This course is designed for students seeking a broad overview of ecological systems and the impacts they have on ecosystems, populations, biodiversity, pollution, environmental economics, and climate change. 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 contemporary research to quantify, document, and track trends in biodiversity. The course will use problem sets and assignments to explore the natural, social, and economic trade-offs associated with conservation and restoration of biodiversity. Students will develop an appreciation for and depth of understanding of biodiversity and how principles of conservation biology, ecosystem ecology, molecular biology, and biogeography can be applied to strategies aimed toward sustaining Earth’s biota.

This course is intended to help students understand ecological concepts at different levels of organization, from individuals to ecosystems, and the linkages among them. Students will also practice the application of quantitative and qualitative methods to ecological systems and processes, as well as hypothesis generation, experimental design, and analysis and interpretation of data. Undergraduates, graduate students, and presenters, and students will explore topics in both basic and applied ecology, which may include population ecology, forest ecology, and epidemiology, climate change, and sustainable agriculture, among others.

In this capstone design project, students will address a collection of design challenges related to energy production. Students will study several major energy systems. The details of such energy systems will be examined using principles, particularly focusing on chemical principles. 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. 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.
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, structure, building enclosure, heating and air conditioning, electrical, plumbing systems, as well as concepts of building performance and sustainability. The course also introduces the principles of building science and green construction.

This course introduces principles and applications of mechanical systems that are required for environmental comfort, health, and safety of building occupants with emphasis on energy efficiency. Students will study the nature of building loads, fluid flow basics, HVAC components and systems, building envelope heat transfer, and energy requirements. In this course, students will develop the ability to design and conduct computational modeling experiments and to analyze and interpret output data for selection between system alternatives in order to optimize energy use.

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 measuring, visual perception, photometry, brightness, luminance, illumination, natural and artificial lighting. Other topics include photometric units, light sources, daylight/illumination, lighting quality, light loss factors, average illumination calculations (lumen method), punch-by-punch calculations, performance impacts, and others. Field measurements and computer simulations are used to explore some major aspects of architectural illumination systems. Design problems are sized by considering economic realities, energy saving criteria and applicable standards and building codes.

This course addresses the basic principles of building energy simulations, with a focus on the practical applications of building energy simulation tools in building design. Topics being covered include various model input parameters such as building geometry, orientation, climate, comfort, sizing, material properties, operation schedules, and system effects. Building energy simulation software packages are introduced 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.

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 reaction 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.

This course provides an understanding of the use and expansion 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, ductility, and corrosion resistance. Experimental laboratory procedures including design of experiments, data collection, analysis, and interpretation are integral components of this course.
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 handling management.

This course provides a background for applying the principle 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 fluid mechanics in pipes and closed systems, open channels and rivers, water supply systems and water distribution networks, water supply systems and networks, 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.

This course introduces the student to the social, economic, political, and environmental factors that affect the complex relationship between the built and natural environments. By using the principles of sustainable development and the concepts of planning, the optimal development patterns 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 concurrent procedures of analysis, formation of alternative solutions, research evaluation and decision choice in accordance with evaluation criteria, is obtained through extensive reading. As such, the course introduces a variety of topics of interest to engineers and environmental scientists.

This course provides in-depth coverage of fundamental concepts of fluid mechanics and heat transfer and their applications to environmental engineering to evaluate the suitability of these areas for sustainable urban and resource-based uses. Topics include basic concepts in sustainability, environmental considerations, and environmental impact assessment and planning. The concepts and techniques developed in this course are used for both urban planning, site design, natural resource management, and the determination of the impact of engineering projects on the environment.

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.

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, soil water storage, streamflow, hydrologic routing, statistics and probability to hydrology, and the quantification of hydrologic processes for water quality protection. The course introduces bioclimatic and the use of hydrologic models for solving problems in water resources and hydrology.

