

CAREER	SUBJECT	CATALOG_NBR	COURSE_TITLE	COURSE_DESCRIPTION	Focused/Related	Reasoning	UN SDGs Covered
UGRD	ARHI	3160	Architectural Utopias	Can we build a better world? Many people from various eras and geographical locations have argued we can. The idea of utopia -- a place of harmony free from want and strife -- has shaped both imagined and real places. So has its opposite: dystopia. This course will focus on architectural visions and solutions for utopias from the ancient world to the present: from myths of long-lost cities to projected colonies on the moon and Mars.	Focused	Focused on the perfect balance of cities and nature.	6, 8, 9, 11
UGRD	ARHI	3550	The City and the Environment	This course examines the many ways that communities, architects, and developers have responded (or not responded) to the American landscape and environment. It will begin with the earliest settlements established by the colonists, such as Havana, Cuba, and New York City and progress to the present with a special emphasis on Lowell and Boston. The course will not only examine specific cities but also architectural utopias, city planning, the national park system, sustainable design, and contemporary efforts to merge the needs of the city with environmental awareness.	Focused	Course examines the intersection between city development decisions and the impacts on the natural world.	1, 7, 8, 9, 11, 13, 15
UGRD	ARHI	3650	Art and Environment	This course surveys developments in land, environmental, and ecological art. Some of the most compelling artists today engage with the politics of land use, including the conditions of the global economy, climate change, environmental justice, sustainability, sovereignty and land claims, uneven geographies and expanding megacities, and the privatization of public space.	Focused	Course focuses on how art exposes and explains economic, social, and environmental sustainability.	1, 2, 3, 6, 8, 10, 11, 13, 14, 15
UGRD	ARTS	2951	BioArt Workshop in Portugal	This is an interdisciplinary course that combines art and science a Cultivamos Cultural in San Luis Portugal. The intersection of Art, Biology and the Environment offer unique opportunities to visual artists. This innovative summer course, which is already on its fourth edition, will allow non-specialists to acquire theoretical and practical skills in biological and environmental sciences in connection to the visual arts. The Summer School explores the interdisciplinary relationship between art, line and environmental sciences through hands-on exercises, combining theory and practice in an informal environment, e.g.: seminars, debates, visits, and the creation of artworks with biological media.	Focused	Course exposes students to other cultures and focuses on how artists can enhance the impact of the biological and environmental sciences.	3, 14, 15
UGRD	ATMO	1500	The Physical Science of Climate Change	Due to the complexity of climate change, there are many important dimensions to the problem, including political, economic, social, and ethical. This course focuses on the physical science dimension of climate change: what are the key scientific principles that are needed to understand the causes and physical impacts of climate change, and to evaluate possible responses and their likely effectiveness The class is offered for both science and non-science majors.	Focused	Directly confronts sustainability challenge.	13
UGRD	BIOL	2400	Evolution, Ecology and Conservation (Formerly 81.240)	Over 5 million species thrive in amazingly diverse habitats on Earth ranging from the extreme freezing cold of the poles to the lush warmth of the tropics. How did this fantastic diversity arise on our earth? How are these species intimately interconnected with one another, their communities and their ecosystem? How can we save this remarkable biodiversity from extinction? This course will address these key questions by examining the fundamental concepts of evolution, ecology and conservation biology. Students will be expected to attend a discussion section in which they will examine case studies and primary scientific literature.	Focused	Course focuses on biodiversity and its relationship to global environments and the impact it has on the Earth.	14, 15
UGRD	BMEN	4020	Biomaterials	This course will provide an introduction to materials used in biomedical applications. It will provide students with and understanding of the fundamental principles and language associated with current biomaterials research and to understand the issues associated with medical applications of these materials. The goal is to enable students in the course to read the biomaterials literature with critical understanding. The course will introduce principles of materials science and cell biology underlying the design of medical implants, artificial organs, and matrices for tissue engineering and covers surface chemistry and physics of selected biomaterials, surface characterization methodology, acute and chronic response to implanted biomaterials, and molecular and cellular interactions.	Focused	Course focuses on how medical technology can help human health.	3
UGRD	CIVE	1070	Introduction to Engineering for Civil and Environmental (Formerly 25.107/14.107)	14.107 Introduction to Engineering for Civil and Environmental Engineers	Focused	Course presents students with a general understanding of the key concepts of Civil and Environmental Engineering.	6, 9, 11
UGRD	CIVE	3620	Environmental Engineering (Formerly 14.362)	Physical, chemical and biological principles of the treatment of water and wastewater are considered along with their application to treatment systems. The system components of wastewater and water treatment plants are studied to provide a basic design capability. Hazardous waste site remediation is also discussed."	Focused	Course integrates the environmental aspects of sustainability in environmental engineering including water/wastewater treatment plant design and hazardous waste remediation.	6, 12
UGRD	CIVE	4600	Water Resources Engineering (Formerly 14.460)	This course is a continuation and extension of Fluid Mechanics, with a focus on engineering applications of hydraulic and hydrologic engineering. This course covers fundamental concepts of open-channel flow, hydraulic structures, design of open channels, surface-water hydrology, and groundwater hydrology.	Focused	Course evaluates the structure and mechanisms of water resource engineering. Sustainability and water conservation are critical components of these processes.	6, 14
UGRD	EECE	4140	Integrated Power Systems (Formerly 16.414/514)	Power System Operations and Electricity Markets provide a comprehensive overview to understand and meet the challenges of the new competitive highly deregulated power industry. The course presents new methods for power systems operations in a unified integrated framework combining the business and technical aspects of the restructured power industry. An outlook on power policy models, regulation, reliability, and economics is attentively reviewed. The course lay the groundwork for the coming era of unbundling, open access., power marketing, self-generation, and regional transmission operations.	Focused	Course examines electrical markets and the power industry and ways to make the industry more efficient for public and private sectors.	7, 9
