risk and exposure will be included.</p>
AH	3570 Health and Safety Management in the Workplace	<p>Knowledge and skills necessary to develop a sustainable occupational health and safety management program in the workplace toward the goal of preventing illness and injury, and property damage.</p>

AH	3275 HAZWOPER	Provides individuals the necessary knowledge and training to meet the criteria for certification recognized by the Occupational Safety and Health Administration (OSHA) in work activities related to hazardous waste sites and clean up operations involving hazardous substances. Mandatory off-site field exercise required.
AH	4221W Trends in Environmental and Occupational Safety and Health	Impact of issues in the workplace in promoting prevention of injuries and illness to workers, and protection of property and the environment.
AH	3320. Introduction to Infectious Diseases	Two credits. Prerequisite: BIOL 1107; open only to junior or higher Allied Health majors, others with consent of instructor. Recommended preparation: CHEM 2241 or 2443 and 2444. The role of the healthcare professional in dealing with infectious diseases. Epidemiology and public health, healthcare epidemiology, pathogenesis and diagnosing of infectious diseases, overview of the major infectious diseases of humans.
AH	4501. International Health	Three credits. Prerequisite: Open to juniors and higher. Global (medical, cultural and economic) health challenges. Children's and women's health. Communicable and noncommunicable diseases.
ANSC	1001 Introduction to Animal Science	The biological, physical, and social factors that influence animal production and utilization.
ANSC	1645. The Science of Food	An introductory level course for students interested in the application of science to food. Nutritional and functional attributes of various food constituents are discussed. Issues concerning food processing and food safety are covered. CA 3.

ANSC	3343. Animal Food Products	A study of the food products derived from animal agriculture, including dairy, meat, poultry and fish. Emphasis will be placed on inspection, grading, processing, biochemistry, nutritive value and food safety concerns of these products. A fee of \$50 is charged for this course.
ANSC	3663 Dairy Management Decision-making	Participation in all phases of dairy herd management including decision-making activities, with particular emphasis on impact of decisions on financial health and stability. Course requires participation beyond specific semester calendars.
ANSC	4341 Food Microbiology and Safety	Current topics in food safety will be discussed, with special emphasis on microbial and chemical contamination of food. Specific topics including the safety of natural versus synthetic chemicals, food additives, irradiation and other practices, basic microbiology and toxicology, current regulatory practices and risk assessment will also be included. The Hazard Analysis Critical Control Points (HACCP) approach to food safety will be discussed.
ANSC	4642. Food Microbiology Laboratory	An introductory laboratory course in sampling of foods for microbiological analysis, enumeration of microorganisms in foods, and isolation and identification of major foodborne pathogens from foods.
ANSC	4662W Dairy Herd Management	A writing-intensive class integrated with course content in ANSC 4341.
ANSC	3318. Probiotics and Prebiotics	Biology, uses, effectiveness and safety of probiotics and prebiotics. Molecular mechanisms underlying the health benefits attributed to the consumption of pre and probiotics. Application of pre- and probiotics to promote human and animal health, including safety and regulation.

ANTH	3002. Culture, Language, and Thought	Anthropological contributions to the study of language, culture, and their relationship. Topics include the Sapir-Whorf hypothesis and the application of cognitive anthropological methods and theory to the study of folk classification systems.
ANTH	3350. Anthropological Perspectives on Women	Major conceptual and historical problems in the study of gender in anthropology. Women's roles in different historical and contemporary settings, and new understandings of family, kinship, power, and cultural ideologies.
ANTH	3351. Sex and Gender	Cross-cultural and interdisciplinary analysis of biological sex, gender, sex roles, and sexuality.
ANTH	3523 The Origins of Agriculture	The origins and spread of agriculture worldwide. Economic, social, and ideological ramifications of the agricultural transition. Processes of plant and animal domestication.
ANTH	2400. Honors Core: Analyzing Religion	An introduction to religion from interdisciplinary and cross-cultural perspectives. Theories, analytic frameworks, and critiques. Religious orientations. Components of religion. The science-and-religion debate. CA 2. CA 4-INT.
ARE	3221 Business Strategies and Policy in Food Industries	Market structure and business strategies of firms, including pricing, advertising, entry, and new products. Analysis of mergers and other antitrust issues from a public as well as firm perspective. Case studies of actual events.
ARE	3222. Marketing and Consumer Behavior	Principles of marketing and determinants of consumer choices. Particular attention to demographic economic factors and to changing concerns regarding health and food safety.

ARE	3225 Price Analysis and Futures Trading	Principles and applications of market price determination, with special emphasis on the use of futures markets for profit and price risk management. Includes food and energy case studies, internet applications, and a futures simulation exercise
ARE	4464 Benefit Cost Analysis and Resource Management	Theoretical foundations and applications of benefit-cost analysis in project appraisal and in evaluation of public policies regarding resource management and environmental protection.
BIOL	1103 The Biology of Human Health and Disease	A laboratory course designed for non-science majors to introduce the concepts of biology and their application to the individual, society and humankind by focusing on health and disease issues. A fee of \$10 is charged for this course.
BIOL	1109 Topics in Modern Biology	Readings, lectures, seminars, films and field trips exploring current developments in biology and their social and scientific implications.
BIOL	1110. Introduction to Botany	Structure, physiology and reproduction of seed plants as a basis for an understanding of the broader principles of biology as well as the relation of plants to human life. Includes a survey of the important groups throughout the plant kingdom. A fee of \$10 is charged for this course. CA 3-LAB.
BIOL	3520W. Ethical Perspectives in Biological Research and Technology	Ethical and policy issues arising from advances in biological research and technology, including topics in ecology, molecular biology, and physiology.

BME	3700. Biomaterials	<p>A lecture and laboratory course that introduces a series of implant materials including metals, ceramics, glass ceramics, polymers, and composites. These materials are compared with the natural materials, with consideration given to issues of mechanical properties, biocompatibility, degradation of materials by biological systems, and biological response to artificial materials. Particular attention is given to the materials for the total hip prosthesis, dental restoration, and implantable medical devices.</p>
BME	4900 Biomedical Engineering Design I	<p>Discussion of the design process; project statement, specifications project planning, scheduling and division of responsibility, ethics in engineering design, safety, environmental considerations, economic constraints, liability, manufacturing, and marketing. Projects are carried out using a team-based approach. Selection and analysis of a design project to be undertaken in BME 4910 is carried out. Written progress reports, a proposal, an interim project report, a final report, and oral presentations are required.</p>
BME	4910. Biomedical Engineering Design II	<p>Design of a device, circuit system, process, or algorithm. Team solution to an engineering design problem as formulated in BME 4900, from first concepts through evaluation and documentation. Written progress reports, a final report, and oral presentation are required.</p>
CE	2010 Civil and Environmental Engineering Professional Issues Seminar	<p>Issues in the practice of Civil &amp; Environmental Engineering: professional ethics, law/contracts, insurance/liability, global/societal issues (e.g., sustainable development, product life cycle), management, business, public policy, leadership, construction management and professional development and licensure.</p>

CE	2410. Geomatics and Spatial Measurement	Elementary plane surveying, geospatial coordinate systems, error and accuracy analysis, introduction to geographic information systems, theory and uses of global positioning systems, introduction to photogrammetry and land-surface remote sensing in the context of civil and environmental engineering.
CE	2710 Transportation Engineering and Planning	Design of transportation facilities. Traffic flow and capacity analysis. Travel demand analysis and planning methods.
CE	3120. Fluid Mechanics	Statics of fluids, analysis of fluid flow using principles of mass, momentum and energy conservation from a differential and control volume approach. Dimensional analysis. Application to pipe flow and open channel flow.
CE	3300 Environmental Engineering Laboratory	Aqueous analytical chemical techniques, absorption, coagulation/flocculation, fluidization, gas stripping, biokinetics, interpretation of analytical results, bench-scale design projects, written and oral reports. A fee of \$29 is charge for this course.
CE	3510 Soil Mechanics	Fundamentals of soil behavior and its use as a construction material. Effective stress principle, seepage and flow nets, consolidation, shear strength, limit equilibrium analysis. Written reports.
CE	4210 Operations Research in Civil and Environmental Engineering	Critical path method for scheduling and managing engineering project tasks. Resource allocation subject to constraints. One and two-phase simplex method for linear programming. Optimization of non-linear problems.
CE	4410 Computer Aided Site Design	Roadway and street network design and site development using computer software, including grading and earthwork, runoff and drainage structures.
CE	4510 Foundation Design	Application of soil properties to design of foundations, retaining structures, excavation drainage, shallow footings, deep foundations, specifications, subsurface exploration.

CE	4542. Earthquake Engineering	Global tectonics and earthquake sources, seismic wave propagation, strong ground motion analysis, seismic hazards, site effects and liquefaction, seismic load to slopes, retaining structures and foundations, structure response to dynamic loads.
CE	4710 Case Studies in Transportation Engineering	Analysis of case studies in transportation and urban planning and design. Application of transportation engineering and planning skills. Oral and written group reports, group discussions, individual written papers.
CE	4720 Street and highway Design	Urban street and highway design: vertical and horizontal alignment, cross-section elements, traffic barriers, interchanges and intersections, pedestrian and bike facilities, traffic calming, community and roadside elements
CE	4730 Transportation Planning	Transportation economics, urban transportation planning process, evaluation of transportation improvements, transportation systems management.
CE	4740 Traffic Engineering Characteristics	Relationships among traffic flow characteristics; microscopic and macroscopic representations of traffic flow; capacity and level of service of highways; traffic stream models; shock wave analysis.
CE	4750 Pavement Design	Analysis and design of flexible and rigid pavements; testing and characterization of paving materials.
CE	4800 Hydraulic Engineering Laboratory	Tests of the flow of water in pipes and open channels. Theory and calibration of flow measurement devices. Generation of pump performance curves. Study of velocity profiles. Physical hydraulic modeling and similitude.
CE	4810 Engineering Hydrology	Hydrologic cycle: precipitation, interception, depression storage, infiltration, evapotranspiration, overland flow, snow hydrology, groundwater and streamflow processes. Stream hydrographs and flood routing. Hydrologic modeling and design. Computer applications. Design project.

CE	4820 Hydraulic Engineering	Design and analysis of water and wastewater transport systems, including pipelines, pumps, pipe networks, and open channel flow. Introduction to hydraulic structures and porous media hydraulics. Computer applications.
CHEG	4140. Unit Operations and Introduction to Design	Theoretical treatment and design of large-scale chemical engineering unit operations. Chemical engineering process synthesis and design; comparison of alternative processing steps; instrumentation; cost estimation; economic analysis; process optimization; emphasis on conceptual design in application of chemical engineering principles; design of process equipment, computer-aided design of equipment and flow sheets; design and analysis of complete process plants.
CHEG	4143 Process Design and Economics	Continuation of CHEG 4142. Students will continue work on chemical process and simulation projects assigned during the fall semester. Spring semester will focus on group work, written and oral communication, and presentation of the final project, which analyzes a chemical process from a technical, economic, safety, and environmental perspective.
CHIN	1122 Modern Chinese Culture	Introduction to modern Chinese culture from the fall of the Qing Dynasty to the present period. Survey of institutions, philosophy, and social customs seen through literature and films. CA 1. CA 4-INT.
CSE	3000 Contemporary Issues in Computer Science and Engineering	The global and societal impact of computer science and engineering decisions, professional and ethical responsibility

CSE	3002. Social, Ethical and Professional Issues in Computer Science and Engineering	Study of areas in which computer science interacts with ethical issues, and issues of public policy. Topics of professional growth, development, and responsibility. Practice in the analysis of complex issues brought about by modern technology
CSE	3002. Social, Ethical and Professional Issues in Computer Science and Engineering	Discussion of the design process; project statement, specification, project planning scheduling and division of responsibility, ethics in engineering design, safety, environmental considerations, economic constraints, liability, manufacturing, and marketing. Projects are carried out using a team-based approach. Selection and analysis of a design project to be undertaken in CSE 4951/ECE 4902 is carried out. Written progress reports, a proposal, an interim report, a final report, and oral presentations are required.
CSE	4951. Electrical and Computer Engineering Design II.	Design of a device, circuit, system, process, or algorithm. Team solution to an engineering design problem as formulated in CSE 4950/ECE 4901, from first concepts through evaluation and documentation. Written progress reports, a final report, and oral presentations are required.
ECE	1001 A Survey of Modern Electronic Technology	A non-specialist introduction to the broad field of electronic technology, including historical roots, contemporary applications, and future directions
ECE	3211 Power Electronics	Power converters for power processing, regulation, and control as applied to computer and telecommunication systems, transportation systems, industrial drives, and renewable power conversion systems.
ECE	3231 Introduction to Modern Power Systems	Power semiconductor device characteristics, transformers, and dc/dc converters including design projects.

