Level	Department	Subject	Prefix	Number	Title	Credit	Sustainabili	Course Description	Additional Supporting Information
Undergrad	Biology & Biotechnology	Biology/Biotechnology	BB	1002	ENVIRONMENTAL BIOLOGY	1/3	Focused	This course is designed for students seeking a broad overview of ecological systems and the effect of humans on the ecosystems. It provides an introduction to natural ecosystems, population growth, and the interaction between human populations and our environment. It is conducted in an active style including the use of case studies, class discussion/participation, and classroom polling systems. The major goal of this course is to help students become more informed environmental citizens, skeptical when presented with data in the media, and knowledgeable enough to question and make informed decisions about the environment. It will primarily focus on current topics but areas of discussion likely to be covered include ecosystems, populations, biodiversity, pollution, environmental economics and climate change.	
Undergrad	Biology & Biotechnology	Biology/Biotechnology	BB	1045	BIODIVERSITY	1/3	Inclusive	Through lectures, readings, and discussions this course will examine the breadth, patterns, mechanisms, and conservation of biodiversity. Case studies and peer-to-peer learning will be used to examine threats to regional and global biodiversity and assess management and engineering strategies for solutions to the biodiversity crisis. Students will investigate and interpret past and contemporary research to quantify, document, and track trends in biodiversity. This course will use problem sets and assignments to explore the natural, social, and economic tradeoffs associated with threats to and conservation of biodiversity. Students will develop an area of expertise and synthesize their comprehension of topics through project work (e.g. management plan, report, presentation, citizen science). Finally this course will provide a synthesis of the interdisciplinary nature of biodiversity conservation and how principles of conservation biology, landscape ecology, metapopulation biology, and biogeography can be applied to strategies aimed towards sustaining Earth's biota.	
Undergrad	Biology & Biotechnology	Biology/Biotechnology	BB	2040	PRINCIPLES OF ECOLOGY	1/3	Inclusive	This course is intended to help students understand ecological concepts at different levels of integration, from individuals to ecosystems, and the linkages among them. Students will also practice the application of qualitative and quantitative models to ecological systems and processes, as well as hypothesis generation, experimental design, and analysis and interpretation of data. In a format that includes team-based case studies, discussion and presentations, and ecological simulations, students will explore topics in both basic and applied ecology, which may include population ecology, host-parasite ecology and epidemiology, climate change, and sustainable agriculture, among others.	
Undergrad	Biology & Biotechnology	Biology/Biotechnology	BB	2904	ECOLOGY, ENVIRONM, & ANIM BEH\	1/6	Inclusive	The lab exercises in this course are designed to provide foundation skills needed for the study of living organisms and systems at the both the organismal and molecular scales. Students will gain experience with procedures, equipment, techniques and skills common to all areas of biology. In particular this course will focus on: Observing, recording, understanding, and analyzing animal behaviors Environmental and Ecological assessment and sampling Observations of population dynamics .	
Undergrad	Biomedical Engineering	Biomedical Engineering	BME	4300	MQP CAPSTONE DESIGN	1/6	Inclusive	This course guides students through the engineering design process during the first term of their MQP to aid them in fulfilling their capstone design requirement. The course focuses on developing a revised client statement based on the objectives, constraints, and functions of the design. Methods for concept generation, concept selection and development strategy will be covered. In addition, project planning tools, business plans, ethics, and design for manufacturability and sustainability will be covered.	
Undergrad	Business	Entrepreneurship	ETR	290X	SOCIAL ENTREPRENEURSHIP	1/3	Inclusive	This course will introduce students to the concept of social entrepreneurship and the ways in which social entrepreneurs are addressing complex social problems with their entrepreneurial ventures. Students will be exposed to the challenges and rewards of running a social enterprise. They will learn valuable business and entrepreneurial tools that can be applied to the design of sustainable social business models. Topics include social opportunity recognition and evaluation, business models in the social sector, social impact assessment, the double-bottom line, scalability of solutions, organizational forms and structures, and social venture financing.	
Undergrad	Business	Organizational Behavior and	OBC	4366	LDRSHP, ETHICS, & SOCL ENTRPRN	1/3	Inclusive	This upper level course considers the essence of leadership from the perspective of leadership theory, self-inquiry, ethics, and social entrepreneurship. Social entrepreneurship pertains to the creation of social value through innovative solutions to complex, challenging social problems. This course will invite students to think about themselves as ethical leaders who can lead innovation in the context of limited resources and high to moderate risk. Lecture, video presentations, case studies, guest speakers, field work, and mini-projects are used to engage students in these course topics.	
Undergrad	Chemical Engineering	Chemical Engineering	CHE	3702	ENERGY CHALLENGES IN THE 21ST CI	1/3	Focused	The goal of this course is to prepare students for future work in energy-related fields by providing an overview of the challenges related to energy production. Students will study several major energy systems. The details of such energy systems will be examined using engineering principles, particularly focusing on relevant chemical processes. For example, the details and processes of a typical power plant or a refinery will be examined. Students will also become familiar with environmental and economic issues related to energy production. Topics to be covered may include: fossil fuels, the hydrogen economy, biofuels, nuclear energy, fuel cells, batteries, and the electricity grid.	
Undergrad	Chemical Engineering	Chemical Engineering	CHE	4402	UNIT OPERATIONS IN CHEM ENG II	1/3	Inclusive	Laboratory projects include experiments in heat and mass transfer such as: heat transfer in two heaters and a cooler, climbing film evaporation, multiple effect evaporation, absorption, extraction, distillation and rotary drying of solids.	Students conduct experiments to measure the reaction rate and activation energy for the transesterification reaction to make biodiesel from vegetable oil. Students also learn how to recover excess methanol and purify the biodiesel.
Undergrad	Chemical Engineering	Chemical Engineering	CHE	4404	CHEMICAL PLANT DESIGN PROJECT	1/3	Inclusive	Application of Chemical Engineering design principles to the design of a major chemical plant. Students work in groups to produce a preliminary practical process flowsheet, equipment and plant design, and economic analysis.	In this capstone design project, students address design aspects that affect energy use, plant life, land use and material resources.
Undergrad	Chemical Engineering/Civil Eng	Chemical Engineering/Civil E	CHE/CE	4063	TRANSPORT & TRANSFORMATIONS I	1/3	Inclusive	In this course, students will learn to make quantitative relationships between human activities and the effects on water, soil, and air in the environment. Students will learn the scientific and engineering principles that are needed to understand how contaminants enter and move in the environment, how compounds react in the environment, how to predict their concentrations in the environment, and how to develop solutions to environmental problems. Topics to be covered may include water quality engineering (including microbial interactions), air quality engineering, and hazardous waste management.	
Undergrad	Chemistry & Biochemistry	Chemistry & Biochemistry	CH	3410	PRINCIPLES OF INORGANIC CHEM	1/3	Inclusive		Towards the end of this course, several class meetings deal with the applications of transition metals as catalysts to enable lower energy and new chemical processes. The research in the Emmert lab at WPI is also presented, which uses sustainable metrics to develop more sustainable processes.

Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	2023	INTRO TO ARCHITECTURAL ENGIN	1/3	Inclusive	The objective of this course is to introduce the functional parts and systems that make up a building as well as their interactions in delivering required sustainable performance. It encompasses foundations, structures, building enclosures, heating and air conditioning, electrical, plumbing and fire safety systems as well as concepts of building performance and aspects of pertinent building codes and standards. This course, in addition, incorporates basic principles of building science and green construction.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3001	ARCHITRL GRAPHICS & COMMUNICT	1/3	Inclusive	With this course, students develop an understanding of the architectural design process and the graphic means for communicating and exchanging design content during the execution of a building project. The course covers the following topics: Nature of design (problems, solutions and process), building siting and orientation aimed at reducing energy requirements, architectural drawings (plans, elevations and cross sections), isometric projections and detail drawings.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3002	ARCHITECTURAL DESIGN	1/3	Inclusive	This course is designed to further the student's knowledge in the process of architectural design through the studies of ideas, principles and methods of design. The concepts are explored with the completion of a project, including a residential or a commercial project, which at its completion, will be reviewed by invited guest critics. The course emphasizes the development of form, space, spatial relationships, materials, and architectural presentation techniques through the use of computer graphics. It introduces principles of passive approaches to reduce energy consumption. It also covers building codes in the design process.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3003	PRINCIPLES OF HVAC SYST DESIGN	1/3	Inclusive	The course introduces principles and applications of mechanical systems that are required for environmental comfort, health, and safety of building occupants with a focus on energy efficiency and conservation. Topics include psychometrics, thermal comfort, building heating and cooling loads, fluid flow basics, HVAC components and systems, building envelop heat transfer, and energy requirements. In the course, students develop the ability to design and conduct computational modelling experiments and to analyze and interpret output data for selection between system alternatives in order to optimize energy use.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3005	LIGHTING SYSTEMS	1/3	Inclusive	This course focuses on the design of illumination systems in buildings. It provides a general introduction to the visual environment, including subjective and objective scales of measurement, visual perception, photometry, brightness, luminance, illumination, natural and artificial lighting. Other topics include photometric units, light sources, daylight luminaries, lighting quality, light loss factors, average luminance calculations (lumen method), point-by-point calculations, performance impacts, and ethics. Field measurements and computer simulations are used to explore some major aspects of architectural illumination systems. Design problems are solved by considering economic evaluation, energy saving criteria and applicable standards and building codes.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3006	ADVANCED HVAC SYSTEM DESIGN	1/3	Inclusive	Analysis of heating and cooling load requirements, considering building construction type, geometry, infiltration, occupancy effects, and daily load variations. Heating design addresses water heating systems, electrical heating, central heating, heating of low and high-rise buildings, selection of heaters, boilers, pumps, piping design. Cooling design addresses refrigerants, refrigeration cycle, evaporator, compressor, condenser, thermostatic expansion valves, refrigeration system control equipment, motor and motor control equipment, refrigeration accessories, calculation of refrigeration piping and absorption systems. Computer applications for heating and cooling load analysis will be introduced to develop energy saving solutions. Analytical techniques and building codes are discussed through case studies and design projects.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3025	BUILDING ENERGY SIMULATION	1/3	Inclusive	The course addresses the basic principles of building energy simulation, with a focus on the practical applications of building energy simulation tools to building design. Topics being covered include various model input parameters such as building geometry, orientation, climate, comfort, zoning, material properties, operation schedules, and HVAC systems. Building energy simulation software packages are illustrated and applied to the analysis of various case studies of buildings. Simulation output results are critically analyzed and compared to the results obtained from other building energy calculation methods.