This course surveys American science and technology from 1689 to the present. Topics may include: Darwinian and societal change, scientific education and the growth of the physical sciences, the rise and fall of scientific revolutions, the goal of efficiency and productivity, science, World War I and the 1920s, the intellectual hegemony and its influence, science and technology, and World War II, the atomic bomb, and its impact. The course also explores the cultural, social, and economic impacts of science and technology on society.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
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<tbody>
<tr>
<td>HI 2403</td>
<td>GLOBAL ENVIRONMENTAL HISTORY</td>
<td>Focused</td>
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<tr>
<td>HI 3317</td>
<td>TOPICS IN ENVIRONMENTAL HISTORY</td>
<td>Inclusive</td>
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<tr>
<td>HI 3335</td>
<td>TOPICS IN THE HISTORY OF NON-HUMANS</td>
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<tr>
<td>HI 3343</td>
<td>TOPICS IN ASIAN HISTORY</td>
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<tr>
<td>HI 3355</td>
<td>TOPICS IN GLOBAL STUDIES</td>
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<tr>
<td>HI 3371</td>
<td>PHILOSOPHY OF KNOWLEDGE</td>
<td>Inclusive</td>
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<tr>
<td>HI 3712</td>
<td>SOCIAL AND POLITICAL PHILOSOPHY</td>
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<tr>
<td>HI 3719</td>
<td>PHILOSOPHY OF SCIENCE</td>
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<tr>
<td>HI 3710</td>
<td>INTRODUCTION TO ETHICS</td>
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<tr>
<td>PY 2711</td>
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<td>PY 3711</td>
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<td>PY 3722</td>
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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 on human societies. The course will trace human history from hunter-gatherer societies to modern-day urban centers, focusing on the development of agriculture, industrial society, and the impacts of transportation and other technologies. Through case studies, the course will consider the impacts of environmental change on human societies. Course information is subject to change at any time; see the registrar's website for the most current information. 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.
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 Ha ... project involves the sustainability of harvesting medicinal herbs from Albania's forests, as this is an expanding industry.

This 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.

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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 include environmental management, local infrastructure, rural resources including land use and water quality, and community resilience in mountainous regions.

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 consultation 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 agencies and with NGOs in New Zealand on issues related to environmental technology and society. Projects focused on environmental issues (rangeland spruce stands of southwestern New Zealand, a conservation and wildlife area, tsunami emergency planning, innovation and entrepreneurship for the greater Wellington region, and outreach for a community health clinic at Victoria University).

Most projects will address environmental issues, with a focus on sustainability, climate change, adaptation, and public health. Projects typically involve field work in the city's neighborhoods, including Anzac Square and inner city areas sponsored by city or historic agencies or 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 at those districts for the Boston Landmark Commission, adapting to sea level rise in the Boston harbor area (The Boston Harbor Association), and efforts to increase the water and wastewater treatment in the Hingham water and sewer system.

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Projects are completed in teams and span a wide variety of topics including the environment, public health, housing, social welfare, transportation, and land use. The course 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, including businesses, non-profits, government agencies, and cultural and technical organizations located in the heart of Venice. 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 UCVC; 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 on the improvement of the urban quality of life in the city and the lagoon islands, which have yielded much among other things; the re-engineering of the Venetian cargo delivery system; and the design of a sewer system to prevent sewage pollutants and the design of a sewer system to prevent discharge of the city's sewage.

The Worcester Community Project Center (WCPC) is a development program of the Anthropology department. This 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.

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This course develops the processing, structure, property, performance relationships in plastics and elastomers. The topics covered include polymerization processes, chain-structure and conformation, molecular weights and distributions, chemical and physical states, and aging under irradiation. 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 blends will be described with specific attention to rheology and extrusion. Relevant issues related to environmental sustainability and recyclability will be highlighted.

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In this course we will explore the complex ecological challenges faced in today's world. We will examine causes, trends, 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.

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.

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This course investigates the effect of human activity upon the environment as well as the effect of the environment on human well-being. It pays special attention to the impact of production and consumption of material goods upon the environment, and quality of life. The course will develop economic theories for understanding mixed systems where markets are combined with government intervention to manage pollution and scarcity. This 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.