ECE	3243 Introduction to Nanotechnology	Basic concepts of nanoscience; new physical properties at these scales (~1-100 nm); different approaches to fabricate, image, characterize and manipulate nanostructures and nanodevices; current and potential applications in areas as diverse as electronics, health and energy; societal impacts of nanotechnology.
ECE	4211 Semiconductor Devices and Nanostructures	Principles and applications of contemporary solid state devices such as light-emitting diodes, injection lasers, solar cells, p-n-p-n diodes, SCRs and Triacs, transistors, MESFETs and MODFETs, and fundamentals of intergrated circuits. Impact of nanostructures on devices.
ECE	4225 Fundamentals of Electron Device Design and Characterization	Design of micro/nano electronic devices using state-of-the-art computer simulation tools, experimental electrical characterization of semiconductor devices and introduction to modern electronic devices such as high-performance MOSFETs, TFTs, solar cells, non-volatile memories, CCDs, and thermoelectric power generators.
ECE	4901 Electrical and Computer Engineering Design I	Discussion of the design process; project statement, specification, project planning, scheduling and division of responsibility, ethics in engineering design, safety, environmental considerations, economic constraints, liability, manufacturing, and marketing. Projects are carried out using a team-based approach. Selection and analysis of a design project to be undertaken in CSE 4951/ECE 4902 is carried out. Written progress reports, a proposal, an interim project report, a final report, and oral presentations are required.
ECON	1108 Game Theory in the Natural and Social Sciences	Introduction to game theory. Applications in the natural and social sciences and technology may include electric power auctions, evolutionary biology, and elections.

ECON	1201 Principles of Microeconomics	How the invisible hand of the market functions through the economic decisions of firms and individuals. How prices, wages and profits are determined, resources are allocated and income is distributed. Topical subjects (e.g., energy policy and health care)
ECON	1202. Principles of Macroeconomics	The organization and function of the economic system as a total unit. Economic decisions, institutions, and policies that determine levels and rates of growth of production, employment, and prices. Topical subjects (e.g., government budget deficits and current interest-rate policy)
ECON	2101. Economic History of Europe	Economic evolution of Europe from feudal times to the present, emphasizing the modern period: the rise of commerce, industry, and banking; the growth of population and the labor force; the changing position of agriculture; business fluctuations; and forms of economic organization.
ECON	2101W. Economic History of Europe	(201W) Prerequisite: ECON 1200 or both ECON 1201 and 1202 (1201 may be taken concurrently); ENGL 1010 or 1011 or 2011 or 3800
ECON	2102. Economic History of the United States	Issues in American economic development, including the political economy of the Constitution, the economics of slavery, the rise of modern corporations and the causes of the Great Depression
ECON	2102W. Economic History of the United States	(203W) Prerequisite: ECON 1200 or both ECON 1201 and 1202 (1201 may be taken concurrently); ENGL 1010 or 1011 or 2011 or 3800.
ECON	2104. Economic History of the Middle East	Economic history of the Middle East, including the organization of rural and urban activity, relationship with Western Europe, and the roles of international trade, foreign capital, petroleum, and institutional structure in economic development.
ECON	2104W. Economic History of the Middle East	(204W) Prerequisites: ECON 1200 or both ECON 1201 and 1202 (1201 may be taken concurrently); ENGL 1010 or 1011 or 2011 or 3800.

ECON	2201. Intermediate Microeconomic Theory	Intermediate microeconomic theory, covering demand and supply, exchange and production, pricing, and welfare economics.
ECON	2202. Intermediate Macroeconomic Theory	Intermediate macroeconomic theory, covering national income accounting; the determination of aggregate output, employment and price levels; elements of business cycles and economic growth.
ECON	2411. Money and Banking	The nature of money, the origins of monetary standards and systems, the development and operation of commercial banking, the Federal Reserve System, and international monetary agencies.
ECON	2431. Economics of Taxation and Government Spending	Critical issues in taxation and government expenditures. Emphasis on institutions and public policy. Topics include: rationale for and effects of progressive taxation, reform of the tax system, Social Security and Medicare, welfare reform, defense, and fiscal federalism.
ECON	2439. Urban Development and Policy	Education, housing, anti-poverty, economic development, and transportation policies for American cities and metropolitan areas. Emphasis on different roles of policies that act upon people versus places. Analysis tools for regional economic development such as input-output matrices and cost-benefit analysis.
ECON	2440 Economics of Global Economy	Analysis of economic integration in the global economy with emphasis on the position of the USA. Several specialist areas of economic thought brought to bear - economic history, economics of the multinational enterprise, international trade, international finance, labor economics, environmental economics, and economics of the internet. Institutional historical, and political economy approaches are emphasized.

ECON	2446. Labor Legislation	Legal status of labor, unorganized and organized, in legislation and court decisions. Emphasis on the labor contract, bargaining procedures, and union and employer tactics. Also, legislation dealing with wages, hours, child labor, old-age benefits, and accident and unemployment compensation.
ECON	2462. Government and Industry	Relations between government and business. Public policies enforcing, supplementing, or replacing competition in particular markets, studies of selected industries and legal cases.
ECON	2477 Transitional Economies of Russia and Eastern Europe	Economic transition of these formerly socialist economies into capitalist, market economies. Comparison of centrally planned and market economies. Problems of macroeconomic imbalance, economic distortions, shortages and repressed inflation. Means and timing of price liberalization, privatization, restructuring, currency convertibility, and building legal and financial institutions.
ECON	3416. Special Problems in Money and Banking	Emphasis on public policy: commercial bank regulations; the relation of liquidity to economic fluctuations; government lending agencies; and central bank policies and credit control.
ECON	3421. International Trade	Economic basis of international trade, trade policies, and international economic organizations.
ECON	3421W. International Trade	(242W) Prerequisite: ECON 2201; ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: ECON 1200 or 1202 and one of: MATH 1071Q, 1110Q, 1121Q, 1131Q, or 1151Q
ECON	3422. International Finance	Payments and financing of international trade: foreign exchange markets, the balance of payments, capital flows, and international monetary arrangements
ECON	3422. International Finance	Government expenditures and tax policies: theories of public choice, size and mix of government budgets, alternative tax systems, and tax reform.

ECON	3431W. Public Finance	(253W) Prerequisite: ECON 2201; ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: ECON 1200 or 1202 and one of: MATH 1071Q, 1110Q, 1121Q, 1131Q, or 1151Q.
ECON	3438. Contemporary Problems in Economics	Current issues of government economic policy, primarily microeconomic: energy, income maintenance, labor markets for minorities and women, government regulation, health care, and others.
ECON	3438W. Contemporary Problems in Economics	(258W) Three credits. Prerequisites: ECON 2201 and 2202 (one of which may be taken concurrently); ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: One of: MATH 1071Q, 1110Q, 1121Q, 1131Q, or 1151Q.
ECON	3439. Urban and Regional Economics	(259W) Prerequisite: ECON 2201; ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: ECON 1200 or 1202 and one of: MATH 1071Q, 1110Q, 1121Q, 1131Q, or 1151Q.
ECON	3439/W Urban and Regional Economics	(259W) Prerequisite: ECON 2201; ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: ECON 1200 or 1202 and one of: MATH 1071Q, 1110Q, 1121Q, 1131Q, or 1151Q.
ECON	3441. Theory of Labor Markets	Theoretical analysis of labor markets: labor supply and demand; wage differentials; human capital; and the inflation-unemployment tradeoff.
ECON	3473. Economic Development	Economics of problems facing developing nations: theories of development, and strategies and policies to promote economic development.
ECON	3473W Economic Development	(247W) Prerequisite: ECON 1200 or 1202; 2201; ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: One of: MATH 1071Q, 1110Q, 1121Q, 1131Q, or 1151Q.

ECON	3479 Economic Growth	Causes and consequences of economic growth examined through theory, data, and economic history. Interactions between economic growth and population growth, technology, education, health and life expectancy, and social institutions. Public policies to promote growth.
ECON	3479W. Economic Growth	(249W) Three credits. Prerequisites: ECON 2202; ENGL 1010 or 1011 or 2011 or 3800.
EEB	2244. General Ecology	Fundamental ecological dynamics of communities, populations and ecosystems, with emphasis in discussion sections on reading primary literature, problem-solving, and exposure to ecological research techniques.
EEB	2244W. General Ecology	Fundamental ecological dynamics of communities, populations and ecosystems, with emphasis in discussion sections on reading primary literature, problem-solving, and exposure to ecological research techniques.
EEB	3230. Marine Biology	The study of the kinds and distributions of marine organisms. Particular attention is paid to biotic features of the oceans, organism-habitat and relationships and general ecological concepts influencing marine populations and communities. Field trips are required.
EEB	3256 Plants and Civilization	Plants and animals used by people; origin, history, biology, distribution, and role in development of civilizations.
EEB	4230W. Methods of Ecology	An intensive introduction to field and laboratory methods in ecology. Emphasis will be placed on the use of quantitative and analytical techniques in physiological, population, community and ecosystem ecology. An introduction to sampling procedures, data collection and statistical analysis. Computers will be used to model population and community dynamics and to analyze ecological data sets. Laboratory periods will consist of field and laboratory problems; field trips required, including occasional weekend trips.

EEB	4251. Medical Entomology	Identification and biology of disease-spreading poisonous, and parasitic arthropods.
EEB	4251W. Medical Entomology	Collection, identification, and ecology of insects.
EEB	4253 Concepts of Applied Entomology	Collection, identification, and ecology of insects.
EEB	4253W Concepts of Applied Entomology	Control, ecology, economics, damage assessment and detection of insect infestations.
EEB	4276. Plant Anatomy	Internal structure of seed plants: development and environmental responses.
EEB	4276W. Plant Anatomy	(276W) Four credits. Prerequisite: BIOL 1108 or 1110 or instructor consent; ENGL 1010 or 1011 or 2011 or 3800.
EEB	3266. Field Herpetology	Field-intensive study of diversity, ecology, physiology, behavior, adaptation and identification of the amphibians and reptiles of the region; herpetofaunal research methods. Field trips required.
EEB	4262. Field Methods in Ornithology	Design of bird population surveys, census methods, behavioral studies of wild birds, data collection and reporting, bird identification skills. Field trips required.
ENGL	1201. Introduction to American Studies	What is an American? A multi-disciplinary inquiry into the diversity of American societies and cultures
ENGL	3210 Native American Literature	Examination of the literatures of pre-contact, post-contact, and contemporary indigenous American cultures
ENGL	3651 Maritime Non-Fiction	Classics of the non-fictional genre as they apply to an understanding of the culture of the sea. Social, humanistic, intellectual and scientific perspectives are examined through analysis of works by writers such as Steinbeck, McPhee, and Sebastian Junger.