Undergrad	Civil & Environmental Engineer	Architectural Engineering	AREN	3026	BUILDING ENVELOPE DESIGN	1/3	Inclusive	The course presents the basic principles of building envelope design, focusing primarily on its functional performance requirements and practical constructability aspects. Various building envelope systems are discussed and analyzed through case studies. Lecture topics include façade and roofing systems made of masonry, stone, concrete, timber, glass, and various metals. In addition, more complex building envelope strategies such as double skin facades, passive solar design, and building automation approaches, are discussed. The course includes design exercises and a case study project.
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3022	LEGAL ASPECTS IN DES. & CONST.	1/3	Inclusive	The course focuses on the legal underpinnings that regulate the design and execution of construction projects and the relations between their participants. The subject is presented according to the various phases of a construction project, from inception to handover. The overall objective is to develop an awareness of the legal aspects that regulate the exercise of the architectural and civil engineering profession and of the environmental constraints of construction. Topics such as permitting process, design/engineering services and ethical issues are included.
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3025	PROJECT EVALUATION	1/3	Inclusive	In this course students are provided with a systematic framework for evaluating the economic sustainability and financial aspects of a building investment through its life cycle: project definition, design, construction and operation. The course develops according to several interrelated topics: budgeting (square foot cost and parametric estimating) and economic feasibility analysis, financing mechanisms, cash flow analysis, (time-value -of -money factors, present worth and rate of return), life-cycle assessment (environmental impact analysis), taxes, depreciation and regulations as well as consideration of risks and uncertainties.
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3026	MATERIALS OF CONSTRUCTION (WI)	1/3	Inclusive	This course provides an understanding of the use and acquisition of engineering properties of construction materials. Topics include relationships between the structure of materials, their engineering properties, and the selection of suitable materials for applications involving strength, durability, and serviceability. Experimental laboratory procedures including design of experiments, data collection, analysis, and representation, and report writing are an integral part of the work.
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3059	ENVIRONMENTAL ENGINEERING	1/3	Focused	This course provides an introduction to engineering aspects of environmental quality control. Students will learn fundamental science and engineering principles needed for environmental engineering, including concepts in chemistry, biology, physics, mass conservation, kinetics and reactor design. These principles are then applied to environmental engineering problems, including modeling of pollutants in natural systems and design of unit processes in engineered systems. Topics covered include environmental regulations, surface and ground water quality, drinking water treatment, wastewater treatment, air pollution, and hazardous waste management.
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3060	WATER TREATMENT	1/3	Focused	This course provides in-depth coverage of processes used in water treatment. Topics include: review of water chemistry and drinking water standards, impurities in natural waters, aeration, water softening coagulation, flocculation, sedimentation, filtration, disinfection, taste and odor control, corrosion control, and iron and manganese removal.

Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3061	WASTEWATER TREATMENT	1/3	Focused	This course provides in-depth coverage of processes used in wastewater treatment. Topics include: review of water quality standards, wastewater characteristics, application of biochemical oxygen demand, sources and effects of pollution, physical, chemical, and biological wastewater treatment processes, and waste sludge management.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3062	HYDRAULICS	1/3	Inclusive	This course provides a background for applying the principles of fluid mechanics to analyze and design hydraulic and fluid flow systems for projects related to water resources and civil and environmental engineering. Topics include hydraulics in pipes and closed systems, open channels and rivers, water supply systems and water distribution networks, pump systems and turbines, wastewater collection and treatment systems, and coastal and other natural environmental systems. Course content includes water quality and energy considerations, as well as the development and application of hydraulic models.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3070	URBAN & ENVIRONMNTL PLANNG	1/3	Focused	This course introduces to the student the social, economic, political, and environmental factors that affect the complex relationship between the built and natural environment. By using the principles of sustainable development and the procedures of planning, the optimal development pattern may be examined, and the infrastructure (roads, water supply systems, waste-water treatment systems, shopping malls, etc.) necessary to support present and future growth patterns may be determined. The information necessary in planning, which involves conscious procedures of analysis, formulation of alternative solutions, rational assessment and deliberate choice in accordance with evaluation criteria, is obtained through extensive reading. As such, the course introduces a variety of topics of concern to engineers and environmental scientists.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	3074	ENVIRONMENTAL ANALYSIS	1/3	Focused	This course provides a background in the principles and techniques of assessing areas of natural environment and applying environmental assessments to evaluate the inherent suitability of these areas for sustainable urban and resource-based uses. Topic areas include basic concepts in sustainability, landscape characterization and analysis, and environmental impact assessment and planning. The concepts and techniques developed in this course are useful for land use planning, site design, natural resources management, and the determination of the impact of engineering projects on the environment.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	4060	ENVIRONMENTAL ENG. LABORATOR'	1/3	Focused	This course familiarizes students with the laboratory studies used to obtain the design parameters for water and wastewater treatment systems. The topics include laboratory experiments dealing with physical, chemical, and biological treatment systems.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	4061	HYDROLOGY	1/3	Inclusive	This course introduces the concepts and principles governing the distribution and transport of water in the environment, and also provides a background for quantifying hydrologic processes as required for the development of water resources projects. Topics include the hydrologic cycle, precipitation, evaporation and transpiration, infiltration, runoff analysis, streamflow, hydrologic routing, statistics and probability in hydrology, and the quantification of hydrologic processes for water quality protection. The course introduces field techniques and the use of hydrologic models for solving problems in water resources and hydrology.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	4071	LAND USE DEVEL & CONTROLS (WI)	1/3	Inclusive	The purpose of this course is to provide an understanding of the regulatory framework under which land is developed and the built environment is designed. The quality of our environment depends upon the development which is permitted to take place and the controls which direct that development. Through this course, the student will learn the principles, methods, and techniques which a planner or engineer may use to plan and design the highest and best uses and development of land. In particular, the use and limits of zoning, special permits, subdivision control, and other tools with which a developer or planner should be familiar will be examined in detail.	
Undergrad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	4600	HAZARDOUS AND INDUSTRIAL WAST	1/3	Focused	This course will cover concepts and techniques for handling hazardous and industrial wastes. Regulations governing hazardous waste, water & soil remediation concepts, and the fundamentals of waste treatment processes will be discussed. Instruction will be provided through lectures, fieldtrips, practitioner seminars, and class problem solving sessions.	
Undergrad	Civil & Environmental Engineer	Geosciences	GE	2341	GEOLOGY	1/3	Inclusive	Students of this course will examine the fundamental principles of physical geology including the materials, structures, and surface features of the earth and the processes which produced them. Emphasis will be placed on the interrelationship of people and environment and applications to various fields of technology. The course includes field trips and a significant laboratory component.	
Undergrad	Electrical & Computer Enginee	Electrical and Computer Eng	ECE	3500	INTRO CONTMPRY ELEC POWR SYSTI	1/3	Inclusive	This course introduces basic concepts underlying the current and future methods of generation, transmission, storage, and use of electric energy. Beginning with an historical overview of the electric power system that has served well for more than 100 years, the course provides an introduction to the fundamental engineering principles underlying the design and implementation of traditional as well as modern electric power systems. Energy sources including thermal (combustion, nuclear, geothermal), solar, wind, and chemical (fuel cells) are presented, along with the environmental impacts. Concepts of three-phase systems, transmission and distribution of power, economic and regulatory aspects, as well as communications, protection, and control systems are included.	This course provides broad coverage of distributed and renewable electricity generation, energy storage, and electric vehicles.