UGRD	EECE	4250	Power Distribution System (Formerly 16.4440/EECE.4440)	An intermediate course in analysis and operation of electrical power distribution systems using applied calculus and matrix algebra. Topics include electrical loads characteristics, modeling, metering, customer billing, voltage regulation, voltage levels, and power factor correction. The design and operation of the power distribution system components will be introduced: distribution transformers, distribution substation, distribution networks, and distribution equipment. Prerequisite: 16.355	Focused	Course focuses on distributed power systems and their functionality.	7, 9
UGRD	EECE	4280	Alternative Energy Sources (Formerly 16.428)	PV conversion, cell efficiency, cell response, systems and applications. Wind Energy conversion systems: Wind and its characteristics; aerodynamic theory of windmills; wind turbines and generators; wind farms; siting of windmills. Other alternative energy sources: Tidal energy, wave energy, ocean thermal energy conversion, geothermal energy, solar thermal power, satellite power, biofuels. Energy storage: Batteries, fuel cells, hydro pump storage, flywheels, compressed air.	Focused	Course integrates the environmental aspect of sustainability by focusing on alternative energy sources compared to conventional fossil fuels and environmental benefits.	7, 9
UGRD	EECE	4290	Electric Vehicle Technology (Formerly 16.429)	Electric vehicle VS internal combustion engine vehicle. Electric vehicle (EV) saves the environment. EV design, EV motors, EV batteries, EV battery chargers and charging algorithms, EV instrumentation and EV wiring diagram. Hybrid electric vehicles. Fuel cells. Fuel cell electric vehicles. The course includes independent work.	Focused	Course focuses on the application of electrical vehicles in the market and the positive impact on the environment.	7, 9

UGRD	ENGL	3245	Writing about the Environment	From John Muir to Rachel Carson to Bill McKibben, environmentalists have traditionally relied upon the power of their prose to transform the thoughts and behavior of their contemporaries. Stemming from the premise that writing is a form of environmental action, this course introduces students to a range of modes of writing in environmental studies. In the process of reading, discussing and practicing different kinds of environmental writing, students will develop a variety of writing skill in addition to an appreciation for writing as an important form of environmental action.	Focused	Course incorporates social and environmental aspects of sustainability and how writing is an important form of environmental action.	4,14,15
UGRD	ENVE	2010	Environmental Engineering Chemistry	Overview of fundamental chemistry related to the source, fate and reactivity of compounds in the atmosphere, hydrosphere, and lithosphere. Topics include reaction kinetics, chemical equilibrium, redox reactions, chemical thermodynamics, carbonate systems, environmental fate of chemicals in natural and polluted environments, anthropogenic and natural pollution.	Focused	Course integrates the environmental aspects of sustainability in environmental engineering by looking at the environmental fate of chemicals in natural and polluted environments, anthropogenic and natural pollution.	14,15
UGRD	ENVE	3630	Environmental Engineering II	This course emphasizes the ecology and physical-chemical processes used in water and wastewater treatment. Topics covered include Streeter-Phelps model, coagulation, flocculation, water softening, precipitation, filtration, activated carbon adsorption, and disinfection.	Focused	Course integrates the environmental aspects of sustainability in environmental engineering with topics in water and wastewater treatment.	6, 11,14
UGRD	ENVE	3640	Energy and the Sustainable Environment	Thermodynamic laws, energy balance, conservation of energy, heat transfer, energy conversion and efficiency, ideal and non-ideal gas and gas mixtures, design and evaluation of renewable energy systems.	Focused	This course looks at renewable energy systems and the sustainable environment.	7,11
UGRD	ENVE	3650	Groundwater Hydrogeology and Remediation	Groundwater flow and aquifer behavior in response to pumping will be addressed. Analysis of contaminant transport and the formation of multi-dimensional contaminant plume formation will be conducted. Physical, chemical and biological based technologies for contaminated aquifer remediation are covered.	Focused	Course integrates the environmental aspects of sustainability in environmental engineering through topics on ground water.	6
UGRD	ENVE	3660	Biological Processes in Environmental Engineering	This course focuses on the fundamental aspects of biological processes that are commonly used in water and wastewater treatment. Topics covered include: the mechanisms and kinetics of biological reactions, mass balances of biological reactors, biological reactor design and diagnosis, and aeration and gas transfer.	Focused	Course integrates the environmental aspects of sustainability in environmental engineering through topics on water and wastewater treatments.	6,9,11
UGRD	ENVE	4610	Chemical Fate and Transport in the Environment	The properties of organic chemicals and equilibrium chemistry controlling the distribution of these chemicals between air, water and soil will be studied. Transport processes and the lifetime of chemicals in the environment will be investigated. Risk assessment for the exposure to chemical contaminants will be addressed.	Focused	Focuses on transport processes and the lifetime of chemicals in the environment will be investigated.	6,11,12,14,15
UGRD	ENVE	4620	Air Quality	Review of gaseous pollutants, their chemistry and properties. Emissions of air pollutants (mass balances) and atmospheric sciences related to air pollution. Gas and particulate handling and treatment technologies are addressed.	Focused	Focuses on Emissions of air pollutants and atmospheric sciences related to air pollution.	3,11,12,15
UGRD	ENVE	4630	Environmental Eng. Ethics and Professional Practice	This course introduces students to the American Society of Civil Engineers (ASCE) code of ethics and standards of practice for environmental professionals. Topics include codes of ethics, agreements and contracts, ethical and legal considerations, professional liability, public protection issues, environmental regulations, and environmental sustainability considerations. It prepares students to think critically while working with complex environmental issues.	Focused	Reviews social and environmental aspects of sustainability through topics on ethics and standards of practice for environmental professionals.	9,11,12,16
UGRD	ENVE	4640	Solid Waste Engineering and Management	Generation, storage, collection, transfer and transport, processing and disposal of municipal solid wastes; treatment and disposal of water and wastewater treatment sludge; landfill design; alternative waste management and disposal strategies.	Focused	Course integrates the environmental aspects of sustainability in environmental engineering through topics on water and wastewater treatments.	6,9,11,14,15
UGRD	ENVI	1010	Environmental Science Seminar (Formerly 87.101)	A survey of the field of environmental science, curriculum options, and career opportunities. Presentations by members of the department and guest speakers.	Focused	Course focuses on the field of environmental science.	6, 13, 14, 15