ENGR	2243 Nanoscience and Society	Introductory, interdisciplinary honors core course on nanoscale science and society. Introduction to the fundamentals of nanoscience and to the broader societal implications of implementing nanotechnology locally and globally. Nanoscience fundamentals (basic concepts and results of quantum physics), fabrication (how to make nanoscale structures, imaging and analysis, applications (electronics, biomedical, environment, new products), society and ethics in nanoscience and technology. Relevant case studies.
ENVE	3200 Environmental Engineering Laboratory	Aqueous analytical chemical techniques, absorption, coagulation/flocculation, fluidization, gas stripping, biokinetics, interpretation of analytical results, bench-scale design projects, written and oral reports. A fee of \$29 is charged for this course.
ENVE	3220 Water Quality Engineering	Physical, chemical, and biological principles for the treatment of aqueous phase contaminants; reactor dynamics and kinetics. Design projects.
ENVE	3530 Engineering & Environmental Geology	Application of geological principles to engineering and environmental problems. Topics include site investigations, geologic hazards, slope processes, earthquakes, subsidence, and the engineering properties of geologic materials. Course intended for both geoscience and engineering majors.
ENVE	4210 Environmental Engineering Chemistry	Quantitative variables governing chemical behavior in environmental systems. Thermodynamics and kinetics of acid/base, coordination, precipitation/dissolution, and redox reactions. Organic chemistry nomenclature.
ENVE	4310 Environmental Modeling	Systematic approach for analyzing contamination problems. Systems theory and modeling will be used to assess the predominant processes that control the fate and mobility of pollutants in the environment. Assessments of lake eutrophication, conventional pollutants in rivers and estuaries and toxic chemicals in groundwater.

ENVE	4800 Hydraulic Engineering Laboratory	Design and analysis of water and wastewater transport systems, including pipelines, pumps, pipe networks, and open channel flow. Introduction to hydraulic structures and porous media hydraulics. Computer applications.
ENVE	4810 Engineering Hydrology	Hydrologic cycle: precipitation, interception, depression storage, infiltration, evapotranspiration, overland flow, snow hydrology, groundwater and streamflow processes. Stream hydrographs and flood routing. Hydrologic modeling and design. Computer applications. Design project.
ENVE	4820 Hydraulic Engineering	Design and analysis of water and wastewater transport systems, including pipelines, pumps, pipe networks, and open channel flow. Introduction to hydraulic structures and porous media hydraulics. Computer applications.
FREN	1169. Modernity in Crisis: France and the Francophone World from 1850 to Today	A cultural history of France and its colonial empire through political, social, artistic and literary revolutions and scandals. Topics include: Impressionism and the shock of the new, the Eiffel Tower scandal, Nazi occupation and the resistance, U.S. cultural imperialism, feminism, immigration and the crisis of national identity
FREN	3211 Contemporary French	An historical and cultural overview of France in the 20th and 21st centuries: from D-Day to the European Union, from Communism to the Green Party, from ballad crooners to rap, from love stories to action films; the changing French nation through authentic documents, literary texts, and films.

GEOG	1302 GIS Modeling of Environmental Change	An introduction to environmental processes and patterns, especially assessing change in environmental systems using spatial analysis techniques. Students will map field sites using Global Positioning System technology and aerial photographs, collect field data on various environmental systems, and build and test a Geographical Information System-based environmental model.
GEOG	1700 World Regional Geography	Analysis of the growth, distribution, and functional patterns within and among Western cities. Application of urban geographical concepts to city planning problems.
GEOG	3220 Race and Food	Analysis of the relationship between race, geography and food/agriculture through the lens of African Americans. Topics include food and the African Diaspora, the effects of slavery on food and agriculture, migration and the spread of food traditions and growing practices, community food security, and whiteness in the alternative food movement.
GEOG	3200 Urban Geography	Study of geographic relationships among natural and cultural environments that help to distinguish one part of the world from another. Analysis of selected countries as well as larger regions, with specific reference to the non-western world.
GEOG	4100 Advanced Economic Geography	Problems involved in analyzing spatial variations of selected economic variables. Emphasis on location theory with view toward integrating geographic viewpoint and economic concepts.
GEOG	4110W Regional Development and Policy	A study of theory and practice in regional development and planning. Emphasis on evaluation of regional problems and public policies designed to resolve them, with a primary focus on the United States.

GEOG	4130 Transportation Geography	Transportation rate establishment, transportation models for predicting transportation flows, impact of transportation on location of economic activities, and planning of transportation facilities in cities.
GEOG	4200W Geographical Analysis of Urban Social Issues	Analysis of socioeconomic patterns and issues within urban areas, with emphasis on applied geographical research. Policy implications are stressed.
GEOG	4210 Urban and Regional Planning	Urban and regional planning, with emphasis on (1) duties of local planners, especially land use planning, and (2) the political context for planners' work. Legal and political issues in communities and organizations.
GEOG	4220 Population Geography	Composition and growth of human populations. Concepts and techniques for analyzing populations in the context of significant population issues in the United States.
GEOG	4230 GIS and Remote Sensing for Geoscience Applications	Application of Geographic Information Systems, remote sensing, and image interpretation to problems in geoscience. Data acquisition, processing and analysis of Digital Elevation Models and satellite imagery. Geologic materials, processes, landforms and landscapes.
GEOG	4300 Advanced Physical Geography	Problems involving the application of physical processes in our changing environment.
GEOG	4510 Applications of Geographic Information Systems	Applications of geographic information systems. Particular attention to land use planning and resource management.

GSCI	1050 Earth and Life through Time with Laboratory	History of planet Earth, emphasizing how rock, air, water, and life interact at different scales to produce the earth's crust, landforms, life systems, natural resources, catastrophes, and climatic regimes. Provides a scientific context for human-induced global change. Includes laboratory component (see GSCI 1052). A fee of \$10 is charged for this course.
GSCI	1051 Earth and Life through Time	History of planet Earth, emphasizing how rock, air, water, and life interact at different scales to produce the earth's crust, landforms, life systems, natural resources, catastrophes, and climatic regimes. Provides a scientific context for human-induced global change.
GSCI	3010 Earth History and Global Change	Reconstruction of earth history from geological data. Processes and events responsible for the stratigraphic record, and techniques used to decipher it. An integrated survey of earth history. One or more weekend field trips may be required
GSCI	3230 Beaches and Coasts	Introduction to the processes that form and modify coasts and beaches, including tectonic setting, sediment supply, coastal composition, energy regimes and sea level change; tools and techniques utilized in marine geologic mapping and reconstruction of submerged coastal features; field trips to selected coastal features.
GSCI	3510 Applied Geophysics for Geologists and Engineers	Introductory survey of surface and borehole geophysical methods and their application to hydrogeologic, environmental monitoring, and geotechnical engineering studies. Demonstrations involve geophysical field measurement, data reduction and geologic interpretation.

GSCI	3710 Engineering & Environmental Geology	Application of geological principles to engineering and environmental problems. Topics include site investigation, geologic hazards, slope processes, earthquakes, subsidence, and the engineering properties of geologic materials. Course intended for both geoscience and engineering majors.
GSCI	4520 Exploration Seismology	Principles of seismic methods for imaging the interior of the earth, with applications to resource exploration and environmental problems.
HDFS	1060. Close Relationships Across the Lifespan	Theory and research on topics in the close relationship literature including attraction, relationship development and maintenance, friendship and social support, love, sexuality, intimacy, power, communication, conflict, dissolution and divorce, and bereavement
HDFS	1070. Individual and Family Development	Human development throughout the life span, with emphasis upon the family as a primary context.
HDFS	2100. Human Development: Infancy Through Adolescence	Individual development and behavior from prenatal period through adolescence; impact of peers, school, other social agencies, and especially the family
HDFS	2200. Human Development: Adulthood and Aging	Individual development and behavior from prenatal period through adolescence; impact of peers, school, other social agencies, and especially the family
HDFS	2300. Family Interaction Processes	Family interaction: communication processes, bonding behaviors, management of conflict and aggression, negotiation of family crisis
HDFS	3110. Social and Community Influence on Children in the United States	Based on an ecological/contextual perspective students investigate the impact on child development of community characteristics and social groups and organizations on the development of children in the United States. Possible topics include: family, peers, schools, media, economic status, health care, social services, and the legal system.

HDFS	3310. Parent-Child Relations in Cross-Cultural Perspective	Theory and research on major dimensions of parenting in the U.S.A. and cross-culturally: parental warmth, control and punishment.
HDFS	3319. Risk and Resilience in Individuals and Families	Challenges, stresses, and crises experienced by individuals and families; protective factors and resilience; coping strategies; prevention and intervention.
HDFS	3340. Individual and Family Interventions	An introduction to individual, couple, family, and group intervention. Topics include counseling theories, developmentally appropriate interventions, and methods for addressing diversity. Intervention strategies used in a variety of human services settings are examined.
HDFS	3343. Family Life Education	Theory and practice of family life education including program development, implementation, evaluation, and professional ethics.
HDFS	3420. Abuse and Violence in Families	Historical, psychological, sociological and legal issues relating to abuse and family violence across the lifespan, including child maltreatment and elder abuse. Introduction to methods for prevention and remediation.
HDFS	3421. Low Income Families	Impact of poverty and related problems on development of the child in the context of the family. Family structure, childrearing patterns, early educational and community programs.

HDFS	3433 Consumer Rights and Responsibilities	The rights and responsibilities of consumers with emphasis on the consumer decisions of individuals, households, and families throughout the lifespan
HDFS	3510. Planning and Managing Human Service Programs	Planning techniques: needs assessment, data collection and analysis, budgeting, and evaluation. Management skills: decision making, management theory and organizational behavior, personnel motivation, accountability, and financial management.
HDFS	3520. Legal Aspects of Family Life	Overview of historical roots and key aspects of family law. The case method is used to analyze the causes and effects of contemporary trends. Topics include: the regulation of marriage, separation, and divorce; procreation and abortion; adoption; child custody and support; and, end-of-life issues.
HDFS	3530. Public Policy and the Family	Analysis of government programs and policies impacting the family: child care, aging, family law, mental health, family violence, income maintenance, and family impact analysis.
HDFS	3540. Child Welfare, Law and Social Policy	Examines the methods through which empirical social science research can affect law and public policy affecting children and families.
HDFS	3550. Comparative Family Policy	Comparative analysis of government programs and policies impacting families in the United States and other countries. Health and welfare policies, family planning, child care, teen pregnancy, and care of the aged.

HDFS	3540W. Child Welfare, Law and Social Policy	Examines the methods through which empirical social science research can affect law and public policy affecting children and families. CA 2.
HORT	1110. Fundamentals of Horticulture	Science and practice of horticultural plant propagation and culture. Basic concepts of plant structure, growth and function. Integrated pest management. Impact of new technology. Horticulture and the environment.
HORT	2750 Landscape Plant Maintenance	Planting, establishment and maintenance of woody and herbaceous plants in built and managed environments. Plant structural and functional requirements. Preserving and protecting established plants. Soil conditions and modification. Influence of climate and modification of microclimate. Plant selection. Pruning, mulching, water and irrigation, nutrition and fertilization, plant health care and other horticultural practices
HORT	3660 Nursery Production	Principles of field and container production of nursery stock. Emphasis on production practices for woody nursery stock from propagule to sale.
HRTS	1007. Introduction to Human Rights	Exploration of central human rights institutions, selected human rights themes and political controversies, and key political challenges of contemporary human rights advocacy
HRTS	2170W Bioethics and Human Rights in Cross-Cultural Perspective	Philosophical examination of the ethical and human rights implications of recent advances in the life and biomedical sciences from multiple religious and cultural perspectives.
HRTS	2263. Women and Violence	Discussion of violence against women in our society, including rape, battering, incest and pornography and the social, political and personal meaning of violence.
HRTS	3028 Indigenous Rights and Aboriginal Australia	An introduction to the study and understanding of Aboriginal ways of life and thought. An exploration of the complexity of contemporary indigenous social orders and land rights issues.