Undergrad	Humanities & Arts	English	EN	2237	LITERATURE AND THE ENVIRONMEN	1/3	Inclusive	This course will examine the many ways in which dramatists, essayists, filmmakers, novelists, and poets have articulated ecological and environmental concerns. Topics to be discussed may include changing attitudes towards terms like 'nature' and 'wilderness', the effects of technology on the environment, issues of conservation and sustainability, the dynamics of population growth, the treatment of animals, the production of food, and the presence of the spiritual in nature. Materials will include works by writers such as Wendell Berry, Rachel Carson, Winona LaDuke, Wangari Maathai, Thomas Malthus, Arne Naess, Nicolas Roeg, and Gary Snyder.	
Undergrad	Humanities & Arts	History	HI	2332	HIST OF MODRN AMER SCI & TECHN	1/3	Inclusive	This course surveys American science and technology from 1859 to the present. Topics may include: Darwinism and Social Darwinism; scientific education; positivism and the growth of the physical sciences; the new biology and medicine; conservation, the gospel of efficiency and progressivism; science, World War I and the 1920s; the intellectual migration and its influence; science technology and World War II; Big Science, the Cold War and responses to Big Science; and cultural responses to science and controversies about science.	
Undergrad	Humanities & Arts	History	HI	2401	U.S. ENVIRONMENTAL HISTORY	1/3	Inclusive	This course surveys the environmental history of North America from the time of Columbus until the present, exploring how the environment has shaped human culture, and how human activity and human ideas have shaped nature. We will examine changes during three periods: a "contact" period focusing on the ecological, economic and cultural ramifications of Old World-New World interconnection; a "development" period focusing on the rise of a market-based, urban-industrial society during the nineteenth century; and a final period characterized by the growth of reform movements to protect nature and the increasing global movement of goods and ideas in the twentieth century. In each period, we will trace changes in production, labor, and consumption patterns; transportation and other technologies; science, knowledge, and planning; disease, health and medicine; and cultural understandings, political debates, and place-making strategies.	

Undergrad	Humanities & Arts	History	HI	2403	GLOBAL ENVIRONMENTAL HISTORY	1/3	Focused	This course will introduce students to global environmental history, a field that examines how the environment has shaped human society, and the effects of human activity and human ideas on non-human nature. The course will trace human history from hunter-gather societies to the present, addressing changes in production, trade, and consumption patterns; transportation and other technologies; science, knowledge, and planning; disease, health and medicine; and cultural understandings, political debates, and place-making strategies.	
Undergrad	Humanities & Arts	History	HI	3317	TOPCS IN ENVIRONMENTAL HISTORY	1/3	Inclusive	In this seminar course, students will explore one aspect of U.S. or global environmental history in more depth. Topics vary each year but may include environmental thought, environmental reform movements, comparative environmental movements, natural disasters, the history of ecology, built environments, environmental justice, New England environmental history, or the environmental history of South Asia or another region of the world.	
Undergrad	Humanities & Arts	History	HI	3335	TOPICS IN THE HISTORY OF NON-WE	1/3	Inclusive	A seminar course on the relationships among science, technology, and society from cultures outside Europe and North America, examined through a series of case studies. Topics from which the case studies might be drawn include: Chinese medicine and technology; Arabic mathematics, medicine, and astronomy; Indian science and technology (including, for example, metalworking and textile production); Mayan mathematics and astronomy; Polynesian navigation; various indigenous peoples' sustainable subsistence technologies (e.g. African agriculture, Native American land management, aboriginal Australian dreamtime).	
Undergrad	Humanities & Arts	History	HI	3343	TOP; IN ASIAN HIST REENG CHINA	1/3	Inclusive	This seminar course examines topics in the cultural, socio-economic, religious and political history of East Asia. Topics vary each year and may include the following: nationalism and the writing of history, travel and exploration narratives, cross-cultural contact, the role of religion and ideology in political history, development and the environment in Asia, film and history, and the place of minorities and women in Asian societies.	This course focuses on sustainability of China's growth by examining urbanization, economic growth, consumerism, energy demands and solutions, and environmental degradation in order to assess the mega project approach taken by PRC government to tackle these issues.
Undergrad	Humanities & Arts	International and Global Stu	INTL	2910	TOPICS IN GLOBAL STUDIES	1/3	Inclusive	This seminar course takes an interdisciplinary approach to historical and contemporary topics in global studies. Topics vary each year and may include international development, global inequality and justice, global public health, war and terrorism, international organizations and governance, humanitarianism and human rights, travel and tourism, the Anthropocene, climate change.	
Undergrad	Humanities & Arts	Philosophy	PY	2711	PHIL THEORIES OF KNOWLEDGE	1/3	Inclusive	The course provides an introduction to some key problems in epistemology and metaphysics. Epistemology is the branch of philosophy inquiring into the nature and conditions of knowledge and truth. Epistemologists ask such questions as: How should we define knowledge? How has the being of nature and knowledge of nature been represented in Western philosophy and science? Is knowledge objective? What constitutes adequate justification for holding a belief? Are different kinds of bodies treated as differently credible in terms of knowledge production? Is it even possible to know anything about the world at all? Metaphysics explores questions concerning the nature and structure of reality, such as: What is the self? Do souls exist? How important are categories such as gender, race, class, and sexuality in forming our identities? Does God exist? Is reality material, immaterial, or a combination of both? What is time? Am I the same person today that I was yesterday? What kind of a phenomenon is mind or thought and can entities in addition to human beings, such a computers, be said to have this attribute? Students will explore questions such as these and others as they submit their beliefs about the nature of knowledge and reality to philosophical examination. Recommended Background: PY/RE 1731, Introduction to Philosophy and Religion.	Among other things, the course examines the transition from Aristotelian to Cartesian metaphysics, showing how the rise of a mechanistic conception of the natural world made possible the instrumental use, and subsequent destruction, of that world.
Undergrad	Humanities & Arts	Philosophy	PY	2712	SOCIAL AND POLITICAL PHILOSOPHY	1/3	Inclusive	What is the scope of the current environmental crisis? What does this crisis reveal about the philosophical presuppositions and dominant values of our intellectual worldviews and social institutions? How can existing social theories help explain the environmental crisis? What implications does the crisis have for our sense of personal identity? What moral and spiritual resources can help us respond to it? Readings will be taken from contemporary and historical philosophers and naturalists.	
Undergrad	Humanities & Arts	Philosophy	PY	2717	PHILOSOPHY & THE ENVIRONMENT	1/3	Focused	What is the scope of the current environmental crisis? What does this crisis reveal about the philosophical presuppositions and dominant values of our intellectual worldviews and social institutions? How can existing social theories help explain the environmental crisis? What implications does the crisis have for our sense of personal identity? What moral and spiritual resources can help us respond to it? Readings will be taken from contemporary and historical philosophers and naturalists	
Undergrad	Humanities & Arts	Philosophy	PY	2719	PHILOSOPHY OF SCIENCE	1/3	Inclusive	This course is an in-depth consideration of the meaning, value, and consequences of scientific inquiry. Questions explored may include: Does science yield truth? Are the results of scientific inquiry more a reflection of the workings of the human mind than of those of the external world? Do pivotal scientific concepts like gene, electron, photon, species, and ecosystem point to entities that actually exist? Does the history of science, which includes many refutations of theories once believed to be true, raise questions about whether currently accepted theories should be trusted? By what methods does a scientific community validate knowledge claims and how are these processes affected by social, political, and economic contexts? Does a scientist have a responsibility to conduct morally conscientious research? How does the development of technology affect our spiritual and moral characters? In what ways is science similar to religion and in what ways is it different? The focus of this course may vary each time it is offered from an examination of science in general to an investigation of the foundations of specific branches of science such as physics, biology, environmental science, or social science.	
Undergrad	Humanities & Arts	Philosophy	PY	2731	INTRODUCTORY ETHICS	1/3	Inclusive	This course will review at an introductory level theories of ethics, individual figures in the history of ethics, and selected problems in ethics. The emphasis will be on philosophical or religious ethics depending on the instructor.	
Undergrad	Humanities & Arts	Philosophy	PY	3711	TPCS PY: Capitalism & Critics	1/3	Inclusive		The subject of this course is capitalism as a world system. A prominent section of the course addresses the role of capital accumulation in ecological destruction.
Undergrad	Humanities & Arts	Philosophy	PY	3712	PHILOSOPHY OF RELIGION	1/3	Inclusive	This course will focus on philosophical questions concerning the following topics: the existence and nature of God; the compatibility of God and evil; the nature of religious faith and the relationship between religion, science and ethics; interpretations of the nature of religious language; the philosophically interesting differences between Western and Eastern religions; philosophical critiques of the role of religion in social life. Authors may include: Hume, Kant, Kierkegaard, Buber, Tillich, Daly, Nietzsche and Buddha.	This course includes discussion of religious enviornmentalism
Undergrad	Humanities & Arts	Philosophy	PY	3731	PESP:Ethical Questns -Our Time	1/3	Inclusive	This course will examine in depth selected problems in ethical theory and social philosophy. The specific content or emphasis will be determined by the instructor.	Some sections of this course consider debates over why endangered species should be protected, as well as debates about ethical responsibilities surrounding climate change.

Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES - IQP ALBANIA (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Albania has many needs, and in addition to environmental projects, we are planning projects in education, tourism and business. For example, we will work with the Harry Fultz School, a pre-engineering high school in Tirana, to introduce programs such as robotics or game design. An example of an agro-business project involves the sustainability of harvesting medicinal herbs from Albania's forests, as this is an expanding industry.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SCIAL SCI RES-IQP(BAR HRB)(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Bar Harbor Projects have a strong focus on the relationship and intersection between the humanities, technology, the arts, and the environment. Within this context, projects involve research and creative activities intended to offer insight into the preservation, improvement, appreciation, and sustainability of the natural environment.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES-IQP CAPETOWN (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Cape Town projects focus on sustainable community development in historically disadvantaged communities, including informal settlements where people live in shacks, without adequate provision of basic services. In the past, we have conducted exciting projects with local partners on themes such as sustainable water and sanitation, energy, early childhood development, micro-business, multimedia communications, urban planning and mapping, and sport and recreation.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES-IQP COSTA RICA(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Costa Rica's unique environment provides students opportunities to focus on environmental conservation and sustainable development by working with government agencies dedicated to those issues and with selected museums and private organizations.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOCIAL SCI RES-IQP CHINA (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Hangzhou projects will provide students first-hand experience on how Chinese organizations approach and tackle issues like green energy, urban housing, sustainable development, historical preservation, education, water challenges, and environmental degradation. Potential sponsors include government ministries, universities, corporations, and NGOs. We anticipate IQPs will deal with sustainable urban development, a greener environment, sustainable resource use, education reform, and other topics as appropriate.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SCL SCI RES-IQP HONG KONG (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	In Hong Kong, WPI works with a number of educational, social service, policy and environmental organizations and institutions. Sponsors have included Friends of the Earth, Worldwide Fund for Nature (WWF), and the Business Environment Council. Examples of past projects include evaluating how to increase recycling of beverage containers and vehicle tires, identifying how to reduce light pollution, investigating how to make Hong Kong's fishing industry more sustainable and evaluating how best to develop the waterfront and marine areas of Victoria Harbour.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOCIAL SCI RES-IQP(MORCCO)(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	IQP projects address issues of water conservation and alternative agriculture in the Middle Atlas countryside, promoting eco-tourism, developing the artisanal industry in textile weaving and mosaic tiles, restoration of historic Kasbah in Fes and Rabat and Roman ruins at Volubilis, financial support for orphans.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES-IQP DENMARK (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	IQP projects in Denmark span a wide range of topics, with an emphasis on environmental issues and technology for people with disabilities. Alternative transportation, food quality, technology to assist visually impaired people with disabilities are all topics of great interest to both the public and private sector.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES-IQP AUSTRALIA (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	IQPs at this center often involve sustainability themes

Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOCIAL SCI RES-IQP INDIA (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	IQPs in Mandi, India will involve diverse collaboration with the IIT students and faculty, with community agencies, and with NGOs on issues of local interest. Likely topics will feature the social and environmental dimensions of city infrastructure, rural resources including land use and water quality, and community resilience in mountain regions.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SCL SCI RES-IQP NEW ZEALND(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	IQPs in Wellington involve diverse collaboration with government organizations and with NGOs in New Zealand on issues related to environment, technology and society. 2013 Projects focused on environmental issues (endangered species at Zealandia, a conservation wildlife area; tsunami emergency planning), museums (visitor engagement analyses and exhibitions), innovation and entrepreneurship for the greater Wellington region, and outreach for a community radio station at Victoria University.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOCIAL SCI RES-IQP(BOSTON)(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Most projects will address environmental issues, with a focus on sustainability, climate change adaptation, and public health. Projects typically include field work in the city's neighborhoods and in the greater Boston area. Some projects sponsored by state or federal agencies may address regional issues. The focus on sustainability and climate change reflects their growing importance for government agencies and private organizations at all levels. Past projects include: a plan for the reduction of neighborhood disruption during the work on the Big Dig (for the North End Neighborhood Association); an analysis of the impacts of Historic Districts on surrounding neighborhoods and a method of streamlining construction permits in those districts (for the Boston Landmark Commission); adapting to seal level rise in the Boston Harbor area (The Boston Harbor Association) effects of sea level rise on water and wastewater treatment in Massachusetts (Massachusetts Department of Environmental Protection); green building policies in Newton (City of Newton); the improvement of public safety through the inventory and mapping of all underground fuel tanks (for the Boston Fire Department), as well as yearly projects for the Museum of Science and for various departments of the cities of Boston, Cambridge, Brookline, Quincy and Newton.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES-IQP NAMIBIA (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Namibia's well-developed government agencies at both the national and municipal levels will sponsor many of the projects, and these projects will generally focus around issues of sustainable development. In particular, projects typically investigate alternative energy sources, improved water and sanitation management, improved preventive health education, low- income housing, micro-level income generating activities and tourism development. Local towns and peri-urban informal settlements will be the venue of some of the projects.
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES-IQP NANTUCKET (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Nantucket is a high-end, tourist destination in the summer when approximately 40,000 tourists visit the island and draw on the island's limited resources. This historic site is deeply committed to historic preservation and museum studies. and the Island is an environmentally-sensitive site where much of the land is protected and where problems such as beach erosion and invasive species have created new challenges. As such, projects tend to focus on environmental challenges (e.g., waste management, tourism impacts, sustainability) and on museum studies (e.g., providing information and maps to tourists; making museum information more accessible to the public).
Undergrad	Interdisciplinary & Global Stud Interdisciplinary	ID	2050 SOC SCI RES - IQP BANGKOK (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Project themes often center on health and human services, community development, sustainable development and appropriate technology, and environmental issues.

Undergrad	Interdisciplinary & Global Stud	Interdisciplinary	ID	2050	SOC SCI RES-IQP PUERTO RCO(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Projects are completed in teams and span a wide variety of topics including the environment, public health, housing, social welfare, transportation, and land use.
Undergrad	Interdisciplinary & Global Stud	Interdisciplinary	ID	2050	SOC SCI RES-IQP SANTA FE (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Projects concentrate on three main areas: Water Conservation, Renewable Energy and Urban Planning.
Undergrad	Interdisciplinary & Global Stud	Interdisciplinary	ID	2050	SOCIAL SCI RES-IQP VENICE (WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	Since the founding of the VPC in 1988, the IQPs in Venice provide an opportunity for students to see the implementation of their projects for the benefit of an entire city. Projects are conducted for Venetian, American and international organizations and include environmental, socioeconomic, artistic, cultural, and technical concerns important to the revitalization of this historic city. The over 120 projects completed in Venice include: studies on aspects of the Canals of Venice; which resulted in the publication of a book under the auspices of UNESCO; a number of projects on the preservation of Venetian art; several environmental studies on the lagoon ecosystem, which are contributing to the creation of a Lagoon Park; a variety of projects for the improvement of the urban quality of life in the city and the lagoon islands, which have resulted among other things, in the re-engineering of the Venetian cargo delivery system and the design of a vacuum sewer system to prevent discharges in the city's canals.
Undergrad	Interdisciplinary & Global Stud	Interdisciplinary	ID	2050	SOC SCI RES -IQP WORCESTER(WI)	1/3	Inclusive	This course is open to students accepted to off-campus IQP centers and programs. The course introduces students to research design, methods for social science research, and analysis. It also provides practice in specific research and field skills using the project topics students have selected in conjunction with sponsoring agencies. Students learn to develop social science hypotheses based upon literature reviews in their topic areas and apply concepts drawn from social psychology, anthropology, sociology, economics and other areas as appropriate. Students make presentations, write an organized project proposal, and develop a communication model for reporting their project findings.	The Worcester Community Project Center (WCPC CEER) - develops projects around three main themes: 1) environmental justice, 2) environmental policy, often focusing on water policy, and 3) social justice.
Undergrad	Mechanical Engineering	Mechanical Engineering	ME	4821	PLASTICS	1/3	Inclusive	This course develops the processing, structure, property, performance relationships in plastic materials. The topics covered include polymerization processes, chain structure and configuration, molecular weights and distributions, amorphous and crystalline states and glass rubber transition. The principles of various processing techniques including injection molding, extrusion, blow molding, thermoforming and calendaring will be discussed. The physical and mechanical properties of polymers and polymer melts will be described with specific attention to rheology and viscoelasticity. Pertinent issues related to environmental degradation and recyclability will be highlighted.	
Undergrad	Mechanical Engineering	Mechanical Engineering	ME	4860	FOOD ENGINEERING	1/3	Inclusive	An introductory course on the structure, processing, and properties of food. Topics covered include: food structure and rheology, plant and animal tissues, texture, glass transition, gels, emulsions, micelles, food additives, food coloring, starches, baked goods, mechanical properties, elasticity, viscoelastic nature of food products, characteristics of food powders, fat eutectics, freezing and cooking of food, manufacturing processes, cereal processing, chocolate manufacture, microbial growth, fermentation, transport phenomena in food processing, kinetics, preserving and packaging of food, testing of food.	