UGRD	ENVI	1020	Environmental Problems Seminar (Formerly 87.102)	A survey of environmental problems and issues. Topics include air, water, and noise pollution; solid and liquid waste disposal; and the social, political, and economic implications of these issues. Readings, discussions, guest speakers, and field trips.	Focused	Course covers the environmental problems the world is currently facing and incorporates related social, political and economic aspects of sustainability.	6, 12, 13, 14, 15
UGRD	ENVI	1100	Global Environmental Studies	This course investigates how human activities impact the earth's environment on a local, national, and global scale. Topics covered include the scientific method, population, fresh water resources, air and water pollution, climate change, energy, biodiversity, food security, solid waste management and sustainable living. As Lowell is often described as the birthplace of the industrial revolution, we will also examine the development, consequences, and cleanup in the context of Lowell MA. This course satisfies the required Breadth of Knowledge (BOK) STEM Perspective (Science, Technology, Engineering, & Mathematics) (STEM).	Focused	Course focuses on local, national, and global environmental and economic sustainability.	2, 6, 11, 12, 13, 14, 15
UGRD	ENVI	1110	Sus.Sol. for People & Planet	This course explores some of the most challenging questions of our times: How can modern society thrive on a finite and changing planet? In what ways is our climate changing and what is causing those changes? How will human society be impacted: What could a transition to a sustainable, green, low-carbon economy consist of? We will explore these questions through a combination of simulations, serious games, and 'systems thinking' - building a skill set to think strategically about complex, dynamic problems. The course considers current events as they relate to climate change and sustainability and introduces students to real-world, interactive tools that allow them to explore scenarios and solutions for themselves.	Focused	Course focuses on ways to engage the public through interactive and fact-based simulations, which seek to bring about social, environmental, and economic change.	1, 2, 3, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
UGRD	ENVI	1200	Principles Environmental Sci.	In this course, we will approach Environmental Science from an interdisciplinary viewpoint and use quantitative approaches to understand the physical, chemical, and biological environment and their interactions. A critical emphasis through this course will be on ecosystem services and how climate change, land use change, and pollution affect these. We will further review environmental law and policies and address concepts of sustainability and resource conservation.	Focused	Course focuses on how humans impact environmental sustainability, and how that impacts social and economic sustainability.	2, 6, 7, 13, 14, 15, 16
UGRD	ENVI	2010	Earth and Environmental Systems I (Formerly 87.201)	An integrated study of the interactions between the lithosphere, hydrosphere, atmosphere, and biosphere. Emphasis will be placed on the physical and biological principles which underlie and control these interactions, pollution, geologic hazards, climate change, and social and political aspects which govern our relationship with the natural environment.	Focused	Course integrates physical and biological principles of interactions of Earth's atmosphere and biosphere with specific focus on pollution, climate change, and the social and political implications.	12, 13
UGRD	ENVI	2020	Earth And Environmental Systems II (Formerly 87.202)	A continuation of Principles of Earth & Environmental Systems.	Focused	Course integrates physical and biological principles of interactions of Earth's atmosphere and biosphere with specific focus on pollution, climate change, and the social and political implications.	12, 13
UGRD	ENVI	3010	GIS in Earth and Environmental Sciences (Formerly 87.301)	This course introduces earth and environmental science students to applications of geographic information systems, emphasizing hands-on field experience in collecting spatial location data and in mapping environmental data using GIS software. Covers fundamentals of: geodesy; spherical and plane coordinate systems; spatial data concepts, including error, accuracy, and precision; location measurement technologies including GPS: vector and raster GIS data structures and file types, basic GIS operations, including georeferencing of raster files and editing of vector files; assembly of field data over a base map; analysis of spatial relationships using GIS tools; symbology and methods of map presentation.	Focused	GIS in relation to earth and environmental sciences is a critical tool to conveying and understanding sustainability concepts through real world applications.	9, 11, 13, 14, 15, 17
UGRD	ENVI	4100	Soil Science	This class provides a fundamental understanding of the formation, structure, and functioning of soils. Topics include soil formation and history, soil chemistry and physics, soil endangerment and protection, and distribution and characteristics of soils across the world.	Focused	Course focuses on how soils are crucial to environmental sustainability.	14

UGRD	ENVI	4160	Climate Change:Sci,Comm,Sol	Like many of the 'grand challenges' currently facing society, climate change is a complex problem that cuts across academic disciplines, including the physical sciences, biology, engineering, economics, political sciences, and behavioral psychology. In this course, we integrate recent research from many of these disciplines to explore the scientific basis of climate change, its impacts on the natural world and human society, and societal responses to it. Through interactive simulations, class discussions, lectures, current scientific literature, and student-led projects (such as video production and dynamic modeling), the goal of this course is to empower students to come to their own decisions about how society can address the climate change challenge.	Focused	Course focuses on aspects contributed to climate change, both natural and man-made, and how the shifting climate will impact the Earth in the near future.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
UGRD	ENVI	1120L	Global Env. Studies Lab	This course investigates how human activities impact the earth's environment on a local, national, and global scale. Topics covered include the scientific method, population, fresh water resources, air and water pollution, climate change, energy, biodiversity, food security, solid waste management and sustainable living. As Lowell is often described as the birthplace of the industrial revolution, we will also examine the development, consequences, and cleanup in the context of Lowell, MA. This course satisfies the required Breadth of Knowledge (BOK) STEM Perspective (Science, Technology, Engineering, & Mathematics) (STEM).	Focused	Course focuses on environmental, social, and economic sustainability at a local and international level.	2, 6, 11, 12, 13, 14, 15
UGRD	ETEC	2720	Intro to Alternative Energy	This course surveys the available alternative energy sources. Alternative energy sources such as solar, wind and thermal are discussed and applied to practical applications. This course will focus on how the different types of alternative energy are used singularly or in a combined alternative energy package in residential, commercial and utility applications. Both grid connected and stand alone applications are reviewed and discussed.	Focused	Course focuses on how alternative energy can replace fossil fuels and thus hopefully increase environmental sustainability.	7