HRTS	3028W Indigenous Rights and Aboriginal Australia	(Also offered as ANTH 3028W.) Three credits. Prerequisite: ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: ANTH 2000.
HRTS	3042. The Theory of Human Rights	Various theories of human rights, both historical and contemporary. Conceptual arguments both in favor and critical of the theory and practice of human rights will be considered, with literature taken primarily from philosophy and political theory
HRTS	3153W. Human Rights in Democratizing Countries	Human rights, political violence, political and legal anthropology, prosecutions of human rights offenders, truth and memory, reconciliation, international justice
HRTS	3201. The History of Human Rights	Case studies in the emergence and evolution of human rights as experience and concept
HRTS	3202 International Human Rights	Historical and theoretical survey of the evolution of human rights since 1945.
HRTS	3212 Comparative Perspectives on Human Rights	Cultural difference and human rights in areas of legal equality, women's rights, political violence, criminal justice, religious pluralism, global security, and race relations.
HRTS	3221. Latinos/as and Human Rights	Latino/a issues related to human, civil and cultural rights, and gender differences
HRTS	3256 Politics and Human Rights in Global Supply Chain	Political and human rights implications of regulating contemporary global supply chains: official regulatory frameworks; non-regulatory approaches to rule-making (such as voluntary corporate codes of conduct and industry standards); social responses to the dilemmas of "ethical" sourcing of goods and services.

HRTS	3256W Politics and Human Rights in Global Supply Chain	Political and human rights implications of regulating contemporary global supply chains: official regulatory frameworks; non-regulatory approaches to rule-making (such as voluntary corporate codes of conduct and industry standards); social responses to the dilemmas of "ethical" sourcing of goods and services.
HRTS	3421. Class, Power, and Inequality	Inequality and its consequences in contemporary societies
HRTS	Inequality and its consequences in contemporary societies	Poverty in the U.S. and abroad, its roots, and strategies to deal with it
HRTS	3430. Evaluating Human Rights Practices of Countries	Examination of the ways in which governments, businesses, NGOs, IGOs, and scholars assess which human rights are being respected by governments of the world. Hands-on experience in rating the level of government respect for human rights in countries around the world
HRTS	3475. Economic Development and Human Rights	Microeconomics of economic development and human rights. Impacts of human capital, health, education, on well-being and poverty
HRTS	3831. Human Rights in the United States	Sociological analyses of human rights issues in the United States, including economic, racial, and gender justice; prisoner's rights and capital punishment; the role of the United States in international human rights agreements and treaties; and struggles on behalf of human rights
HRTS	3835. Refugees and Humanitarianism	Social and political challenges of living as a refugee and working in humanitarian settings with a focus on refugee camps, institutional development of the United Nations High Commissioner for Refugees, and alternative approaches to refuge
HRTS	3837. Sociology of Global Human Rights	Comparative approach to the study of human rights in the United States and elsewhere around the world from a sociological perspective

HRTS	3219W. Topics in Philosophy and Human Rights	What are human rights? Why are they important? Topics may include the philosophical precursors of human rights, the nature and justification of human rights, or contemporary issues bearing on human rights.
INTD	3584 Seminar in Urban Problems	Discussions based upon assigned readings and led by faculty and invited speakers from outside and within the University.
LAND	2210 The Common (Shared) Landscape of the USA: Rights, Responsibilities and Values	An introduction to the study of vernacular landscapes in the USA with an emphasis on the relationship between societal values and land use patterns.
LAND	3310 Landscape Architecture: Construction I – Site Engineering	Theory and practice in manipulating landform in landscape architecture. Earthwork computation, drainage systems, sedimentation and erosion control, roadway design and low-impact design.
LAND	3420 Landscape Architecture: Design II – Space, Form and Meaning	Knowledge and theory of spatial form in architecture, landscape architecture and urban design. Application of theory in the creation of 3-dimensional landscape models in a studio environment. Student attitudes about self-expression, environmental issues and social responsibility will be explored.
LAND	4330 Landscape Architecture: Construction III – Planting Design	Knowledge and theory of the role of plants as visual, spatial, ecological and cultural design elements. Analysis and creation of planting plans that support and develop design concepts and respond to physical site conditions. Application of knowledge and theory by developing planting plans, models and databases for a variety of project types in a studio environment.
LAND	4440 Landscape Architecture: Design IV – Community Planning	Knowledge and theory of design of large scale landscapes such as open space systems, village and town centers and residential subdivisions. Application of theory to a variety of projects including community outreach work.

LING	1030 The Diversity of Languages	Overview of world languages and language families. Typological classifications of linguistic properties: what can we expect in a structure of a language? Unity and diversity of language systems. Mechanisms of language change and variation.
LING	3610W Language and Culture	The study of language, culture, and their relationship. Topics include the evolution of the human language capacity; the principles of historical language change including reconstruction of Indo-European and Native American language families; writing systems; linguistic forms such as Pidgins and Creoles arising from languages in contact; the interaction between language and political systems, the struggle for human rights, gender, ethnicity, and ethnobiology.
LLAS	1000. Introduction to Latina/o Studies	Interdisciplinary examination of the Latina/o experience and its impact across the United States. Consideration of behavioral, institutional and societal perspectives; national and transnational identity; cultural, legal and educational issues.
MARN	3014 Marine Biology	The study of the kinds and distributions of marine organisms. Particular attention is paid to biotic features of the oceans, organism-habitat and relationships and general ecological concepts influencing marine populations and communities. Field trips are required.
MARN	3230 Beaches and Coasts	Introduction to the processes that form and modify coasts and beaches, including tectonic setting, sediment supply, coastal composition, energy regimes and sea level change; tools and techniques utilized in marine geologic mapping and reconstruction of submerged coastal features; field trips to selected coastal features.

MARN	3505 Remote Sensing of Marine Geography	Introduction to remote sensing applications in oceans and seas. Applications include image analysis of sea surface temperature, winds, altimetry, sea ice, chlorophyll, primary productivity, and bathymetry.
MARN	3811 Seminar on Marine Mammals	Instructors from different areas of expertise discuss the natural history, evolution, anatomy, physiology, husbandry, and conservation of marine mammals. Current research is emphasized.
MARN	4010 Biological Oceanography	Structure and function of marine food webs, from primary producers to top trophic levels; interaction of marine organisms with the environment; energy and mass flow in food webs; elemental cycling; coupling between pelagic and benthic environments.
MARN	4018. Ecology of Fishes	General concepts in fish ecology such as distribution, feeding, bioenergetics, growth, larval fish ecology, biotic interactions, life history evolution and other contemporary research topics.
MAST	1101 Introduction to Maritime Studies	A study of history and literature to understand the international maritime culture that links peoples, nations, economies, environments, and cultural aesthetics
MAST	1200 Introduction to Maritime Culture	A study of history and literature to understand the international maritime culture that links peoples, nations, economies, environments, and cultural aesthetics
MAST	2467. Economics of the Oceans	Economies of industries that use and manage ocean resources. Applications of industrial organization, law and economics, natural resource theory, and environmental economics

MCB	2000 Introduction to Biochemistry	The structure, chemistry, and metabolism of carbohydrates, lipids and proteins. Enzyme function and kinetics, energy metabolism, and structure and function of nucleic acids. A survey course for students of agriculture, general biology, medical technology, nursing, and pharmacy. Molecular and Cell Biology majors, biophysics majors, and other students desiring a more intensive introduction or considering advanced course work in biochemistry or molecular biology should take MCB 3010. A fee of \$25 is charged for this course.
MCB	2610 Fundamentals of Microbiology	Biology of microorganisms, especially bacteria. Cellular structure, physiology, genetics, and interactions with higher forms of life. Laboratory familiarizes students with methodology of microbiology and aseptic techniques. A fee of \$30 is charged for this course.
MCB	3640W Bacterial Diversity and Ecology	A study of the ecophysiology of diverse bacterial types with particular emphasis on the activities of bacteria in situ. Investigative laboratory includes individual projects. A fee of \$75 is charged for this course.
ME	3285 Sustainable Energy Sources and Systems	Topics include current energy sources and usage, environmental pollution from use of fossil fuels, nuclear energy, biomass energy, geothermal energy resources and usage, hydroelectric, solar, wind and tidal energy conversion principles, hydrogen generation and usage in electrochemical devices, energy economics and effects of energy pricing on economically viable energy options.

MSE	4241 Nanomaterials Characterization and Application	<p>Introduces materials characterization and applications at the nanoscale. Standard and advanced methods in Scanning Probe Microscopy, Electron Microscopy, and Focused Ion Beams are presented. Self-Assembled and Lithographically defined structures are treated. Nanoscale particles, tubes, films, and structures are discussed. Applications for enhanced mechanical, electronic, magnetic, optical, and biological properties are described. Societal implications including performance, costs, environmental impacts, and health issues are addressed. Readings from modern scientific literature are assigned weekly for in-class discussions.</p>
MSE	4800 Materials for Advanced Fossil Energy Systems	<p>Will familiarize students with the state of the art in fossil fuel power generation technologies ranging from conventional combustion to emerging technologies such as oxyfuel combustion; integrated coal gasification (IGCC) and fuel cell (IGFC) systems; and CO<sub>2</sub> separation and sequestration</p>
NRE	2000 Introduction to Geomatics	<p>Principles and applications of geographic information systems (GIS), global positioning system (GPS), and remote sensing will be covered. Students will be provided with the scientific knowledge and technical skills needed to collect and use spatial data effectively in a Geographic Information System (GIS).</p>
NRE	2010 Natural Resources Measurements	<p>Principles and instrumentation used in the measurement of environmental conditions and processes.</p>
NRE	2415 Dendrology	<p>The taxonomy, silvics, and distribution of trees and shrubs of the United States with emphasis upon Northeastern species. Field trips will be required.</p>

NRE	3125 Watershed Hydrology	Fundamental hydrologic processes, water balances, precipitation analyses, infiltration, soil water, evapotranspiration, open channel flow, discharge measurements, and analysis, flow frequencies, ground water-surface water interactions, runoff processes and prediction. Problem oriented course requiring use of computer spreadsheets.
NRE	3145 Meteorology	A survey course in meteorology at the introductory level covering weather and climate processes.
NRE	3535 Remote Sensing of the Environment	How population dynamics models are used in science and in the management of fish and wildlife populations, factors influencing population dynamics. Design, evaluation, and use of a population model.
NRE	4370 Population Dynamics	How population dynamics models are used in science and in the management of fish and wildlife populations, factors influencing population dynamics. Design, evaluation, and use of a population model.
NRE	4544 Application of Surveying for Natural Resources	Use of opto-mechanical instruments (spirit levels and total stations) for high-accuracy land measurement, with applications to common problems in natural resource management such as transect layout. Students will learn to perform control surveys and to create detailed maps from the control surveys.
NRE	4575 Natural Resource Applications of Geographic Information Systems	Principles and applications of computer-assisted spatial data analysis in natural resources management. Hypothetical and actual case studies of the use of geographic information systems (GIS) to solve natural resource problems will be discussed. Raster- and vector-oriented, microcomputer-based GIS software will be applied.