Undergrad	None - basic engineering backg	Engineering Science	ES	2800	ENVIRONM IMPACTS OF ENGIN DEC	1/3	Focused	Engineering decisions can affect the environment on local and global scales. This course will introduce students to concepts that will make them aware of the ramifications of their engineering decisions, and is intended for engineering students of all disciplines. Specific topics the course will cover include: environmental issues, waste minimization, energy conservation, water conservation and reuse, regulations (OSHA, TSCA, RCRA, etc.), lifecycle assessment, risk assessment, sustainability, design for the environment, and environmental impact statements. Energy and mass balances will be applied to activities that impact the environment.	
Undergrad	None - Dean's Office	First Year	FY	1100	GPS:FOOD SUSTAINABILITY	1/3	Focused	Food is hot! Free range chickens, locavores in San Francisco, organic veggies, frankenfoods, high fructose corn syrup – all topics in the news. Can we feed the world? Does use of ethanol in gasoline cause food shortages? What are the dangers and benefits to genetic engineering of food plants? Learn about and work to solve the current paradoxes of our food situation – the malnutrition of too little AND too much food: deprivation and obesity. What solutions are there – political, economic, biological and chemical?	
Undergrad	None - Dean's Office	First Year	FY	1100	GPS: LIVABLE CITIES	1/3	Focused	This Great Problems Seminar addresses the possibilities and liabilities of human life in the urban environment. As an increasing proportion of the world's population becomes urban, the possibilities for human achievement and the particular difficulties encountered in city life become more pressing. Through lectures, readings, discussion, and group projects this course will examine the interdisciplinary topics of urban ecology, environmental justice, city design and planning, and gentrification as they relate to urban landscapes. Urban sprawl can pose many threats to the environment, and we will examine ecological conditions (e.g., land use, pollution, heat island), patterns (e.g., changes in diversity), and processes (e.g., invasion of non native species) associated with urbanization. We will use lessons from ecology, case studies, and peer-to-peer learning to develop an understanding of historical global and local urban trends (e.g., Levittowns, urban village community). Students will investigate the role of the emerging fields of new and ecological urbanism as a way to increase sustainability and restore natural environments in urban settings. Additionally, students will develop an area of expertise in one problem of urban living and research, present, and propose sustainable solutions.	

Undergrad	None - Dean's Office	First Year	FY	1100	GPS:BIOSPH,ATMOSPH,HUMAN FEAI	1/3	Focused	In this course we will explore the complex ecological challenges faced in today's world. We will examine causes, trends, impacts, and solutions to land use changes, climate variability, loss of habitat and biodiversity, and other similar ecological problems from scientific, social, ethical, philosophical, and technological perspectives so as to gain a more complete picture of such challenges and possible ways of addressing them.
Undergrad	None - Dean's Office	First Year	FY	1100	GPS: POWER THE WORLD I	1/3	Focused	Every community faces energy problems. Solutions to these problems always involve positive and negative consequences. Fossil fuels currently dominate the energy landscape but involve impacts that are becoming less and less acceptable. Renewable sources of energy, like wind and solar, are gaining traction but present a whole new set of challenges. This course investigates the depth and breadth of energy production, transmission and use. It explores the technical, social, economic and environmental effects and challenges of power generation.
Undergrad	None - Dean's Office	First Year	FY	1100	GPS: THE WORLD'S WATER I	1/3	Focused	Explores the social, political, technical, and environmental dimensions of our looming water crisis. This course prepares students to analyze problems and seek sustainable and equitable solutions to a variety of water challenges. Changing climate and increased development are compromising many water resources around the world. Water scarcity is on the rise in many places due to drought and overuse. In addition, many water bodies are becoming contaminated as a result of various human activities. At the same time, natural systems that purify and protect our water resources are increasingly at risk. It is time to rethink our water use practices and polices regarding what we discharge into our water bodies as well as what we use to hydrate our own bodies and communities. Topics this course will cover include water as a human right, water pollution, virtual water, water security, blue, green and gray infrastructure, water use and control, and water purification.
Undergrad	None - Dean's Office	First Year	FY	1100	GPS: HEAL THE WORLD I	1/3	Inclusive	Starts with the biology of an infectious disease and moves on to study both the biology and the management of disease control. Students study the cost of research and regulation required to bring new drugs to market. You will learn to examine problems with local complexity and global scale. Students also study management issues as cost/benefit analysis, innovation, decision-making, and competitive analysis.
Undergrad	None - Dean's Office	First Year	FY	1101	GPS: FOOD SUSTAINABILITY II	1/3	Focused	Food is hot! Free range chickens, locavores in San Francisco, organic veggies, frankenfoods, high fructose corn syrup – all topics in the news. Can we feed the world? Does use of ethanol in gasoline cause food shortages? What are the dangers and benefits to genetic engineering of food plants? Learn about and work to solve the current paradoxes of our food situation – the malnutrition of too little AND too much food: deprivation and obesity. What solutions are there – political, economic, biological and chemical?
Undergrad	None - Dean's Office	First Year	FY	1101	GPS: LIVABLE CITIES II	1/3	Focused	This Great Problems Seminar addresses the possibilities and liabilities of human life in the urban environment. As an increasing proportion of the world's population becomes urban, the possibilities for human achievement and the particular difficulties encountered in city life become more pressing. Through lectures, readings, discussion, and group projects this course will examine the interdisciplinary topics of urban ecology, environmental justice, city design and planning, and gentrification as they relate to urban landscapes. Urban sprawl can pose many threats to the environment, and we will examine ecological conditions (e.g., land use, pollution, heat island), patterns (e.g., changes in diversity), and processes (e.g., invasion of non native species) associated with urbanization. We will use lessons from ecology, case studies, and peer-to-peer learning to develop an understanding of historical global and local urban trends (e.g., Levittowns, urban village community). Students will investigate the role of the emerging fields of new and ecological urbanism as a way to increase sustainability and restore natural environments in urban settings. Additionally, students will develop an area of expertise in one problem of urban living and research, present, and propose sustainable solutions.
Undergrad	None - Dean's Office	First Year	FY	1101	GPS:BIOSPH,ATMOSPH,HUMAN FEAI	1/3	Focused	In this course we will explore the complex ecological challenges faced in today's world. We will examine causes, trends, impacts, and solutions to land use changes, climate variability, loss of habitat and biodiversity, and other similar ecological problems from scientific, social, ethical, philosophical, and technological perspectives so as to gain a more complete picture of such challenges and possible ways of addressing them.
Undergrad	None - Dean's Office	First Year	FY	1101	GPS: POWER THE WORLD II	1/3	Focused	Every community faces energy problems. Solutions to these problems always involve positive and negative consequences. Fossil fuels currently dominate the energy landscape but involve impacts that are becoming less and less acceptable. Renewable sources of energy, like wind and solar, are gaining traction but present a whole new set of challenges. This course investigates the depth and breadth of energy production, transmission and use. It explores the technical, social, economic and environmental effects and challenges of power generation.
Undergrad	None - Dean's Office	First Year	FY	1101	GPS: THE WORLD'S WATER II	1/3	Focused	Explores the social, political, technical, and environmental dimensions of our looming water crisis. This course prepares students to analyze problems and seek sustainable and equitable solutions to a variety of water challenges. Changing climate and increased development are compromising many water resources around the world. Water scarcity is on the rise in many places due to drought and overuse. In addition, many water bodies are becoming contaminated as a result of various human activities. At the same time, natural systems that purify and protect our water resources are increasingly at risk. It is time to rethink our water use practices and polices regarding what we discharge into our water bodies as well as what we use to hydrate our own bodies and communities. Topics this course will cover include water as a human right, water pollution, virtual water, water security, blue, green and gray infrastructure, water use and control, and water purification.
Undergrad	None - Dean's Office	First Year	FY	1101	GPS: HEAL THE WORLD II	1/3	Inclusive	Starts with the biology of an infectious disease and moves on to study both the biology and the management of disease control. Students study the cost of research and regulation required to bring new drugs to market. You will learn to examine problems with local complexity and global scale. Students also study management issues as cost/benefit analysis, innovation, decision-making, and competitive analysis.
Undergrad	Social Science & Policy Studies	Economics	ECON	1110	INTRODUCTORY MICROECONOMICS	1/3	Inclusive	The course focuses upon the implications of reliance upon markets for the allocation of resources in a society, at the household, firm, and community level. Outcomes of current market systems are examined in terms of the efficient use of natural and other economic resources, as well as their impact upon the environment, fairness, and social welfare. of special interest in these analyses is the role of prices in the determination of what commodities are produced, their means of production, and distribution among households. In cases where current market outcomes have features subject to widespread criticism, such as the presence of excessive pollution, risk, discrimination, and poverty, the analysis is extended to suggest economic solutions.

Undergrad	Social Science & Policy Studies	Economics	ECON	2117 ENVIRONMENTAL ECONOMICS	1/3	Focused	This course investigates the effect of human activity upon the environment as well as the effect of the environment on human well beingwell-being. It pays special attention to the impact of production and consumption of material goods upon the quantity and quality of environmental goods. The analysis focuses on the challenges presented in mixed economics where markets are combined with government intervention to manage pollution and scarcity. The course reviews efforts to measure the costs and benefits of improving environmental conditions and evaluates current and potential policies in terms of the costs of the environmental improvements they may yield. Attention is also paid to the special difficulties which arise when the impacts of pollution spill across traditional political boundaries.