UGRD	FAHS	1150	Lowell as Text	First year seminar for students interested in exploring Lowell, past and present, and using the city to investigate various other issues beyond local.	Focused	Course focuses on getting students involved with and learning about the community.	11
UGRD	LGST	3670	Environmental Law (Formerly 41.367)	This course examines the legal and administrative problems of protecting the quality of the human environment. Federal and state legislation on environmental policy is studied. Public interest litigation as a supplement to the enforcement of environmental law is discussed. The course also focuses on the practical problems of balancing the needs of business, the global competitiveness of the United States, the increasing demand for natural resources, and the need to protect, preserve, and restore the environment. The importance of sustainable development and environmental ethics are discussed.	Focused	Class focuses on federal and state legislation on environmental policy including how it affects global competitiveness, demand for natural resources, environmental protection, environmental ethics and sustainable development.	8, 9, 13, 14, 15
UGRD	LIFE	1080	Biochemistry in the Kitchen	This course is an integrated lecture and laboratory course for non-science majors and is designed to fulfill the core laboratory science requirement. The course will present fundamental principles of biochemistry in the context of cooking and foods to explain everyday phenomena. Class periods will include lecture and discussion and there will be laboratory assignments to be completed by the student.	Focused	Course focuses on the role of plants in society, specifically agriculture and the food system.	2, 3, 15
UGRD	LIFE	1250	Plants and Human Society (Formerly 83.125)	This course is designed primarily to fulfill the science elective requirement for the non-science major. Its purpose is to provide the undergraduate student who is not majoring in the biological sciences with an introduction to the study of plants and their importance in our everyday world. The importance of plants in agriculture, medicine and industry will be emphasized.	Focused	Course focuses on the role of plants in society, specifically medicine and agriculture.	2, 3, 15
UGRD	LIFE	1270	Plants & Human Society Lab (Formerly 83.127)	Not suitable for credit towards any degree in the Division of Sciences.	Focused	Course focuses on the role of plants in society, specifically medicine and agriculture.	2, 3, 15
UGRD	LIFE	2140	Human Ecology (Formerly 83.214)	Designed to reveal and discuss the increasing problems of overpopulation in regard to environmental deterioration, living space, limits of natural resources and the adverse effects of human alteration on destruction of the natural ecosystem. The implications of current literature and news items will be emphasized.	Focused	Course focuses on the problem of human over population and the negative impact on the environment.	11, 12, 13, 14, 15
UGRD	MECH	4260	Green Energy Engineering (Formerly 22.426)	Introduces a comprehensive range of green energy sources, and the tools and techniques to use that energy. A strong emphasis is given to residential applications, particularly those that are cost effective. Topics include solar energy, photovoltaic, water power, wind power, geothermal heating, and bio-fuel production and use. Course will also investigate architectural considerations essential to effective implementation of green energy. Course is open to Seniors in engineering and science and those with a solid knowledge of vector notations and college algebra. Familiarity with the MATLAB computing environment would be useful.	Focused	Course focuses on the application of engineering to clean and renewable energy sources.	7, 11
UGRD	NURS	4120	Community Health and Health Policy (Formerly 33.412)	This course analyzes the development of policy and its impact on the health of populations. Students apply epidemiology and community health science to population-based nursing practice. Students identify a community health problem that can be addressed through health promotion activities.	Focused	Course integrates the health aspect of sustainability by analyzing health care policy and its impact on the health of populations.	3, 11
UGRD	NUTR	2010	Food Science with Lab	This course explores the basic principles of food science such as: food preparation, food ingredients and food preservation, regulatory agencies and food regulations, and concepts that relate to food safety, recipe alteration and menu design. The laboratory component demonstrates and illustrates the chemical and physical properties of foods including the effects of processing, ingredients, and storage on food quality and nutrient retention.	Focused	Course focuses on food's impact on health.	2, 3, 16
UGRD	PHYS	4240	Environmental Health Physics (Formerly 98.524 & 94.424)	Natural and man-made sources of environmental radioactivity and radiation; environmental transport in air, water, and soil; exposure pathways; environmental standards and regulations; environmental monitoring and surveys (MARSSIM); contaminated site characterization, and site remediation; environmental radiological impact of industry, accidents, and natural and man-made disasters.	Focused	Course focuses on environmental radioactivity, transport standards and regulations.	7, 12
UGRD	PLAS	1080	Introduction to Polymer Sustainability	This course provides a foundation in the principles of environmental sustainability and the relationship of polymers and plastics to the environment. The course introduces principles of lifecycle and material flow analysis, waste management, circular design, green chemistry and engineering and renewable materials. The basic concepts underpinning recyclability and toxicity are covered. We discuss current challenges of waste management systems and future options for increasing use of secondary feedstocks. Students learn about properties of biobased and biodegradable plastics. The course also covers fate of plastics in the environment and strategies for reducing leakage. The overarching objective is to provide an understanding of environmental challenges and solutions in the plastics industry.	Focused	Course primary focus is intersection of production/consumption and environmental impacts.	6, 8, 9, 11, 12, 14, 15
UGRD	POLI	1750	Introduction to Environmental Politics (Formerly 46.175)	This course introduces major concepts in environmental politics to provide a comprehensive understanding of the formation of environmental policy in the United States. Throughout the course, particular attention is paid to the role of government and markets in creating environmental crises and shaping policy responses.	Focused	Course focuses on the relationship between the environmental politics and the formation of environmental policy in the United States.	3, 5, 13, 16
UGRD	POLI	3320	The Politics of Food (Formerly 46.332)	The course will examine current debates in food politics over: regulatory politics and the appropriate reach of the state in food labeling, safety, and oversight; genetically modified food, organic and sustainable agriculture, the effects of economic globalization of the food supply chain and the future of the world food system.	Focused	Course focuses on the relationship between humans, anthropogenic food production, the economy, and the environment.	2, 8, 12, 13, 14, 15