NRE	4665 Natural Resources Modeling	Applications of conservation of mass, energy and momentum in modeling natural resources systems. Defining systems; determining flows and storages; interactions and feedback mechanisms within systems. Problem oriented course including computer solutions using spreadsheets or modeling programs.
NUSC	1030. Interdisciplinary Approach to Obesity Prevention	Explores the biology of obesity including genetic predispositions and behaviors that increase obesity risk (dietary, physical activity, social, psychological), the obesigenic environment, including how communities are physically built, as well as the economic relationship to obesity risk, and policy and ethical implications for obesity prevention. Multi-level obesity prevention approaches that involve the individual family, organization, community, and policy
NUSC	1645 The Science of Food	An introductory level course for students interested in the application of science to food. Nutritional and functional attributes of various food constituents are discussed. Issues concerning food processing and food safety are covered.
NUSC	2200. Nutrition and Human Development	Nutritional needs and consequences of nutritional deficiencies throughout the life cycle: preconception, pregnancy, lactation, childhood, adolescence and aging. Maternal and child public health issues in the developed and developing world.
NUSC	3230. Community Nutrition	Role of community structure, agencies, and resources in community health relating to nutrition.
OSH	3174 Environmental Laws, Regulations, and Issues	Overview of the history and framework of federal environmental legislation to protect the environment along with environmental issues, laws and regulations associated with industrial operations.

OSH	4221W Trends in Environmental and Occupational Safety and Health	Impact of issues in the workplace in promoting prevention of injuries and illness to workers, and protection of property and the environment.
PHIL	1175. Ethical Issues in Health Care	Theories of ethics, with specific application to ethical issues in modern health care
PHIL	2170W. Bioethics and Human Rights in Cross-Cultural Perspective	Philosophical examination of the ethical and human rights implications of recent advances in the life and biomedical sciences from multiple religious and cultural perspectives
PHIL	2217. Social and Political Philosophy	Conceptual, ontological, and normative issues in political life and thought; political obligation; collective responsibility; justice; liberty; equality; community; the nature of rights; the nature of law; the justification of punishment; related doctrines of classic and contemporary theorists such as Plato, Rousseau, John Rawls.
PHIL	3219. Topics in Philosophy and Human Rights	What are human rights? Why are they important? Topics may include the philosophical precursors of human rights, the nature and justification of human rights, or contemporary issues bearing on human rights.
PLSC	1000 Orientation to Plant Science and Landscape Architecture	An introduction to programs, careers, and research in Plant Science and Landscape Architecture.
PLSC	3820 Ecology and Control of Weeds	Biology and management of insects with an emphasis on pests of ornamental plants and turf. Identification of key pests and their damage symptoms, monitoring insect populations and management strategies and tactics.
PLSC	3830 Insect Pests of Ornamentals and Turf	Biology and management of insects with an emphasis on pests of ornamental plants and turf. Identification of key pests and their damage symptoms, monitoring insect populations and management strategies and tactics.

PLSC	4210 Plant Physiology: How Plants Work	Principles of plant physiology and gene expression from the cell to the whole plant level. Emphasis on plant cell structure, water movement, transport systems, photosynthesis, respiration, phytohormone signals and responses to environmental stresses.
PLSC	4215 Plant Physiology Lab: Investigations into How Plants Work	Independent research projects investigating plant physiology, development and response to the environment. Principles of experimental design, data analysis and scientific communication. A fee of \$20 is charged for this course.
PLSC	2500. Principles and Concepts of Agroecology	Application of ecological processes to modern agricultural production practices. Crops and their environment. Soil quality and maintenance of soil productivity. Sustainability of agroecosystems.
POLS	1007 Introduction to Human Rights	Exploration of central human rights institutions, selected human rights themes and political controversies, and key political challenges of contemporary human rights advocacy.
POLS	3208 Politics of Oil	Historical and contemporary role of oil in comparative politics and international relations.
POLS	3208W Politics of Oil	Prerequisite: ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: POLS 1202 or 1207.
POLS	3218 Indigenous Peoples' Politics and Rights	Governments, political behavior, human rights and constitutional rights of indigenous peoples of North America and Latin America. Impact of international law and globalization on indigenous peoples.
POLS	3218W Indigenous Peoples' Politics and Rights	Prerequisite: ENGL 1010 or 1011 or 2011 or 3800. Recommended preparation: POLS 1202 or 1207.

POLS	3232 Comparative Politics of North America	Commonalities and differences in the political systems of the NAFTA countries, Canada, Mexico and the United States. Issues include political culture and value systems; electoral politics, approaches to federalism and regionalism; public opinion and support for NAFTA and its expansion; migration, political integration, the treatment of indigenous peoples, ethnic and gender representation; and decentralization and the role of municipal government in the provinces/states.
POLS	3245 Chinese Government and Development	Chinese political processes, with emphasis on ideology and problems of development.
POLS	3256 Politics and Human Rights in Global Supply Chain	Political and human rights implications of regulating contemporary global supply chains: official regulatory frameworks; non-regulatory approaches to rule-making (such as voluntary corporate codes of conduct and industry standards); social responses to the dilemmas of "ethical" sourcing of goods and services
POLS	3256W Politics and Human Rights in Global Supply Chain	Prerequisite: ENGL 1010 or 1011 or 2011 or 3800; open to Political Science or Human Rights majors and minors; open to juniors or higher. Recommended preparation: POLS 1202 and 1402 and POLS/HRTS 3212
POLS	3211. Politics of Water	The role of water in state building, state-society relations, and economic and political development. Draws on approaches from comparative politics and international relations.
POLS	3214. Comparative Social Policy	Institutional structures of modern welfare states, including systems of social insurance, healthcare, and education. Assessment of leading political explanations for their growth and cross-national differences among them.

POLS	3249. Gender Politics and Islam	Construction of gender in Islamic texts and history, the religion's interaction with other patriarchal cultures and systems, western interventions and their impact, male leaders' reform efforts, women's movements.
PSYC	2701. Social Psychology of Multiculturalism	Introduction to theoretical perspectives and behavioral research that seek to explain the nature and mechanisms of intergroup relations and the psychology of culture, prejudice, and biased behavior
PSYC	3102. Psychology of Women	Gender roles, socialization, women and work, women's relationships, violence against women, and other topics.
PSYC	3102. Psychology of Women	Empirical and theoretical literature on psychological experiences of African Americans. Impact of race, culture, and ethnicity on psychological development.
PSYC	3106W. Black Psychology	Empirical and theoretical literature on psychological experiences of African Americans. Impact of race, culture, and ethnicity on psychological development.
SOCI	1251 Social Problems	Major social problems, their sources in the organization of society, public policies for their alleviation, and questions of ethics and social justice: alcohol and drug abuse, physical and mental illness, sexual variances, poverty and inequality, ethnic and racial prejudice and discrimination, women and gender, the changing family, violence, crime and delinquency, the environment, urban problems, and population planning and growth.
SOCI	1501. Race, Class, and Gender	Race, class, and gender, as they structure identities, opportunities, and social outcomes
SOCI	1501W. Race, Class, and Gender	Race, class, and gender, as they structure identities, opportunities, and social outcomes
SOCI	2501. Sociology of Intolerance and Injustice	Sociological concepts of intolerance and injustice and how they affect members of marginalized groups; case studies may consider social class, race/ethnicity, gender, sexuality, age, religion, and disability

SOCI	2501W. Sociology of Intolerance and Injustice	Sociological concepts of intolerance and injustice and how they affect members of marginalized groups; case studies may consider social class, race/ethnicity, gender, sexuality, age, religion, and disability
SOCI	3271. Topics in the Sociology of Culture	A variable topics course focusing on issues in the sociology of culture. Specific topics may include: production of culture and the culture industry, popular culture, the sociology of the arts, cultural representation of deviance and social problems, women and culture, film and the developing world, material culture, and cultural constructions of social inequality.
SOCI	3421. Class, Power, and Inequality	Inequality and its consequences in contemporary societies.
SOCI	3421W. Class, Power, and Inequality	Inequality and its consequences in contemporary societies.
SOCI	3425. Social Welfare and Social Work	Social welfare needs and programs; introduction to social work as a professional service.
SOCI	3429 Sociological Perspectives on Poverty	Poverty in the U.S. and abroad, its roots, and strategies to deal with it.
SOCI	3429W Sociological Perspectives on Poverty	(249W) Prerequisite: ENGL 1010 or 1011 or 2011 or 3800; open to juniors or higher.
SOCI	3451. Sociology of Health	Social factors related to health, illness, and healthcare systems
SOCI	3453. Women and Health	Social factors shaping women's health, health care, and their roles as health-care providers.
SOCI	3453W. Women and Health	(241W) Prerequisite: ENGL 1010 or 1011 or 2011; open to juniors or higher

SOCI	3501. Ethnicity and Race	Ethnic groups, their interrelations, assimilation, and pluralism. Culture, and identity that arise from differences in race, religion, nationality, region, and language.
SOCI	3501W. Ethnicity and Race	Ethnic groups, their interrelations, assimilation, and pluralism. Culture, and identity that arise from differences in race, religion, nationality, region, and language.
SOCI	3503. Prejudice and Discrimination	Sources and consequences of racial and ethnic prejudice and discrimination.
SOCI	3503W. Prejudice and Discrimination(243W)	Prerequisite: ENGL 1010 or 1011 or 2011; open to juniors or higher.
SOCI	3505. White Racism	The origin, nature, and consequences of white racism as a central and enduring social principle around which the United States and other modern societies are structured and evolve.
SOCI	3601. Sociology of Gender	Explores processes contributing to social construction of gender; examines the theories used to explain the system of inequality in the United States with particular attention to the intersection of gender, race, ethnicity, sexuality, and class; and evaluates how men and women are differentially constituted in the family, in education, work, politics, and language.
SOCI	3601W. Sociology of Gender	(252W) Prerequisite: ENGL 1010 or 1011 or 2011; open to juniors or higher
SOCI	3651. Sociology of the Family	The American family, its changing forms and values, and the social conditions influencing it: mate selection, marital adjustment, the responsibilities and opportunities of parenthood, and resolving family crises.
SOCI	3651W. Sociology of the Family	(250W) Prerequisite: ENGL 1010 or 1011 or 2011

SOCI	3701 The Developing World	Social and economic conditions in Asia, Africa, and Latin America and attempts to improve them.
SOCI	3701W The Developing World	(258W) Prerequisite: ENGL 1010 or 1011 or 2011 or 3800; open to juniors or higher.
SOCI	3831. Human Rights in the United States	Sociological analyses of human rights issues in the United States, including economic, racial, and gender justice; prisoner's rights and capital punishment; the role of the United States in international human rights agreements and treaties; and struggles on behalf of human rights.
SOCI	3833. Topics in Sociology and Human Rights	Social and political challenges of living as a refugee and working in humanitarian settings with a focus on refugee camps, institutional development of the United Nations High Commissioner for Refugees, and alternative approaches to refuge.
SOCI	3835. Refugees and Humanitarianism	Social and political challenges of living as a refugee and working in humanitarian settings with a focus on refugee camps, institutional development of the United Nations High Commissioner for Refugees, and alternative approaches to refuge.
SOCI	3837. Sociology of Global Human Rights	Comparative approach to the study of human rights in the United States and elsewhere around the world from a sociological perspective.
SOCI	3841. Public Opinion and Mass Communication	Contemporary public opinion and ideology, the process and effects of mass communication, and the measurement of public opinion.
SOCI	3841W. Public Opinion and Mass Communication	(267W) Prerequisite: ENGL 1010 or 1011 or 2011; open to juniors or higher.
SOCI	3903W. Urban Problems	Social problems of American cities and suburbs, with emphasis on policy issues.
SOCI	2275 Social Well-Being	Socially-embedded facets of well-being. Definitions and levels of well-being; relationship of well-being to social situations, social interactions, and social institutions.