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, environmental science, political science, economics, and geography. By exploring the policy challenges and innovations that address these 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.

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 and planning management. Students are encouraged to think critically about problems land and natural resources are seen to society. Technical principles and analysis of sustainability planning are introduced and applied to challenges that consultation currently face such as food, fiber and energy production, environmental degradation, land use and transportation, water security, economic development, and waste management. Techniques to engage a diverse set of stakeholders in collaborative planning processes are examined along with the role of technology.

This course examines how people think about and behave toward the environment. Environmental problems are ultimately the reflections of 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 causes of environmentally harmful behavior is essential for designing effective solutions to environmental problems. The goal of this course is (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, cause relationships, preserving biological diversity, and hazardous waste and (2) to help students identify and improve shortcomings in their knowledge and decision 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, risk behaviors, individual responsibility, intelligent criteria of environmental claims, making effective environmental choices, strategies for promoting pro-environmental behavior, and human ability to model and manage the global environmental future.

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 strategies about the proper role of government and science in current and future society, the regulation of technology. 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 scientific bureaucracy, including controversies such as public participation in scientific debates; the macro-economic forces for supporting research, and the regulation of technology. Throughout the course we will pay particular attention to the fundamental themes discussed between government demands for accountability and the scientific community's commitment to autonomy and self-regulation.

This course introduces Geographic Information Systems (GIS) as a powerful mapping and analytical tool. Topics include GIS data structure, map projections, and 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.

This course is intended by 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 terms, students prepare and present a final capstone paper and presentation that critically engages their educational experiences is environmental studies and anticipates how their courses and experiences will translate into their future personal and professional environmental experiences.
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 legislatures 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 solve environmental problems; (4) the future of the environment in the society 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 individual and groups can play within the context of our legal system to protect and improve their immediate habitat and the earth’s atmospheres; and (7) some methods and sources for legal research that they may use on their own.

Environmental issues present some of the major international problems and opportunities facing the world today. Most case examples involve irrevocable degradation of the earth’s natural systems, but virtually every analysis tests the need for major change worldwide to cope with problems such as global warming, deforestation, course-fuel depletion, loss of biodiversity, and population growth. The nature of environmental issues and their solutions is quite different from those of any previous generation. It is the purpose of this course to explore the causes of concern and the policy options for global environmental problems, including catastrophic climate change. A major theme is the role of science in environmental issues. In the course, students will learn to place these issues within the framework of long-standing models of the global climate. Students will also be introduced to the major international institutions involved in international environmental cooperation. Approximately half the course focuses on international law and institutions, including international agreements, organizations, and funds. It also covers issues such as the impacts of technologies, and the role of national and regional governments in promoting effective international cooperation. Students will be required to undertake a term research project, which will be presented in class. The project will entail reading and writing about a selected national or international environmental issue, focusing on the legal framework and the political context.

The course explores environmental policy as it relates to the environment and health of all people worldwide. In this course, we will use an interdisciplinary approach to explore the major underlying 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 the role of external factors such as poverty, inequality, and the lack of access to clean water and sanitation. The course will also cover the determinants of health, focusing on how globalization has changed the patterns of the spread of disease and the methods needed to control disease. It will also cover the complex relationships between health, social and economic factors, and how critical issues in the delivery of health care services, such as the persistence of health disparities and the challenges facing health care systems in developing countries, are shaped by the economic and social context in which they operate.