UGRD	PUBH	1021	Introduction to Public Health	Public health topics, both historical and contemporary are of importance to all citizens and to societal decisions. This survey course provides a foundation for understanding public health through exposure to current health care and policy issues viewed through the perspective of multiple disciplines. Methodology for understanding population health and developing critical thinking and decision-making skills in the analysis of public health issues using a population-based perspective will be developed. The course will provide an ecological understanding of the causation and prevention of disease with an emphasis on health issues that affect society as a whole.	Focused	Focuses on the health and environmental aspects of sustainability.	3, 6, 11
UGRD	PUBH	2080	Principles of Environmental Health Science (Formerly PUBH.208)	This is a survey course that provides an overview of the rapidly growing field of environmental health, through an introduction to the links between environmental stressors and impacts on public health. The course will explore human and industrial activities that impact on health such as overpopulation, food production, air and water pollution, waste, toxic substances, pests, and global climate change. The course will also examine the types of diseases and illnesses that result from environmental impacts. These impacts have multiple causes and understanding these can in turn provide clues as to the most effective prevention options. Students will explore topics of interest in greater detail through short writing assignments.	Focused	Course focuses on the environmental dynamics of sustainability within a community and the field of environmental health.	2, 3, 6, 12, 13, 14, 15
UGRD	PUBH	3060	Socio-Ecological Health Assessment (Formerly 31.306)	Systems thinking, ecological and spatial principles and techniques are used to assess multiple contemporary health issues such as health literacy, emergence, reemergence of infectious diseases, climate change impacts and dimensions, aging population, and war and violence among other topics. The practical component of the course includes mapping and spatial analysis projects. Juniors only.	Focused	Course focuses on the socio-ecological aspects of sustainability by examining contemporary health issues including climate change impacts.	3, 4, 11, 16
UGRD	PUBH	3100	Communicable Diseases and Environmental Health (Formerly PUBH.310)	This course introduces students to the fundamentals of communicable diseases and how humans and the environment affect their distribution and impact. The course will provide an overview of infectious diseases including how they affect humans, their vectors and sources. Communicable disease investigation and tracking, as well as prevention planning and response will be discussed. The course covers the following aspects of communicable disease: the public health significance; overview of immunology and disease development and transmission; sources and carriers of disease, outbreak investigation, and disease control and prevention.	Focused	Course addresses the public health significance to communicable diseases and environmental health.	3
UGRD	SOCI	2360	Sociological Approaches to the Environment (Formerly 48.236)	Focusing on case studies of recent and pending environmental disasters, this course will trace how political, social, economic and cultural arrangements and choices contribute to environmental catastrophes and their resolution. In order to identify possibilities for agency, students will play several environmental games in which they will assume roles in the global economy, governmental and civil society to identify possibilities for agency. As a final project, students will describe a recent disaster identifying both structures that create environmental stresses and the options that might exist for structural changes. The project is intended to develop both critical thinking and communication skills.	Focused	Course focuses on social, political, economic and cultural reactions to environmental disasters.	8, 11, 13, 14, 15
UGRD	SOCI	3040	Science, Technology & Society	The complex relationships between science, technology, and society are commonly obscured by a popular belief in the value-neutrality and objectivity of science and technology. Being able to analyze that belief as a myth is necessary in order to engage in critical analysis of the ways in which science, technology and society are mutually constituted. Social inequalities are both built into and perpetuated by science, technology, and engineering. Likewise, science, technology, and engineering shape and are shaped by various societal power relations. This course will provide the analytical tools necessary to understand science, technology, and engineering as fundamentally social enterprises and to understand how they shape society.	Focused	Course focuses on the interrelationships of social sustainability, science, and technology.	9, 11
UGRD	SOCI	3300	Fast Food, Hot Planet: Sociological Approaches (Formerly 48.330)	With an eye on climate change sustainability, this course maps the social and historical dimensions of crisis and inequalities of food production and distribution. In addition to exploring food security's relation to sustainable food production, students will strengthen critical thinking, writing, and library research skills.	Focused	Course describes the social implications of food production and distribution specifically related to climate change sustainability.	1, 2, 3, 8, 9, 10, 12, 13, 14, 15
GRAD	ACCT	6020	Advanced Management and Sustainability Accounting (Formerly ACCT/60.602)	In the new environment of change, accountants are increasingly called on to support strategy through increasing efficiencies and reducing costs. This course will examine the different ways that accountants can add value through an understanding of value chain activities, use of technology, and extending value chain activities to develop a sustainability strategy.	Focused	Course focused on financial and social responsibility aspects of sustainability in accounting.	8, 9
GRAD	AMHE	597LP	ST-Land Protection Tools & Techn	Inter-campus course -- Please refer to UMASS Amherst Course Catalog for details. (NRC 597LP)	Focused	Course integrated sustainability through development alternatives for preserving the natural environment.	11, 13, 15
GRAD	AMHE	697RF	Recreational Fisheries Science	Inter-campus Course -- Please refer to the UMASS Amherst Course Catalog for details (ECO-697RF)	Focused	Course focuses on fisheries and how they contribute to social and economic sustainability.	14
GRAD	ATMO	5080	The Climate System (Formerly 85.508)	The main elements of the Climate System are the atmosphere, ocean, biosphere, land surface, and the cryosphere; the primary input of energy is from the Sun. This course examines these elements, the ways in which they interact and how they can be modeled. The Global Energy Budget is examined and both natural and human-caused climate change are considered.	Focused	The main elements of our Climate System are examined in order to understand how they interact and impact the climate system including human caused climate change.	13, 14, 15