SOCI	2275W. Social Well-Being	The experience of well-being in society. Includes demographic correlates of well-being, connections to social situations, social interactions, social structures, and culture.
SOIL	3410 Soil Chemistry Components	Basic concepts of the physical chemistry of soil constituents. Topics include soil atmospheres, soil solutions, soil organic matter, soil mineralogy, and surface characteristics and analysis.
SOIL	3620 Soil Fertility	Factors governing nutrient uptake by plants, fate of nutrients applied to soils, principles and practices in the manufacture and use of fertilizers for crop production, laboratory and greenhouse studies of soil and plant response to applied nutrients.
SOIL	4420 Soil Chemistry Processes	Physical chemical characteristics of soil minerals and soil organic matter, and their reactivity with compounds present in the aqueous and vapor phase. Topics include: redox reactions, adsorption and desorption measurements, electrokinetics, adsorption modeling, and basic principals of soil modification and remediation practices.
STAT	4625 Introduction to Biostatistics	Rates and proportions, sensitivity, specificity, two-way tables, odd ratios, relative risk, ordered and non-ordered classifications, trends, case-control studies, elements of regression including logistic and Poisson, additivity and interaction, combination of studies and meta-analysis.
TURF	1100 Turfgrass Management	An overview of turfgrass adaptation, selection, and management. Topics include turfgrass growth, physiology, soil interactions, weeds and diseases, morphology and identification, establishment, and maintenance. Cultural system practices for lawns, golf courses, athletic fields, and other turf areas.

TURF	3200 Turfgrass Physiology and Ecology	Turfgrass physiology related to growth and development. Response to temperature, light, water, traffic, and wind. Turfgrass community dynamics, competition, and environmental effects of turfgrass culture.
TURF	3200W Turfgrass Physiology and Ecology	Prerequisite: TURF 1100; ENGL 1010 or 1011 or 2011 or 3800; open to juniors or higher.
TURF	3300 Principles of Turfgrass Irrigation Systems	Turfgrass irrigation systems, principles of hydraulics, irrigation components, design, installation and repair. Students will design irrigation systems for various turf areas. Field trips and fieldwork will be required.
URBN	1300. Exploring Your Community	Various aspects of urban and community life emphasizing the interplay of social justice, diversity, individual and social well-being. Theories, concepts, and methods in community studies. May contain a service learning component.
URBN	1300W. Exploring Your Community	(140W) Three credits. Prerequisite: ENGL 1010 or 1011 or 2011. CA 2. CA 4.
URBN	2000 Introduction to Urban Studies	Introduction to the analysis of urban development with particular stress on those problems pertinent to the American central city.
URBN	2000W Introduction to Urban Studies	(230W) Prerequisite: ENGL 1010 or 1011 or 2011 or 3800
URBN	3000 Urban Anthropology	A general course on urbanization, emphasizing contrasts between "developed" and "developing" countries.
URBN	3276 Urban Problems	Social problems of American cities and suburbs with emphasis on policy issues.
URBN	3276W Urban Problems	Prerequisite: ENGL 1010 or 1011 or 2011 or 3800.

URBN	4000 Understanding your Community	Examination of an urban area or local community. Production of a detailed case study including historical perspective, analysis of issues and stakeholders, evaluation of internal strengths and weaknesses as well as external threats and opportunities. Proposal of strategies for addressing problems and advancing equity, growth, and development.
URBN	4000W Understanding your Community	(290W) Prerequisite: ENGL 1010 or 1011 or 2011 or 3800.
WGSS	1104 Feminisms and the Arts	Interdisciplinary exploration of the work of women artists in drama, the visual arts, music, literature, and/or film. Key issues of feminist criticism in the arts are discussed.
WGSS	1124 Gender and Globalization	Exploration of the construction and reproduction of gender inequality and the gendered nature of global structures and processes. Key topics include women's rights as human rights; women's work; gender, development, and the global economy; migration; religious fundamentalism; reproduction, health, and HIV/AIDS; education; violence against women; and gender, war, and peace advocacy.
WGSS	2263 Women and Violence	Discussion of violence against women in the U.S .and globally, including close examination of various forms of interpersonal and structural violence as well as the social, political and personal meanings of violence.
WGSS	2267. Women and Poverty	Exploration of poverty and gender inequality within the frameworks of the global political economy in select countries. Impact of race, class, and gender differences on policy
WGSS	3052 Women and Politics	An introduction to feminist thought, the study of women as political actors, the feminist movement and several public policy issues affecting women.
WGSS	3102. Psychology of Women	National and transnational politics of reproduction including: contraception, sexuality education, abortion, childbirth, surrogacy, adoption, health care policy and funding.

WGSS	3105 The Politics of Reproduction	National and transnational politics of reproduction including: contraception, sexuality education, abortion, childbirth, surrogacy, adoption, health care policy and funding.
WGSS	3271 Seminar on Rape Education and Awareness I Explores	Explores issues of sexual violence and trains those enrolled to facilitate rape awareness workshops for the campus community. Students are required to attend an intensive two-day training program and participate in weekly seminars.
WGSS	3272 Seminar on Rape Education and Awareness II	Further explores broader issues of sexual violence and continues to train those enrolled to facilitate rape awareness workshops for the campus community. Students are required to participate in weekly seminars and facilitate rape awareness workshops.
WGSS	3560 Constructions of Race, Gender, and Sexuality in U.S. History	Examination of historical development, interconnections, and complexities of conceptions of race, gender, and sexuality in U.S. from European conquest to the present
WGSS	3561 History of Women and Gender in the U.S. to 1850	Gender ideologies of indigenous and settler cultures, changing conditions of women's and men's lives as the U.S. became a nation, while emphasizing intersections with ethnicity, race, class, religion, and region.
WGSS	3562 History of Women and Gender in the United States 1850-Present	History of gender and the lives and cultural representations of women in the U.S., emphasizing intersections with race, sexuality, class, region, and nation
WGSS	3621 Sociology of Sexualities	Explores the social organization, construction, and politics of sexualities; particular focus on lesbian, gay, bisexual, transgender, and queer experiences and the intersection of sexualities, gender, race, and class
WGSS	3621 Sociology of Sexualities	Explores the social organization, construction, and politics of sexualities; particular focus on lesbian, gay, bisexual, transgender, and queer experiences and the intersection of sexualities, gender, race, and class

WGSS	3672. Feminist Development Studies and Practice	Feminist development theories and practices applied to Third World or Global South countries, and drawing on related social science and humanities traditions.
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Graduate Courses		
Department	Course Number and Title	Course Description
ACCT	5563 Enterprise Risk Management: Identify Events as Risks to Manage or Opportunities to Seize	This course provides students with the ability within the COSO framework to identify events that may impact a nonfinancial publicly traded enterprise's ability to realize value for its stakeholders using the concept of the triple bottom line of profit, people, and planet. Events will be evaluated as risks that have negative impacts and opportunities as well as potential positive impacts. ERM techniques applied in the course will include: risk control, business continuity, reputation risk, supply-chain management, compensation system alignment, and strategic decisions.
ANTH	5306 Human Behavioral Ecology	This seminar will apply the theory of natural selection to the study of human behavior in an ecological setting, with particular focus on the adaptive features and biological design of human behavior.
ANTH	5308 Human Evolutionary Theory	Evolutionary concepts applied to human body size and shape, diet, disease, group composition, and reproductive behavior.
ANTH	5309 Violence, Stress, and Social Support	This seminar surveys theory and observations bearing on the nature, sources and consequences of traumatic stress, stressors, and social support in human populations.
ANTH	5389 Population Ecology	This seminar surveys theory and observations bearing on the causes and consequences of changes in fertility and mortality rates, and in the configuration of causes of mortality and morbidity in human populations.

ANTH	5522 Ecological Anthropology	Interdisciplinary study of human ecology integrating ecological and anthropological theory with archaeological, historical, and contemporary case studies.
ANTH	5315 Gender and Culture	Anthropological perspectives on the analysis of gender with special focus on dynamics of gender, culture, and power
ANTH	5391 Human Rights in a Diverse World	Basic issues, methods and theories in the anthropological study of human rights; cultural relativism, the international human rights system, social movements, transnational activist networks, media and representation are studied in their relationship to rights claims, adjudication, and outcomes.
ANTH	5392 Human Rights in a Diverse World	Basic issues, methods and theories in the anthropological study of human rights; cultural relativism, the international human rights system, social movements, ransnational activist networks, media and representation are studied in their relationship to rights claims, adjudication, and outcomes.
ANTH	5377 International Wealth	The role of anthropology in international health, morbidity and mortality, population, maternal and child health, nutrition, infectious diseases and epidemiology, health care infrastructure and underdevelopment.
BLAW	5175 Business, Law, and Ethics in Modern Society	This course examines the formulation, interpretation, and application of law to business. It incorporates the study of ethical issues that arise in contemporary business settings, including professional conduct and corporate social responsibility. This course covers major areas of legal regulation to which businesses are subject, including tort liability, contract law, partnership and corporate law, employment and labor law, intellectual property law, environmental regulation and sustainability, and financial regulation. Emphasis is placed on active, experiential application of legal reasoning and analysis and on the global and comparative dimensions of legal and ethical issues.

BLAW	5660 International Business Law	This course examines major issues in international law by focusing primarily on the extensive legal and ethical environment of the modern international marketplace. Key topics to be explored include jurisdiction, international dispute resolution, contract law and the international sale of goods, intellectual property, employment, and environmental issues. The course will also help students understand key institutions in the international legal system and learn about current legal topics related to international trade and foreign investment.
CE	5221 Transportation and Transformation of Air Pollutants	Transport and deposition of gaseous and aerosol pollutants; chemical formation and reactions of oxidants and acidic compounds.
CE	5240 Biodegradation and Bioremediation	Biochemical basis of the transformation of key organic and inorganic pollutants; quantitative description of kinetics and thermodynamics of pollutant transformation; impact of physiochemical and ecological factors on biotransformation.
CE	5250 Environmental Physicochemical Processes	Reactor dynamics, applications of interfacial phenomena and surface chemistry, processes for separation and destruction of dissolved and particulate contaminants. Scholarly reviews.
CE	5251 Environmental Biochemical Processes	Regulatory framework. Soil clean-up criteria. Treatment technologies: soil vapor extraction, solidification - stabilization, soil washing - chemical extraction, hydrolysis - dehalogenation, thermal processes, bioremediation. Risk analysis.
CE	5252 Contaminant Source Remediation	Regulatory framework. Soil clean-up criteria. Treatment technologies: soil vapor extraction, solidification - stabilization, soil washing - chemical extraction, hydrolysis - dehalogenation, thermal processes, bioremediation. Risk analysis.