Undergrad	Social Science & Policy Studies	Economics	ECON	212X PUBLIC ECONOMICS	1/3	Inclusive	This course examines the economics of government expenditure and taxation. On the expenditure side, the course will review why governments often choose to be involved in the provision of healthcare, education, national defense, a clean environment, and infrastructure such as roads and bridges. It will also delve into the rationale behind programs such as social security. Regarding taxation, the course will cover income, consumption, and corporate taxes, including the use of corrective taxes to address market failures due to externalities. Within each topic, the relevant economic theories will be presented, and then students will practice applying the theories to real-world examples. As such, there will be plenty of opportunity to discuss policy implications and debate proposed policy changes.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	1100 INTRO TO ENVIRONMENTAL STUDIES	1/3	Focused	The study of environmental problems and their solutions requires an interdisciplinary approach. This course will examine current environmental issues from the intersection of several key disciplines including: environmental philosophy and history, environmental policy, and science. The course will develop these different approaches for analyzing environmental problems, explore the tensions between them, and present a framework for integrating them. Topics such as environmental justice, developing nations, globalization, and climate change policy will be explored.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	1500 INTRO TO GEOGRPHCL INFO SYSTMS	1/3	Inclusive	This course introduces Geographic Information Systems (GIS) as a powerful mapping and analytical tool. Topics include GIS data structure, map projections, and fundamental GIS techniques for spatial analysis. Laboratory exercises concentrate on applying concepts presented in lectures and will focus on developing practical skills. These exercises include examples of GIS applications in environmental modeling, socio-demographic change and site suitability analyses. Although the course is computer-intensive, no programming background is required.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	2201 PLANNING FOR SUSTAINABLE COMM	1/3	Focused	Sustainability planning seeks to anticipate and balance environmental, social, and economic impacts of human actions. This course presents an overview of how various perspectives can contribute to frameworks for environmental land use planning and management. Students are encouraged to think critically about problems land and natural resource use pose to society. Technical principles and analysis of sustainability planning are introduced and applied to challenges that communities currently face such as food, fiber and energy production, environmental conservation, hazard mitigation and resilience, water security, economic development, and waste management. Techniques to engage a diverse set of stakeholders in a collaborative planning process are examined along with the role of technology.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	2400 ENVIRONMENTAL PROBLEMS AND H	1/3	Focused	This course examines how people think about and behave toward the environment. Environmental problems can ultimately be attributed to the environmental decisions and actions of human beings. These behaviors can in turn be understood as resulting from the nature and limitations of the human mind and the social context in which behavior takes place. Knowledge of the root causes of environmentally harmful behavior is essential for designing effective solutions to environmental problems. The goals of the course are (1) to provide students with the basic social science knowledge needed to understand and evaluate the behavioral aspects of such important environmental problems as air and water pollution, global warming, ozone depletion, preserving biological diversity, and hazardous waste and (2) to help students identify and improve shortcomings in their knowledge and decisions related to the environment. Topics will include, but not be limited to: environmental problems as "tragedies of the commons"; public understanding of global warming and global climate modeling; folk biology; risk perception; intelligent criticism of environmental claims; making effective environmental choices; strategies for promoting pro-environmental behavior; and human ability to model and manage the global environmental future.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	2600 ENVIRONM PROBLMS IN DEVEL WRL	1/3	Focused	Environment and development are often seen as incompatible, in part because many poor people in the developing world depend directly on natural resources for their livelihoods. At the same time, poor people are often seen as responsible for causing environmental degradation because they lack the knowledge, skills and resources to manage the environment effectively. The vicious circle is completed as environmental degradation exacerbates poverty. However, optimists argue that poor people can and do contribute positively to environmental outcomes, that states and organizations can facilitate their efforts and that environmental interventions can coincide with development. This course will examine these different perspectives on environmental problems in the developing world through the insights and critiques of social science. Subjects covered include sustainable development, population, environmental risks, gender, urbanization, environmental decision making, and non-governmental organizations (NGOs). The goals of this course are to think critically about the various links between environment and development and the role of governmental and non-governmental organizations in promoting sustainable development in the developing world.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	4400 SENIOR SEMINAR IN ENVRONM STDS	1/3	Focused	This course is intended for Environmental Studies majors. The course is designed to integrate each student's educational experience (e.g., core environmental courses, environmental electives, and environmental projects) in a capstone seminar in Environmental Studies. Through seminar discussions and writing assignments students will critically reflect on what they learned in their previous courses and project experiences. In teams, students will prepare a final capstone paper and presentation that critically engages their educational experience in environmental studies and anticipates how their courses and experiences will translate into their future personal and professional environmental experiences.
Undergrad	Social Science & Policy Studies	Political Science, Governmer	GOV	2302 SCIENCE-TECHNOLOGY POLICY	1/3	Inclusive	This course is an examination of the relationship between science-technology and government. It reviews the history of public policy for science and technology, theories and opinions about the proper role of government and several current issues on the national political agenda. Examples of these issues include genetic engineering, the environment and engineering education. It also examines the formation of science policy, the politics of science and technology, the science bureaucracy, enduring controversies such as public participation in scientific debates, the most effective means for supporting research, and the regulation of technology. Throughout the course we will pay particular attention to the fundamental theme: the tension between government demands for accountability and the scientific community's commitment to autonomy and self-regulation.

Undergrad	Social Science & Policy Studies	Political Science, Governmer	GOV	2311	ENVIRONMENTAL POLICY AND LAW	1/3	Inclusive	This course deals with environmental law as it relates to people, pollution and land use in our society. A case method approach will be used to illustrate how the courts and legislators have dealt with these social-legal problems. The course is designed to have the student consider: 1) the legal framework within which environmental law operates; 2) the governmental institutions involved in the formulation, interpretation and application of environmental law; 3) the nature of the legal procedures and substantive principles currently being invoked to resolve environmental problems; 4) the types of hazards to the environment presently subject to legal constraints; 5) the impact that the mandates of environmental law have had, and will have, on personal liberties and property rights; 6) the role individuals and groups can play within the context of our legal system to protect and improve man?s terrestrial habitat and the earth?s atmosphere; and 7) some methods and sources for legal research that they may use on their own.
Undergrad	Social Science & Policy Studies	Political Science, Governmer	GOV	2312	INTERNATIONAL ENVIRONMENTAL P	1/3	Focused	Environmental issues present some of the major international problems and opportunities facing the world today. Worst-case scenarios envision irrevocable degradation of the earth's natural systems, but virtually every analysis sees the need for major change worldwide to cope with problems such as global warming, deforestation, ozone layer depletion, loss of biodiversity, and population growth, not to mention exponential increases in "conventional" pollutants in newly industrialized countries. The global environment issues represent a "second-generation" of environmental policy in which the focus of concern has moved from national regulations to international law and institutions. In addition, the environment has emerged as a major aspect of international trade, conditioning corporate investment and accounting for some $200 billion in sales of pollution control equipment in 1991. Exploration of the genesis and implications of these phenomena is the essence of the course. Topically, the material begins with the nature of global environmental problems, drawing on literature from large-scale global modeling as well as particular analyses of the problems mentioned above. Approximately half the course focuses on international laws and institutions, including multilateral treaties (e.g., the Montreal Protocol limiting CFC use, ocean dumping, biodiversity), international institutions (UNEP, the Rio Convention, the OECD) and private initiatives (international standards organizations, ICOLP (Industry Committee for Ozone Layer Protection), etc.) In addition, US policy toward global environmental issues will be compared with that in Japan, Europe and developing countries, from which it differs significantly. Students will design and undertake term projects that address particular issues in detail in an interdisciplinary manner.
Undergrad	Social Science & Policy Studies	Political Science, Governmer	GOV	2319	GLOBAL ENVIRONMENTAL POLITICS	1/3	Focused	It is apparent that environmental problems have outgrown national policy frameworks. Thus, institutions have emerged at the international and transnational levels to coordinate collective problem solving. But governance involves more than just the practicality of problem solving; it also involves uncertainty, controversy, power and politics. This course will examine the ways in which global environmental governance has been conceived: from establishing international institutions and agreements, to less tangible ways of interacting. We will examine themes such as scales of governance (from the United Nations to communities), policy networks, the role of NGOs, think tanks and special interests and the role of knowledge in global environmental debates. Students will then use this conceptual and theoretical basis to analyze major global environmental issues including: deforestation; biodiversity; endangered species; and climate change. The goals of this course are to gain an understanding of the main positions in global environmental debates; critically analyze these positions; and gain insight into the politics of global environmental policy and governance.