GRAD	ATMO	5100	Regional Weather and Climate Modeling (Formerly 85.510)	Mesoscale atmospheric dynamics and regional climate dynamics. Application of regional weather and climate model to regional weather, climate modeling and forecast problems. Multi-scale physical processes, such as mesoscale and convective-scale phenomena, low-level jets, mountain waves and orographic precipitation, land/sea breezes, cyclones etc., will be discussed in order to understand the linkage between regional weather and climate.	Focused	Course integrates climate aspect of sustainability via application of regional weather and climate models and the linkage between the two.	13, 14
GRAD	BOST	603ENVSCI	Coasts and Communities I	Inter-campus Course -- Please refer to UMASS Boston Course Catalog for details. (ENVSCI.603)	Focused	Course focuses on how humans impact coasts and vice versa, outlining best practices and areas of concern.	11, 13, 14
GRAD	BOST	604ENVSCI	Coasts and Communities II	Inter-campus Course -- Please refer to UMASS Boston Course Catalog for details. (ENVSCI.604)	Focused	Course focuses on how humans impact coasts and vice versa, outlining best practices and areas of concern.	11, 13, 14
GRAD	BOST	613ENVSCI	Oceans and Human Health	Inter-campus Course -- Please refer to UMASS Boston Course Catalog for details. (ENVSCI.613)	Focused	Course focuses on how oceans impact human health.	3, 14
GRAD	BOST	630ENVSCI	Biological Oceanography	Inter-campus Course -- Please refer to UMASS Boston Course Catalog for details. (EOS 630)	Focused	Course focuses on oceans and their impact on environmental sustainability.	14
GRAD	BOST	654BIOL	Sustainability Science	Inter-campus Course -- Please refer to UMASS Boston Course Catalog for details. (BIOL.654)	Focused	Course focuses on sustainability through a scientific lens.	13, 14, 15
GRAD	BOST	671CHEM	Intro to Green Chemistry	Inter-campus Course--Please refer to UMASS Boston Course Catalog for details. (CHEM 671)	Focused	Course focuses on environmentally-friendly alternatives to toxic chemical practices.	12
GRAD	BOST	671MBAMGT	Intro Environmental Management	Inter-campus Course--Please refer to UMASS Boston Course Catalog for details. (MBAMGT 671L)	Focused	Course focuses on humans attempting to increase environmental sustainability.	12

GRAD	CHEM	5360	Advanced Materials Chemistry I	This course covers the concepts, principles, and applications of physical properties of organics- and polymer-based materials. In a broad sense, organic electronics and photonics, as a modern research and technology field, encompass both molecular organics and polymers in design, synthesis, and fabrication processes in the light of device application. For the practical purpose, this course discusses a collection of technologies that include conducting organics and polymers, organic light emitting diodes (OLED), organic photovoltaics (OP), dye sensitized solar cells (DSSC), nonlinear optical (NLO) two-photon absorption (2PA) chromophores, electro-optical (EO) polymers, and photodynamic therapeutic (PDT) and antibacterial inactivation (aPDI) drugs.	Focused	Course studies materials for use in solar energy production.	7
GRAD	CHEN	5250	Sustainable Chemistry and Engineering	This course will provide an overview of the principles of sustainable or green chemistry and engineering. The first half of the course will review the fundamental chemical engineering principles (including chemical reactions, kinetics, catalysis, thermodynamics, separations, and equilibrium) that can be used to advance the field of green chemistry and engineering. The second half of the course will introduce several emerging green engineering topics, including waste treatment, alternative energy, and renewable materials and chemicals.	Focused	Looks at green chemistry and green engineering topics, including waste treatment, alternative energy, and renewable materials and chemicals.	7,
GRAD	CIVE	5150	Cementitious Materials for Sustainable Concrete	This course is designed for introducing advanced topics in cement hydration chemistry, materials characterization and concrete sustainability. Advanced topics in chemistry of commonly used cementitious materials, micro-structure, mechanical properties, durability and sustainability will be offered. Students will learn and practice to characterize and analyze the roles of chemical admixtures and supplementary cementitious materials in concrete property improvement. Chemical issues involved in the engineering behavior of concrete will be offered. A service-learning project about sustainable concrete will be provided. Emerging topics such as self-healing concrete, self-consolidating concrete, mart concrete, 3D concrete printing and ultra-high performance concrete will also be covered.	Focused	Focused on sustainable building materials.	9,11,12
GRAD	CIVE	5415	Hazardous Materials Transportation	Hazmat transportation, safety and security are a convergence of operations, policies and regulation, and planning and design. This course will address the multimodal operations, vessels, technologies, packaging and placarding involved in the safe and secure transportation of hazmat. Safety and security rules, regulations, emergency preparedness and response, industry initiatives and programs, and U.S. government agencies governing hazmat transportation will be included, as well as international impacts on hazmat transportation safety and security.	Focused	Course integrates the environmental aspects of sustainability related to hazardous materials management systems.	12
GRAD	CIVE	5680	Environmental Fate and Transport (Formerly 14.568)	The fate of contaminants in the environment is controlled by transport processes within a single medium and between media. The similarities in contaminant dispersion within air, surface water and groundwater will be emphasized. Interphase transport processes such as volatilization and adsorption will then be considered from an equilibrium perspective followed by the kinetics of mass transfer across environmental interfaces. A professional presentation of a select paper or group of paper concerning a course topic is required.	Focused	Course integrates the environmental aspects of sustainability related to the fate and transport of environmental contaminants.	6, 12
GRAD	CIVE	5730	Solid Waste Engineering (Formerly 14.573)	Characterization, handling and disposal of municipal, industrial and hazardous wastes. Technologies such as landfills, recycling, incineration and composting are examined. A term paper and professional presentation in class regarding a relevant topic is required.	Focused	Course integrates the environmental aspects of sustainability related to solid and hazardous waste management systems and techniques.	12
GRAD	COMP	5520	Foundations in Digital Health	Digital health is concerned about utilizing computational technologies to develop health systems, in order to improve healthcare quality. These technologies include various software and hardware solutions such as web apps and wearable devices. This will introduce the foundations and methods in digital health and hand on lab sections to both undergraduate and graduate students, which include the scientific problems, challenges, and application tools of the domain, the tasks we need to handle with, and the applications of various methods such as statistics, machine learning and deep learning. After taking this course, students will obtain a clear concept about what is digital health and knowledge of a wide rang of resources and tools to solve the problems and tasks in this domain.	Focused	Course focuses on how medical technology can help human health.	3