CE	5253 Ground Water Assessment and Remediation	Quantitative evaluation of field data in assessing nature and extent of groundwater contamination. Subsurface control and remediation. Case studies. Also offered as ENVE 320.
CE	5821 Vadose Zone Hydrology	Theoretical and experimental elements of primary physical and hydrological properties of porous media and processes occurring in partially-saturated soils. Practical experience in measurement and interpretation of hydrological information and methods of analysis for vadose-zone related environmental problems.
CHEG	5358 Composite Materials	An introduction to the mechanical properties of fiber reinforced composite materials. Included are discussions of the behavior of unidirectional composites, short fiber composites and laminates. Special topics such as fatigue, fracture and environmental effects are also included.
CHEG	5381 Water Purification Principles	An advanced study of the application of thermodynamics, transfer operations, and chemical kinetics to disposal and recovery of aqueous industrial and municipal wastes.
ECON	5102 American Economic History	The growth and development of the American economy and the evolution of its economic institutions from the colonial period to the present. Assessment of agriculture, industry, transportation, commerce, finance, government, and population; and of their interaction with the physical environment, technology, public policy, and the world economy.

ECON	5128 Economic Rights, 5348 Economic Development Policy	Economic Rights include the right to an adequate standard of living, the right to work, and the right to basic income guarantees for those unable to work. These rights are grounded in international law - particularly in the Universal Declaration of Human Rights and the International Covenant on Economic, Social, and Cultural Rights. This class will explore the conceptual bases, measurement, and policy applications of economic rights. Specific topics will include: child labor, the right to development, non-governmental initiatives, and the institutionalization of economic rights (e.g., constitutionalization versus statutory implementation versus discretionary policies).
ECON	5439 Urban and Regional Economics	Theoretical and empirical analysis of urban and regional systems in developed and developing economies. Special emphasis on the spatial characteristics and problems of metropolitan markets for housing, transportation services, productive factors, and final products; land-use controls, housing subsidies, public transit, and other forms of public sector intervention.
EEB	5301 Population and Community Ecology	Overview of population and community ecology, including population regulation and dynamics, metapopulations, species interactions, biodiversity, community structure, and evolutionary ecology. Theoretical and case-history approaches, emphasizing plants, invertebrates, and vertebrates. Lecture, discussion, and exercises in analysis and modeling.
EEB	5302 Organisms and Ecosystems	Overview of organismal and ecosystem ecology, including biophysical basics, resource utilization and allocation, life history patterns, energetics, matter and energy flow in ecosystems, and temporal and spatial dynamics at ecosystem and landscape scales. Theory, experiments, and computer modeling.

EEB	5360 Functional Ecology of Plants	Physiological, morphological, and structural responses of plants to the physical and biotic environment and to environmental change. Readings, lectures and discussions emphasize plant responses at all levels of organization, from cells to whole plants. Themes include: organismal integration, consequences and constraints in plant adaptation, and the functioning of plants within communities and ecosystems.
EEB	5463 Plant Ecology	An advanced course in plant ecology with emphasis on the effects of environment on development of vegetation, metabolism of the ecosystem, cycling of nutrients, growth and succession. Principles of vegetation dynamics, classification and their ecological interpretation will be discussed.
EKIN	6425 Special Topics in Health and Wellness across the Lifespan	An in-depth examination of health issues across the lifespan. The health issues addressed will involve perspectives from social and behavioral health science, occupational and environmental health science, and/or public health policy.
ENVE	5090 Advanced Topics in Environmental Engineering	Classroom or laboratory courses as announced for each semester.
ENVE	5221 Transportation and Transformation of Air Pollutants	Transport and deposition of gaseous and aerosol pollutants; chemical formation and reactions of oxidants and acidic compounds.
ENVE	5240 Biodegradation and Bioremediation	Biochemical basis of the transformation of key organic and inorganic pollutants; quantitative description of kinetics and thermodynamics of pollutant transformation; impact of physiochemical and ecological factors on biotransformation.
ENVE	5250 Ground Water Assessment and Remediation	Quantitative evaluation of field data in assessing nature and extent of groundwater contamination. Subsurface control and remediation.

ENVE	5251 Environmental Physicochemical Processes	Reactor dynamics, applications of interfacial phenomena and surface chemistry, processes for separation and destruction of dissolved and particulate contaminants. Scholarly reviews.
ENVE	5252 Contaminant Source Remediation	Regulatory framework. Soil clean-up criteria. Treatment technologies: soil vapor extraction, solidification - stabilization, soil washing - chemical extraction, hydrolysis - dehalogenation, thermal processes, bioremediation. Risk analysis.
ENVE	5253 Combustion and Air Pollution Engineering	Review of thermodynamics and chemical equilibrium. Introduction to chemical kinetics. Studies of combustion processes, including diffusion and premixed flames. Combustion of gases, liquid, and solid phases, with emphasis on pollution minimization from stationary and mobile systems. Air pollution measurement and instrumentation.
ENVE	5254 Industrial Waste Management and Regulation	Origin and characteristics of industrial wastes. Engineering methods for solving industrial waste problems.
ENVE	5270 Advanced Environmental Engineering Laboratory	Analysis of water and waste water. Experimental laboratory and plant investigation of water, wastewater and industrial waste treatment processes.
ENVE	Analysis of water and waste water. Experimental laboratory and plant investigation of water, wastewater and industrial waste treatment processes.	Movement and fate of chemicals: interfacial processes and exchange rates in environmental matrices.
ENVE	5311 Environmental Biochemical Processes,	Major biochemical reactions; stoichiometric and kinetic description; suspended and attached growth modeling; engineered biotreatment systems for contaminant removal from aqueous, gaseous, and solid streams; process design.

ENVE	5340 Environmental Systems Modeling	Modeling pollutants in natural surface waters. Advective, dispersive, and advective-dispersive systems. Modeling water quality, toxic organic and heavy metals pollution.
ENVE	5370 Environmental Monitoring	Also offered as CE 314. Introduction to complexities and challenges associated with acquisition of information on environmental processes and characteristics of natural systems. Hands-on experience with selection of measurement strategy and sensing technology; sampling network and protocol design; and deployment, acquisition and interpretation of measurements in natural systems.
ENVE	5381 Subsurface Contaminant Transport Modeling	Fate and transport of contaminants in groundwater. Convection, dispersion, adsorption, and biological and radioactive decay. Field scale modeling. Galerkin finite elements. Application to field sites.
ENVE	5821 Vadose Zone Hydrology	Theoretical and experimental elements of primary physical and hydrological properties of porous media and processes occurring in partially-saturated soils. Practical experience in measurement and interpretation of hydrological information and methods of analysis for vadose-zone related environmental problems.
ENVE	6210 Advanced Combustion	Review of thermodynamic properties, transport properties, conservation equations of multicomponent reacting gas. Introduction to chemical kinetics. Classification of combustion waves. Deflagrations, detonations and diffusion flames. Ignition phenomena, droplet and spray combustion and some aspects of turbulent combustion.
GEOG	5110 Regional Development and Policy	A study of theory and practice in regional development and planning. Emphasis on evaluation of regional problems and public policies designed to resolve them, with a primary focus on the United States.
GEOG	5210 Planning and Land Use	Contrasting approaches to planning, with an emphasis on legal and political issues in communities and organizations.

GEOG	5230 Advanced GIS for Remote Sensing for Geoscience Applications	Research methods for using Geographic Information Systems, remote sensing, and image interpretation to investigate problems in geoscience. Includes research techniques for data acquisition, processing and analysis of Digital Elevation Models and satellite imagery. Geologic materials, processes, landforms and landscapes.
GEOG	5290 Advanced Urban Geography	Analysis of social and economic patterns within urban areas, with emphasis on individualized research. The implications for planning are stressed.
GEOG	5390 Advanced Physical Geography	Problems involving the application of physical processes in our changing environment.
GEOG	5505 Remote Sensing of Marine Geography	Introduction to remote sensing applications in oceans and seas. Applications include image analysis of sea surface temperature, winds, altimetry, sea ice, chlorophyll, primary productivity, and bathymetry. Graduate section includes individualized projects.
GEOG	5510 Application Issues in Geographic Information Systems	The study of operational and management issues in geographic information systems (GIS). Ways in which traditional planning and management theories and techniques can be implemented in GISs are examined. Topics include problems of data exchange standards, implementation of GIS in an institutional setting including benchmarking a GIS, applications of GIS in various fields, social impacts and legal aspects of GIS. Practical work includes analytical exercises using GIS culminating in an application project.
GEOG	5520 GIS Modeling of the Urban Environment	Survey of GIS methods and spatial analysis for studying spatial patterns of land use and human activity in an urban environment
GEOG	6820 Advanced Topics in Regional Analysis	N/A
GEOG	6830 Advanced Topics in Population Geography	N/A

GEOG	6840 Advanced Topics in Urban Geography	N/A
GEOG	850 Advanced Topics in Geography of Public Policy	N/A
GEOG	6860 - Advanced Topics in Economic Geography	N/A
GEOG	6870 Advanced Topics in Physical Geography	N/A
GEOG	6880 Advanced Topics in Environmental Geography	N/A
GERM	5314 German Studies	Exploration of the field of German Studies as an "interdiscipline"; analysis of a coherent body of material drawn from the social sciences, humanities, natural sciences, or other fields that helps to illuminate the German-speaking world.
GPPS	5325 Issues in Economic Development	This course concerns economic, social, and demographic change in those countries comprising the less wealthy regions of the South. It examines development from linear (neoclassical), structuralist (political economy), and other perspectives, and emphasizes relationships between "advanced" and "developing" countries within the context of the global economy. In addition to theoretical grounding, the course provides practice in preparing development profiles of individual countries.
GSCI	5510 Applied Geophysics for Geologists and Engineers	Introductory survey of surface and borehole geophysical methods and their application to hydrogeologic, environmental monitoring, and geotechnical engineering studies. Laboratory involves geophysical field measurement, data reduction and geologic interpretation.

GSCI	5520 Exploring and Engineering Seismology	Theory of elasticity applied to wave propagation: equations of motion; reflection and refraction of elastic waves; velocity analysis and fundamental petrophysics; and principles of detecting subsurface interfaces and structures.
GSCI	5680 Applied Geologic Mapping	Advanced surveying and techniques of 3D mapping using electronic total stations, GPS and Geodetic-grade GPS instrumentation. Environmental field geophysics; GPR, resistivity, seismic, magnetic and microgravity surveys. Petrologic, geochemical and geophysical core logging for geotechnical and exploration applications. Field sampling for assay and environmental geochemistry. Detailed geological outcrop mapping. Mine and subsurface geologic mapping.
GSCI	5710 Advanced Hydrogeology	Transport processes in groundwater systems. Mathematical methods in groundwater hydrology. Water quality and resource evaluation.
GSCI	5720 Groundwater Modeling	Numerical techniques for modeling flow and contaminant transport in groundwater systems. Model design, calibration, visualization, verification and sensitivity analysis. Application to field sites.
HDFS	HDFS 5020 Culture Health, and Human Development	Introduction to current interdisciplinary approaches to the study of human development and health in the context of culture. An overview of theoretical approaches; presentations of current research by invited speakers, focusing on how to combine disciplinary perspectives and methods in order to build a new integrative science of health and development across and within cultures.

HDFS	HDFS 5021 Culture Health, and Human Development	<p>Introduction to current interdisciplinary approaches to the study of human development and health in the context of culture. An overview of theoretical approaches; presentations of current research by invited speakers, focusing on how to combine disciplinary perspectives and methods in order to build a new integrative science of health and development across and within cultures.</p> <p>Open to graduate students in Human Development and Family Studies, others with permission.</p>
HDFS	HDFS 5031 Culture Health, and Human Development Project	Group discussion and guidance through planning, implementation, and write-up of a publishable research project in fulfillment of a core requirement for the Graduate Certificate in Culture, Health, and Human Development.
HDFS	HDFS 5442 Latina/O Health Disparities	Overview of health and health care issues among Latina/os in the United States with particular focus on health disparities.
HDFS	HDFS 5550 Social Policy, Law, and Child Welfare	HDFS 5550 Social Policy, Law, and Child Welfare
HAS	5323 Community Development for Local Capacity Building	This course provides the student with the essentials of community development and the skills of local capacity building. Local capacity building skills are needed by Humanitarian workers in order to foster sustainable community development.
HAS	5332 International Human Rights	The course will address the evolution of international human rights and of the legal instruments designed for their promotion and protection, It will study the theoretical foundations of the idea of human rights in various civilizations and cultures, evaluate its legacy within the western and non-western traditions, and examine its meaning and relevance in the contemporary world.