Undergrad	Social Science & Policy Studies	Society/Technology Studies	STS	1200	FUNDAMENTALS OF GLOBAL HEALTH	1/3	Inclusive	The focus of global health research and practice is improving the overall health and health equity of all people worldwide. In this course, we will use an interdisciplinary approach to explore the major underlying biological determinants of health including the contributions of social, political, environmental, and economic factors. We will analyze the dual burden of communicable and non-communicable disease facing the world?s populations including study of current health systems, global health practices and priorities as well as major organization and institutional players. Class sessions will consist of lecture, intensive small group discussion, and global health case analyses. After successful completion of this course, students will be able to explain the basic principles of public health; discuss the determinants of health; describe how globalization has changed the patterns of the spread of disease and the methods needed to control disease; evaluate the complex, multi-faceted links between health, social and economic factors; and identify critical issues in the delivery of health care services, with a particular emphasis on challenges faced with regard to different cultural and economic settings.
Undergrad	Social Science & Policy Studies	System Dynamics	SD	1510	INTRO TO SYST DYNAMICS MODLNG	1/3	Inclusive	The goal of this course is to provide students with an introduction to the field of system dynamics computer simulation modeling. The course begins with the history of system dynamics and the study of why policy makers can benefit from its use. Next, students systematically examine the various types of dynamic behavior that socioeconomic systems exhibit and learn to identify and model the underlying nonlinear stock-flow-feedback loop structures that cause them. The course concludes with an examination of a set of well-known system dynamics models that have been created to address a variety of socioeconomic problems. Emphasis is placed on how the system dynamics modeling process is used to test proposed policy changes and how the implementation of model-based results can improve the behavior of socioeconomic systems.
Grad	Biology & Biotechnology	Biology/Biotechnology	BB	515	ENVIRONM CHG:PROBL & APPROACI	3	Focused	This seminar course will examine what is known about ecological responses to both natural and human-mediated environmental changes, and explore approaches for solving ecological problems and increasing environmental sustainability. Areas of focus may include, and are not limited to, conservation genetics, ecological responses to global climate change, sustainable use of living natural resources, and the environmental impacts of agricultural biotechnology.
Grad	Business	Business	BUS	500	BUS LAW, ETHICS & SOCL RESPNSB	3	Inclusive	This course combines analysis of the structure, function and development of the law most important to the conduct of business with an examination of the ethical and social context in which managers make decisions. Emphasizing the social responsibility considerations of all business stakeholders, the course focuses on practical applications via extensive use of case studies. Students will gain a sound understanding of the basic areas of U.S. and international law including: intellectual property law; business formation and organization; international business law; securities regulation; cyber law and e-commerce; antitrust law; employment law and environmental law.
Grad	Business	Operations & Industrial Engi	OIE	541	OPERATIONS RISK MANAGEMENT	3	Inclusive	Operations risk management deals with decision making under uncertainty. It is interdisciplinary, drawing upon management science and managerial decision-making, along with material from negotiation and cognitive psychology. Classic methods from decision analysis are first covered and then applied, from the perspective of business process improvement, to a broad set of applications in operations risk management and design including: quality assurance, supply chains, information security, fire protection engineering, environmental management, projects and new products.

Grad	Business	Operations & Industrial Engi	OIE	555	LEAN PROCESS DESIGN	3	Inclusive	Lean thinking has transformed the way that organizational processes are designed and operated, using a systematic approach that eliminates waste by creating flow dictated by customer pull. In this course we explore the lean concepts of value, flow, demand-pull, and perfection in global, multistage processes. The tactics that are used to translate these general principles into practice, such as creating manufacturing cells, are also discussed. The design process is complicated because in reality not all wastes can be eliminated. To learn effective design, students will practice applying lean ideas in case studies and simulations, exploring how variability affects process dynamics and combining this knowledge with analysis of process data.	
Grad	Chemical Engineering	Chemical Engineering	CHE	531	FUEL CELL TECHNOLOGY	3	Inclusive	The course provides an overview of the various types of fuel cells followed by a detailed discussion of the proton-exchange membrane (PEM) fuel cell fundamentals: thermodynamics relations including cell equilibrium, standard potentials, and Nernst equation; transport and adsorption in proton-exchange membranes and supported liquid electrolytes; transport in gas-diffusion electrodes; kinetics and catalysis of electrocatalytic reactions including kinetics of elementary reactions, the Butler-Volmer equation, reaction routes and mechanisms; kinetics of overall anode and cathode reactions for hydrogen and direct methanol fuel cells; and overall design and performance characteristics of PEM fuel cells.	
Grad	Chemistry & Biochemistry	Chemistry & Biochemistry	CH	555	ADVANCED TOPICS	2	Inclusive		Methods to improve the sustainability of chemical processes are presented in this coursee. Metrics to assess the sustainable nature of chemical reactions are taught and applied by students in case studies
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	515	SMART STRUCTURES	3	Inclusive	The goal of this course is to develop the student?s proficiency to design intelligent infrastructural systems (such as smart buildings and bridges), based on sensing, modeling, classification, regression and control theory. The ability to perform health monitoring system design and an understanding of the mechanism of automatic control systems are implicit in the concept of proficiency. The course format includes formal lectures, computer laboratory sessions, student presentations based on assigned term project. Guest speakers may be invited based on the topics covered and discussed in class. Prerequisites: Basic knowledge of dynamics and vibrations.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	542	GEOHYDROLOGY	3	Inclusive	This course addresses engineering problems associated with the migration and use of subsurface water. An emphasis is placed on the geology of water-bearing formations including the study of pertinent physical and chemical characteristics of soil and rock aquifers. Topics include principles of groundwater movement, geology of groundwater occurrence, regional groundwater flow, subsurface characterization, water well technologies, groundwater chemistry and unsaturated flow.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	562	BIOSYSTEMS IN ENVIRONM ENGIN	3	Inclusive	Application of microbial and biochemical understanding to river and lake pollution; natural purification processes; biological conversion of important elements such as C, N, S, O and P; biological aspects of wastewater treatment; diseaseproducing organisms with emphasis on waterborne diseases; and quantitative methods used in indicator organism counts and disinfection.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	565	SURFACE WATER QUALITY MODELIN	3	Inclusive	This course provides a quantitative analysis of the fate and transport of contaminants in surface water systems. Water quality models are developed using a mass balance approach to describe the transport, dispersal, and chemical/biological reactions of substances introduced into river and lake systems. Topics covered include water quality standards, model formulation and application, waste load allocation, and water quality parameters such as biochemical oxygen demand, dissolved oxygen, nutrients, and toxic chemicals.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	566	GROUND WATER FLOW & CONTR	3	Inclusive	This course provides a review of the basic principles governing ground water flow and solute transport, and examines the models available for prediction and analysis including computer models. Topics covered include mechanics of flow in porous media; development of the equations of motion and of conservation of solute mass; analytical solutions; and computer-based numerical approaches and application to seepage, well analysis, artificial recharge, groundwater pollution, salinity intrusion and regional groundwater analyses.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	567	HAZARDOUS WASTE: CONTAINMENT	3	Inclusive	This course provides a survey of the areas associated with hazardous waste management. The course materials deal with identification of hazardous waste legislation, containment, storage, transport, treatment and other hazardous wastes management issues. Topics include hazardous movement and containment strategies, barrier design considerations, hazardous waste risk assessment, spill response and clean-up technologies, centralized treatment facilities, on-site treatment, in situ treatment, and industrial management and control measures. Design of selected containment and treatment systems, and a number of industrial case studies are also covered. This course is offered to students with varying backgrounds. Students interested in taking this course must identify a specific problem that deals with either regulation, containment of hazardous waste, treatment of hazardous waste or industrial source reduction of hazardous waste. This problem becomes the focal point for in-depth study The arrangement of topics between the students and the instructor must be established by the third week. A knowledge of basic chemistry is assumed.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	571	WATER CHEMISTRY	3	Inclusive	This course covers the topics of chemical equilibrium, acid/base chemistry, the carbonate system, solubility of metals, complexation and oxidationreduction reactions. These principles will be applied to understanding of the chemistry of surface waters and groundwaters, and to understanding the behavior of chemical processes used in water and wastewater treatment.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	574	WATER RESOURCES MANAGEMENT	3	Inclusive	This course provides an introduction to water resources engineering and management, with an emphasis on water resources protection and water supply. Course content addresses technical aspects as well as the legal, regulatory and policy aspects of water resources management. Topics include surface water hydrology and watershed protection, development of water supplies, conjunctive use of groundwater and surface water, management of reservoirs and rivers, the role of probability and statistics, systems analysis techniques, and planning of water resources projects.	
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	587	BUILDING INFORMATION MODELING	3	Inclusive	This course introduces the concept of Building Information Modeling (BIM) which is a relatively new approach in planning, design, construction and operation of constructed facilities in a technologically enabled and collaborative fashion. The course reviews fundamental concepts for collaboration and integration; it also reviews technologies that support the BIM approach and provides discipline specific as well as global perspectives on BIM. The course format includes formal lectures, computer laboratory sessions, student presentations based on assigned readings and a project developed collaboratively by the students throughout the course. Guest speakers may be invited based on the topics covered and discussed in class.	

Grad	Mechanical Engineering	Materials Science & Engine	MTE	5847	MTRLS FR ELECTROCHEM ENRGY SYS	2	Inclusive	An introductory course on electrochemical engineering, fuel cells and batteries. With escalating oil prices and increasing environmental concerns, increasing attention is being paid to the development of electrochemical devices to replace traditional energy. Here several types of batteries and fuel cells will be discussed. Topics covered include: basic electrochemistry, lithium ion battery, proton exchange membrane fuel cell, solid oxide fuel cell, electrochemical method.