GRAD	ECON	5150	Pol & Econ of Public Policy	The course will provide students with both a set of analytical frameworks to understand how and why specific public policies develop, and a set of normative perspectives to assess what makes for good public policy. Our treatment will be interdisciplinary drawing from areas of economics and political science. Following some grounding in the political economy of the role of government and policy making in a market based economy such as the United States, we will do case studies to understand and to evaluate policies from a variety of current areas of interest to the students and professors. Students will be introduced to basic ideas of cost benefit analysis, program evaluation, and implementation analysis.	Focused	Course focuses on how politics impact social and economic sustainability.	16, 17
GRAD	EECE	5140	Integrated Power Systems (Formerly 16.414/514)	Power System Operations and Electricity Markets provide a comprehensive overview to understand and meet the challenges of the new competitive highly deregulated power industry. The course presents new methods for power systems operations in a unified integrated framework combining the business and technical aspects of the restructured power industry. An outlook on power policy models, regulation, reliability, and economics is attentively reviewed. The course lay the groundwork for the coming era of unbundling, open access, power marketing, self-generation, and regional transmission operations.	Focused	Course examines electrical markets and the power industry and ways to make the industry more efficient for public and private sectors.	7, 9
GRAD	EECE	5250	Power Distribution Systems (Formerly 16.525)	An intermediate course in analysis and operation of electrical power distribution systems using applied calculus and matrix algebra. Topics include electrical loads characteristics, modeling, metering, customer billing, voltage regulation, voltage levels, and power factor correction. The design and operation of the power distribution system components will be introduced: distribution transformers, distribution substation, distribution networks, and distribution equipment.	Focused	Course focuses on distributed power systems and their functionality.	7, 9
GRAD	EECE	5280	Alternate Energy Sources (Formerly 16.528)	PV conversion, cell efficiency, cell response, systems and applications. Wind Energy conversion systems: Wind and its characteristics; aerodynamic theory of windmills; wind turbines and generators; wind farms; siting of windmills. Other alternative energy sources: Tidal energy, wave energy, ocean thermal energy conversion, geothermal energy, solar thermal power, satellite power, biofuels. Energy storage: Batteries, fuel cells, hydro pump storage, flywheels, compressed air.	Focused	Course explores alternative energy sources compared to conventional electricity. New and clean energy ensure a sustainable industry.	7, 9
GRAD	EECE	5290	Electric Vehicle Technology (Formerly 16.529)	Electric vehicle VS internal combustion engine vehicle. Electric vehicle (EV) saves the environment. EV design, EV motors, EV batteries, EV battery chargers and charging algorithms, EV instrumentation and EV wiring diagram. Hybrid electric vehicles. Fuel cells. Fuel cell electric vehicles. The course includes independent work.	Focused	Course focuses on the application of electrical vehicles in the market and the positive impact on the environment.	7, 9

GRAD	ENGN	5400	Designing Sustainable Products	The course introduces students to the sustainability aspects of product design. Sustainable products are designed to conserve materials and energy, select low-impact materials, eliminate toxic substances, extend product life, re-use materials, and reduce the generation of wastes. The entire product life cycle will be considered including: material extraction, material processing, manufacturing, transportation, product use, and disposal. Students will learn the impact of design solutions in a global, economic, environmental, and societal context. The students will learn strategies to identify the sustainability impacts throughout the product life cycle, as well as the application of sustainable product design principles and strategies to address these impacts.	Focused	Course focuses on the nuances of sustainable production.	12
GRAD	ENGY	5180	Energy Tech.Economics & Policy	Survey course where students integrate the knowledge from previous undergraduate courses to explore and interpret energy technologies, economics and policies. This course is an elective course for engineering students and requires a good basic understanding of technical concepts related to the measurement and calculation of energy conversion and engineering economics.	Focused	Course focuses on how alternative energy can replace fossil fuels and thus hopefully increase environmental and economic sustainability.	7, 9
GRAD	ENVI	5100	Environmental Pollution	This class is designed for graduate students in Environmental, Earth and Atmospheric Sciences, Environmental Engineering, Environmental Chemistry and Biology. The class describes the origin, transport, and transformation of pollutants in the environmental behavior and biological impacts of contaminants. Students also will learn about national and international regulations regards pollutant emissions and technology for control and remediation.	Focused	Course focuses on pollution and its impact on the environment.	12, 13, 14, 15, 16, 17
GRAD	ENVI	5160	Climate Change:Sci,Comm, Sol	Climate change offers one of the greatest challenges yet faced by society and scientists. The scientific consensus is clear that climate change is occurring, its pace is accelerating, its impacts on human society will be largely negative, and it is largely caused by anthropogenic greenhouse gas emissions. Yet, despite strong scientific evidence for the enormous challenges that society may face, scientists' attempts to disseminate that evidence beyond their peers have not yet been successful. Indeed in today's media world of blogs, YouTube video clips, and sound-bites, confusion over the scientific reality of climate change frequently dominates the discourse in classrooms and communities. This course will provide students with the tools and knowledge that they need to develop their own well-informed view of climate change. Because climate change is both impacted by humans and will increasingly impact society, this course takes a cross-disciplinary approach, integrating science, policy solutions, and media literacy as they relate to climate change.	Focused	Course integrates the scientific, social, political and media aspects. of climate change an its impact on human society.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
GRAD	ENVI	5200	Methods in Environmental Impact Assessment and Analysis (Formerly 87.520)	This course describes, and illustrates with case studies, environmental evaluation required to implement projects and policies potentially affecting the environment. Methods available to integrate technical impact predictions, prepare Environmental Statements, and make informed decisions regarding environmental effects will be covered. Incorporation of sustainability and permitting with environmental analyses will also be examined.	Focused	Course is focused on environmental evaluation of projects and policies and methods to make informed environmental decisions and conduct sustainability analyses.	6, 11, 13