HRM	5351 Human Resources and Public Policy	<p>This course examines the government's influence on the workplace and the impact of public policy on the human resource function within organizations. The course is geared towards developing a better understanding of public policy frameworks, processes, and analytical methods, and their impact on HR issues, problems, challenges, and the resulting actions required in the practice of Human Resources Management.</p>
HSMG	5544 Competitive Strategies for Health Care Organizations	<p>This course focuses on the microeconomic organization of healthcare business units and analyzes various issues central to the individual firm's short-term and long-term competitive success. Competitive strategies pertaining to various types of healthcare organizations such as physician practices, hospitals, health maintenance organizations, and pharmaceutical companies are explored using a wide variety of business tools and methods. Efficient market theory, industry analysis, the boundaries of the firm, principal and agent problems, incentive mechanisms, mergers and acquisitions, the development and sustainability of competitive advantage, and competitive pricing are some of the general topics discussed in the context of the health care sector.</p>
HSMG	5243 Health Care Economics	<p>This course demonstrates how various economic theories can be used to think about health care issues and takes a macro or industry perspective of various health care problems and policy questions. Students are provided with a set of economic tools to evaluate a theoretical or empirical argument relating to health or medical care. The course culminates with an in-depth analysis of the structure, conduct, and performance of the markets for medical insurance, physician services, hospital services, pharmaceutical products, and long-term care. Health care reform is also discussed.</p>

HSMG	5687 Global Healthcare Systems	This course focuses on the examination and evaluation of diverse healthcare systems across the world. As part of this process, students will review the rationale that shapes the unique characteristics and attributes of different systems throughout the world and their associated strengths and weakness. From an organizational perspective, this course will introduce models used for the provision of health care services within the framework of business management practices. This course can be used to satisfy the MBA Program at Hartford.
HSMG	5688 Risk Management and Quality Across Borders	This course examines the management of risk and quality within health care organizations and within different international settings. Within this framework, students are exposed to a number of different quality modes and study the relationship between risk management and quality.
MARN	5012 Ecology of Marine Invertebrates	Functional responses of organisms to abiotic factors in the marine environment (light, temperature, salinity, oxygen tension, intertidal exposure).
MARN	5013 Marine Systems Ecology	Effects of biotic and abiotic parameters on the structure and function of marine ecosystems. Techniques for the analysis of energetics, nutrient cycles, and trophic characteristics in both theoretical and applied problems. Field trips are required.
MARN	5014 Marine Phytoplankton Ecology and Physiology	The physiology of marine phytoplankton, environmental factors affecting their growth and photosynthesis in the ocean, the oceanographic processes responsible for the temporal and spatial distributions of phytoplankton biomass and production, and current topics in phytoplankton research.

MARN	5051 Radiotracer Applications in Natural Systems	Applications of radiotracers in the environment for environmental engineers, environmental scientists, geologists, hydrologists and oceanographers. Use of radionuclides in the interpretation and quantification of aqueous transport processes. The interaction of geochemistry, mass transport and flux balances in Earth, ocean and environmental systems.
MCB	5636 Industrial Microbiology	Biology of industrial microorganisms, including their physiology, selection, and biochemical and genetic manipulation. Primary and secondary metabolite biosynthesis and production. Pollution microbiology and biodegradation.
ME	6170 Combustion and Air Pollution Engineering	Review of thermodynamics and chemical equilibrium. Introduction to chemical kinetics. Studies of combustion processes, including diffusion and premixed flames. Combustion of gases, liquid, and solid phases, with emphasis on pollution minimization from stationary and mobile systems. Air pollution measurement and instrumentation.
ME	6174 Seminar in Combustion Generated Pollution	A study of the mechanism of production of pollutants such as nitrogen oxides, carbon monoxide, sulphur dioxide, soot and unburned hydrocarbons from power plants such as stationary gas turbines, internal combustion engines, and jet engines. Emphasis will be placed on current research problems and recent advances in combustor designs.
ME	6320 Environmental Engineering	Design and arrangement of heating, air conditioning and refrigeration equipment and controls to meet comfort and industrial process requirements.

MGMT	5800 Strategy, Policy, and Planning	<p>A firm's ability to survive and succeed in an increasingly competitive global arena depends on its ability to develop and maintain an effective strategy. This capstone course deals with the two major aspects of strategy: formulation and implementation. Strategy formulation examines such issues as environmental threats and opportunities, the values and priorities of management and societal stakeholders, and the strengths of company resources and competencies relative to principal competitors. Strategy implementation covers such topics as strategic leadership, organizational structure, resource allocation, and building a strategy-supportive culture. The course uses cases and readings to develop the knowledge and skills necessary to prepare students to deal with strategic issues. The student must have completed basic courses in the functional areas of business in order to be ready to assume the holistic perspective required of those who address this important topic.</p>
NRE	5125 Environmental Measurements and Instrumentation	<p>Principles that govern the selection and use of both field sensors and recording data systems for field research and environmental monitoring.</p>
NRE	5145 Environmental Biophysics	<p>Gas laws and transport processes. Radiation environment. Momentum, heat, and mass transfer. Steady-state and transient energy balance. Microclimate of plants and animals. Physical and physiological interactions between plants/animals and their environment.</p>

NRE	5175 Climate and Environmental Systems Modeling	<p>Recommended preparation: Undergraduate Calculus I,II. How physical processes in climate and environmental systems - such as atmospheric motion, hydrological processes and transport of atmospheric constituents - are represented in numerical models. Topics include classification of numerical models, steps in climate and environmental (mathematical) modeling, conservation theories of mass and energy, mass balance equations, numerical techniques, and initial and boundary conditions</p>
NRE	5252 Physiology and Ecology of Trees	<p>An examination of the interactions between trees and their environment at the molecular, individual and forest stand scales. Lectures and reviews of current research span at least two spatial scales of organization for each course topic. Course topics include tree carbon balance, water relations, mineral nutrition, morphology, genomics, phenology, climate change and modeling.</p>
NRE	5335 Advanced Stream Ecology	<p>Advanced Stream Ecology is intended to introduce graduate students to the current state of knowledge and research in rivers and streams. Topics will include both basic structure and function of stream habitats and biotic assemblages as well as branch into the management and conservation applications of ecological information. Term project and paper is required. Instructor consent required - students with previous stream ecology coursework (such as NRME 3205) may take the course for 2 credits and attend the single weekly meeting. Students lacking a basic introduction to stream ecology may take the course for 3 credits and will attend NRME 3205 lectures in addition to the weekly meeting.</p>

NRE	5461 Landscape Ecology	Interdisciplinary focus on the effect of landscape pattern on environmental processes and conditions and the influence of disturbance and underlying geomorphology on landscape pattern. Consideration of landscape ecology principles in planning and management of pattern and processes in which conservation and production land uses are intermingled.
NRE	5575 Natural Resource Applications of Geographic Information System	The principles and applications of computer-assisted spatial data analysis in natural resources management will be covered. Both hypothetical and actual case studies of the use of geographic information systems (GIS) to solve natural resource problems will be discussed. Raster- and vector-oriented, microcomputer-based GIS software will serve as the hands-on tools for students
NRE	5605 Environmental Data Analysis	Topics on natural resources and environmental data analysis, including: random variables and probability distributions, parameter estimation and Monte Carlo simulation, hypothesis testing, simple regression and curve fitting, wavelet analysis, factor analysis; formulation and classification of optimization problems with and without constraints, linear programming; models for stationary and non-stationary time series; solution of ordinary differential equations with Laplace transforms and Euler integration; solution of partial differential equations with finite differences; basics of modeling.
NRE	6175 Ground Water Modeling Applications	Application of Modflow to ground water flow and contaminant problems. Well head protection modeling. Not open to students who have passed GEOL 356.
NRE	6325 Wildlife Ecology	A discussion of the principles upon which wildlife conservation is based.

NURS	5080 Health Care Financing	An analysis of economic theory as it relates to health care. Incorporation of expert support systems in the design of nursing department and unit financial plans. Compare and contrast various budgeting systems. Open to non-degree students.
NURS	5250 Community Health Nursing Theory: Enhancing Wellness	Theoretical formulations from nursing, public health, and related sciences are used to enhance the levels of wellness of selected population groups in the community. A needs assessment is conducted to develop a community diagnosis as the basis for developing a plan for health promotion
OSH	5321 Seminar in Occupational Safety and Health Management	This course is an in-depth study of the impact of issues such as the changing demographics, and globalization of regulations, on promoting prevention of injuries and illness to workers, and protection of property and the environment in the workplace. This course is taught as a series of active seminars requiring students to research, write, and discuss papers.
PHAR	5454 Principles of Safety Evaluation	Introduction to toxicologic risk assessment. Fundamentals of dose-response relationships and risk characterization, and their application in the establishment of permissible exposure limits for drugs and other chemicals in the environment or workplace
PHIL	5312 Seminar in the Philosophy of Science	A discussion of selected current, methodological issues in the philosophy of science. Topics may include scientific realism versus nonrealism; theories of scientific explanation; the nature of scientific revolutions; theories of the lawfulness of nature; and feminist theories of science.
PHIL	5352 Seminar in Feminist Theory	The focus of inquiry might be the history of feminist theory, a school of contemporary feminist theory, an issue or a selection of issues in feminist theory, or feminist approaches to major texts or themes in the history of philosophy.

PLSC	5252 Physiology and Ecology of Trees	<p>An examination of the interactions between trees and their environment at the molecular, individual and forest stand scales. Lectures and reviews of current research span at least two spatial scales of organization for each course topic. Course topics include tree carbon balance, water relations, mineral nutrition, morphology, genomics, phenology, climate change and modeling.</p>
POLS	5390 Economic Rights	<p>Economic Rights include the right to an adequate standard of living, the right to work, and the right to basic income guarantees for those unable to work. These rights are grounded in international law - particularly in the Universal Declaration of Human Rights and the International Covenant on Economic, Social, and Cultural Rights. This class will explore the conceptual bases, measurement, and policy applications of economic rights. Specific topics will include: child labor, the right to development, non-governmental initiatives, and the institutionalization of economic rights (e.g., constitutionalization versus statutory implementation versus discretionary policies).</p>
PUBH	5467 Occupational and Environmental Disease	<p>Clinical introduction to occupational disease, including diagnostic strategies and patient management techniques. Review of the diseases of primary target organs, including the range of syndromes from that organ, appropriate diagnostic techniques, and treatment options.</p>
PUBH	5468 Occupational and Environmental Epidemiology	<p>Topics include the history of occupational epidemiology, causal models, occupational exposure classification systems, environmental epidemiology, cohort mortality studies, cross-sectional surveys, case-control studies, ecologic studies, and statistical and methodological issues in research design and their solutions.</p>

WGSS	WGSS 5315 Gender and Culture	Anthropological perspectives on the analysis of gender with special focus on dynamics of gender, culture, and power.
WGSS	WGSS 5333 Topics in the History of American Women	Instructor Consent Required.