Grad	Mechanical Engineering	Mechanical Engineering	ME	5105	RENEWABLE ENERGY	2	Focused	The course provides an introduction to renewable energy, outlining the challenges in meeting the energy needs of humanity and exploring possible solutions in some detail. Specific topics include: use of energy and the correlation of energy use with the prosperity of nations; historical energy usage and future energy needs; engineering economics; electricity generation from the wind; wave/ocean energy, geo-thermal and solar-thermal energy; overview of fuel cells, biofuels, nuclear energy, and solar-photovoltaic systems and their role and prospects; distribution of energy and the energy infrastructure; energy for transportation; energy storage.
Grad	Mechanical Engineering	Mechanical Engineering	ME	5847	ELECTROCHEMICAL ENERGY SYSTEM	2	Inclusive	An introductory course on electrochemical engineering, fuel cells and batteries. With escalating oil prices and increasing environmental concerns, increasing attention is being paid to the development of electrochemical devices to replace traditional energy. Here several types of batteries and fuel cells will be discussed. Topics covered include: basic electrochemistry, lithium ion battery, proton exchange membrane fuel cell, solid oxide fuel cell, electrochemical method.
Grad	Physics	Nuclear Science and Engine	NSE	530	HEALTH PHYSICS	3	Inclusive	This course builds on fundamental concepts introduced in NSE510 and applies them to key topics in health physics and radiation protection. Health physics topics include man-made and natural sources of radiation, dose, radiation biology radiation measurement, and radiation safeguards. Radiation protection concepts are explored as they apply to existing and advanced nuclear power generators, including reactor safety, nuclear waste and byproducts, regulatory constraints, and accident case studies.
Grad	Physics	Nuclear Science and Engine	NSE	550	REACTOR DESGN, OPERTNS, & SFTY	3	Inclusive	This course provides a systems engineering view of commercial nuclear power plant technology. Power plant designs and their evolutions are studied, ranging from early to modern generation light water reactors, as well as advanced designs families, such alternate moderator and breeder reactors. Critical aspects of conventional power reactor designs are explored in detail, including steam supply, reactor core, control, and protection systems. Plant operational characteristics are studied, including reactor dynamics, control, feedback, and fuel cycle management. Critical power plant safety aspects of the design and operations are explored and reinforced with lessons learned from major power generator accidents scenarios (including Three Mile Island, Chernobyl, and Fukushima Daiichi).
Grad	Physics	Physics	MPE	574	PHYSICS FOR CITIZENS AND LEADERS	3	Inclusive	Emphasizes physics concepts and connections to society. Educators will explore and understand the important connections between society and the relevant physics concepts and their context. The goal is for the educator to be able to apply critical thinking of the application of physics to important societal issues. Topics can range from energy options, climate change, technology assessment and risk, ethical use of science.
Grad	Social Science & Policy Studies	Social Science	SS	590	ST: ENERGY AND ENVIRO DYNAMICS	3	Focused	
Grad	Social Science & Policy Studies	System Dynamics	SD	561	ENERGY AND ENVIRONMENTAL DYN	3	Focused	This course helps students develop understanding and proficiency in system dynamics simulation of energy and environmental problems. The majority of the content is devoted to case studies that focus on energy, water and environmental problems. Major business applications deal with boom and bust in power plant construction and a similar pattern of boom and bust in real-estate construction. The text used is: Ford, Andrew. 2009. Modeling the Environment, 2nd Edition. Island Press. The book's website (http://www. wsu.edu/~forda/AA2nd.html) provides model files, background on the case studies and a wide variety of extra exercises. For example, Students interested in water resource management can simulate the complex tradeoffs in the management of large river basins; students interested in water quality can experiment with models of accelerated eutrophication of fresh water lakes. A highlight of SD 561 is a class project. One option is to select one of the more challenging sets of exercises from the book (or the book's website). Such a project is often the best way to conclude SD561 for students who are new to system dynamics. The other option is to improve one of the models from the book or the website. This option is usually best for students with previous course work in system dynamics. Their project report will explain why their simulations are an improvement on the published simulations. And they will explain whether the conclusions from their modeling reinforce or contradict the conclusions from the book.
Undergrad	Humanities & Arts	History	HI	2353	HISTORY OF THE LIFE SCIENCES	1/3	Inclusive	This course surveys major developments in the global history of biology, ecology, and medicine, as manifestations of the human endeavor to understand living organisms. Topics may include: Aristotelian biology, Galenic, Chinese, and Arabic medical traditions; Vesalius and the Renaissance; Linnaeus and Enlightenment natural history; Romantic biology and the Darwinian revolution; genetics from Mendel to the fruit fly; eugenics and racial theories as "applied" biology; modern medicine, disease, and public health; microbiology from the double helix to the Genome project; and the relationship of the science of ecology to evolving schools of environmental thought.
Undergrad	Mechanical Engineering	Mechanical Engineering	ME	4810	AUTOMATIVE MATERIALS AND PROC	1/3	Inclusive	This course focuses on materials used in the automotive industry. Students complete a term-long project that integrates design, materials selection and processing considerations. Activities include: problem definition, development of design specifications, development and analysis of alternative designs, conceptual designs and materials and process selection. Students will consider cost, and environmental impact of alternative material choices. Students will present their results in intermediate and final design reviews.
Undergrad	Social Science & Policy Studies	Environmental Studies	ENV	2700	SOCIAL MEDIA, SOCIAL MOVEMENTS	1/3	Focused	Social media platforms are changing the world of social movements, giving rise to a new generation of social activism. Social media can enable local actors to link with others from across the globe to incite social and environmental change. Social media has enabled people to document and share injustices (e.g., violence; dumping of toxic waste) in places where freedom of the press is limited or non-existent, and it has enabled people across different social groups (race, class, etc.) to engage with one another on issues of shared concern. Social media has also allowed people to share resources (financial, expertise, and organizational) with other social actors across the globe, empowering communities in novel ways. This course introduces students to the phenomena of social and environmental movements, theories on why they succeed and fail, and how social media has changed the landscape of social mobilization. This course will draw on interdisciplinary readings, concepts, and case studies from the social sciences, with emphasis on geography, public policy, sociology, and media studies. Course work will include small group projects, analyses of current social movement cases, and a final project. The final project will consist of interviewing members of a current social movement (potentially using social media), evaluating whether particular social media applications have helped to enable social mobilization, and designing new or revised social media tools to further enhance social mobilization.

Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	561	ADVANCED PRINCIPLES OF WASTEW	3	Focused	Theory and practice of wastewater treatment. Natural purification of streams; screening; sedimentation; flotation, thickening; aerobic treatment methods; theory of aeration; anaerobic digestion; disposal methods of sludge including vacuum filtration, centrifugation and drying beds; wet oxidation; removal of phosphate and nitrogen compounds; and tertiary treatment methods
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	563	INDUSTRIAL WASTE TREATMENT	3	Focused	Legislation; the magnitude of industrial wastes; effects on streams, sewers and treatment units; physical, chemical and biological characteristics; pretreatment methods; physical treatment methods; chemical treatment methods; biological treatment methods; and wastes from specific industries. Lab includes characterization and treatment of typical industrial wastes
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	570	CONTAMINANT FATE AND TRANSPO	3	Focused	This course introduces the concepts of contaminant fate and transport processes in the environment, with consideration to exchanges across phase boundaries and the effects of reactions on environmental transport. Topics include equilibrium conditions at environmental interfaces, partitioning and distribution of contaminants in the environment, transport and exchange processes in surface water; dispersion, sorption, and the movement of non-aqueous phase liquids in ground-water, and local, urban and regional scale transport processes in the atmosphere.
Grad	Civil & Environmental Engineer	Civil & Environmental Engin	CE	572	PHYSICAL AND CHEMICAL TREATMEI	3	Focused	This course presents the physical and chemical principles for the treatment of dissolved and particulate contaminants in water and wastewater. These concepts will provide an understanding of the design of commonly used unit operations in treatment systems. Applications will be discussed as well. Topics covered include water characteristics, reactor dynamics, filtration, coagulation/flocculation, sedimentation, adsorption, gas stripping, disinfection, and chemical oxidation
Grad	Mechanical Engineering	Materials Science & Enginee	MTE	558	PLASTICS	2	Inclusive	This course will provide an integrated overview of the design, selection and use of synthetic plastics. The basic chemistry associated with polymerization and the structure of commercial plastics will be described. Various aspects of polymer crystallization and glass transition will be outlined. Salient aspects of fluid flow and heat transfer during the processing of plastics will be highlighted. Fundamentals of the diverse processing operations used to shape plastics and the resulting structures that develop after processing will be discussed. The mechanical behavior of plastics including elastic deformation, rubber elasticity, yielding, viscoelasticity, fracture and creep will be discussed. Plastic degradation and environmental issues associated with recycling and disposal of plastics will be examined. Typical techniques used in the analysis and testing of plastics will be described and a working knowledge of various terminologies used in commercial practice will be provided.