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 will learn the basic concepts and tools of system dynamics, including the use of computer simulation models to understand complex socio-economic systems. The course will also examine case studies of how system dynamics models have been used to address a variety of socio-economic problems, such as economic growth, environmental sustainability, and global health. By the end of the course, students will be able to understand how system dynamics can be used to evaluate the effectiveness of different policies and to design new solutions to existing problems.
Learn how to transform the way that operations work by using a systematic approach that eliminates waste. This course explores the key concepts of value, demand, and perfection in the global manufacturing process. The tools that are used to translate these general principles into practice are taught and practiced in simulated and real-world cases. The course is structured around group efforts that facilitate the learning process by creating an environment where effective communication and teamwork are encouraged. Effective communication is essential to the success of any operation. This course provides an overview of the subject area of fuel cells followed by a detailed discussion of the proton exchange membrane (PEM) fuel cell fundamentals. Thermodynamics relations involving cell equilibria, standard potentials, and thermal equations; transport and adsorption in proton exchange membrane and supported liquid electrolytes; transport in gas/polymer membranes; fundamentals of electrolyses and fundamental 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.

This 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 involving cell equilibria, standard potentials, and thermal equations; transport and adsorption in proton exchange membrane and supported liquid electrolytes; transport in gas/polymer membranes; fundamentals of electrolyses and fundamental 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.
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: basis electrochemistry, lithium ion battery, proton exchange membrane fuel cell, solid fuel cell, electrochemical method.

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/tidal energy, geothermal and solar thermal energy; overview of fuel cells, fuel/oil, nuclear energy, and solar photovoltaic systems and their role and properties; distribution of energy and the energy infrastructure; energy for transportation, energy storage.

This course builds on fundamental concepts introduced in MTE 5847 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 safety. These topics will be augmented with nuclear power generation, nuclear reactor operation and design, nuclear reactor physics, nuclear power generation, including reactor safety, nuclear waste and byproducts, regulatory constraints, and accident case studies.

This course provides a systems engineering view of commercial nuclear power plant technology. Power plant designs and their evolution are studied, ranging from early generation light water reactors, as well as advanced reactor systems, such as the molten salt reactor, to advanced gas reactors and fusion reactors. The course emphasizes the role of systems theory in the development of complex energy systems and the importance of systems thinking in the development of energy policy.

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 energy and water plant construction and system behavior. These case studies are introduced through the book by M. J. Sadowski (ed.), Systems Thinking: Engineering the Environment, 2nd edition. Island Press. The book’s website (http://www doucheable.net/softbook.rar) provides models, data, and discussion questions to help students develop a working understanding of system behavior and the role of these techniques in the development of complex social and natural systems.

This course covers the fundamentals of health physics and radiation protection. Topics include the basic principles of radiation, dosimetry, radiation protection, and the application of these principles to the design and operation of nuclear power plants.

This course is designed to provide a modern understanding of the role of nuclear power plants in the energy and environmental landscape. The course covers the technical aspects of nuclear power plant design, operation, and safety, as well as the social and environmental impacts of nuclear energy.

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**CE 561 ADVANCED PRINCIPLES OF WASTEWATER**

**CE 563 INDUSTRIAL WASTE TREATMENT**
- Legislation, the magnitude of industrial wastes, effects on streams, sewers and treatment costs; physical, chemical and biological characteristics; pretreatment methods; physical treatment methods; chemical treatment methods; biological treatment methods; wastes from specific industries. Lab includes characterization and treatment of typical industrial wastes.

**CE 570 CONTAMINANT FATE AND TRANSPORT**
- 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 of environmental interfaces, partitioning and distribution of contaminants in environmental matrices, fate and transport of contaminants in surface water: dispersion, sorption, and the assessment of nonaquatic phase inputs to groundwater, and local, urban and regional scale transport processes in the atmosphere.

**CE 572 PHYSICAL AND CHEMICAL TREATMENT**
- This course presents the physical and chemical principles for the treatment of dissolved and particulate contaminants in water and wastewater. Topics covered include water characteristics, reactor dynamics, filtration, coagulation/flocculation, sedimentation, adsorption, gas stripping, distillation, and chemical oxidation.

**MTE 558 PLASTICS**
- 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 phase transition will be outlined. Studies of melt flow and heat transfer during the processing of plastics will be included. Other processing operations used in shaping plastics, and the resulting structures that develop after processing will be discussed. The mechanical behavior of plastics, including elastic deformation, yield behavior, necking, anisotropy, 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.