GRAD	ENVI	5720	Energy and Environment (Formerly 87.572)	This course discusses the world and U.S. primary energy resources and consumption, including fossil, nuclear and renewable energy sources. Principles of thermodynamics are reviewed, especially in regard to energy usage efficiency improvement. A significant part of the course is devoted to electricity production, including site visits to fossil and nuclear power plants. The environmental effects are discussed of energy extraction and consumption, such as SOx, NOx and particulate matter emissions, acid deposition, the greenhouse effect, radioactive waste disposal. Also the risks of accidents are discussed in fossil and nuclear fuel usage.	Focused	Course focuses the use and production of energy the United States, with an emphasis on environmental impact and regulation.	7, 11, 12, 13
GRAD	ENVI	5850	Climate Change in the Classroom (Formerly 87.585)	The course is designed to help teachers from all levels improve their ability to foster student learning about the earth's changing climate. The course addresses the scientific, sociological, and pedagogical dimensions associated with climate change science. How to incorporate climate change into existing curriculum across disciplines is considered.	Focused	Course explores the dynamics of climate change ranging from scientific to social changes.	13
GRAD	ENVI	5170L	Climate Change: Sci.Comm.Sol.R	This course is designed to integrate closely with the lecture course, Climate Change: Science, Communication, and Solutions. Students will use interactive simulations, build models, and create media projects that explore climate change and sustainability. Topics include the physical climate system and carbon cycle, human energy systems, and climate policy and economics. Students take this course at the graduate level will lead group projects.	Focused	Course integrates the scientific, social, political and media aspects . of climate change an its impact on human society.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
GRAD	ENVI	5170L	Climate Change: Sci.Comm.Sol.R	This course is designed to integrate closely with the lecture course, Climate Change: Science, Communication, and Solutions. Students will use interactive simulations, build models, and create media projects that explore climate change and sustainability. Topics include the physical climate system and carbon cycle, human energy systems, and climate policy and economics. Students take this course at the graduate level will lead group projects.	Focused	Course integrates the scientific, social, political and media aspects. of climate change an its impact on human society.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
GRAD	ENVS	5810	Understand MA Cont Plan	The Massachusetts Contingency Plan (MCP) is a body of regulations designed to streamline and accelerate the assessment and cleanup of releases of oil and hazardous materials to the environment. This course serves as an introduction to the MCP and will explore the intent and use of key aspects of this working document. Though primarily a regulatory course, some topics to be covered are technical by nature. Prerequisites: None. Though not required, some familiarity with relevant environmental science and/or engineering principles is desirable.	Focused	Course focuses on Massachusetts' regulatory approach to streamlining and accelerating assessment and cleanup of oil and hazardous materials releases to the environment.	12, 14, 15, 16
GRAD	GEOL	5010	Paleoclimatology (Formerly 89.501)	This course provides students with an overview of paleoclimatology by examining the use of proxy records, such as marine and lake sediment sequences, ice cores, tree rings, corals and historical data to reconstruct past climatic conditions. Dating methods will be introduced. Throughout, we will critically analyze our understanding of past climates and environments and identify directions for future research. Topics include: abrupt climate change, human evolution and climate, biosphere-climate interactions and paleoclimate modeling.	Focused	Course is focused on climate change and biosphere-climate interactions and explores historical data to reconstruct past climatic conditions.	13
GRAD	MECH	5040	Energy Engineering Workshop (Formerly 22.504)	A group design of an innovative energy system. Integration of many aspects of the student's engineering background, including design concepts, technical analyses, economic and safety considerations. Ideally the whole design cycle of design, build, test. A formal report and oral presentation.	Focused	Course focuses on the design of innovative energy systems including economic and safety considerations.	3, 7, 9
GRAD	MECH	5210	Solar Fundamentals (Formerly 22.521)	Utilization Terrestrial irradiation on tilted surfaces; radiation, conduction, convection in collectors; absorptance, emittance, reflection, transmittance of solar irradiation; energy flow in flat plate and concentrator collectors; storage; design tools; small project; web-based.	Focused	Course focuses on the science and application of solar energy to sustainability.	
GRAD	MECH	5220	Wind Energy Fundamentals	An overview of all aspects of wind energy power generation: The nature of and statistics of wind, turbine siting requirements, aerodynamics of the rotor system, mechanical power transmission, generators, blade construction, structural analysis of turbine components, electrical power distribution.	Focused	Course examines renewable energy innovation and implementation.	7

GRAD	MECH	5250	Grid-Connected Solar Electric Systems (Formerly 22.525)	Students will study the concepts and design considerations of grid-connected, solar-powered, electrical generation systems, from residential through utility scale. Emphasis will be on practical applications that help make the student ""work ready"" at graduation. Grading consists of two tests during semester; one individual project (residential scale PV system); and one group project (commercial-scale system). This course fulfills an elective requirement for renewable energy students.	Focused	Course focuses on distributed power systems and their functionality.	7, 8
GRAD	MECH	5255	Hydropower	The fundamentals of hydropower engineering and the related parameters for the design of hydropower plants, including, hydraulic, hydromechanics and hydroelectric components, are presented in this course. References are also made to dams and water conduit systems, in multi-purpose hydro development projects, as well as small hydroelectric plants. The hydrological, environmental and economical aspects of hydro projects are also briefly addressed. At the end of the course, students should be able to calculate the basic parameters of hydropower projects, at a preliminary level, such as powerhouse capacity, turbine and generator technical parameters and dimensions, water conduit and hydro mechanical equipment types and sizes, and perform a cost-benefit evaluation.	Focused	Course analyzes the fundamentals on hydropower, its application to the energy sector, and multi-factor assessment of hydro plants.	6, 7, 14
GRAD	MECH	5270	Solar Energy Engineering (Formerly 22.527)	Systems engineering, stochastic modeling, design, and life-cycle cost analysis of several solar systems: photovoltaics, passive heating, solar cooling, and daylighting; Web Based.	Focused	Course focuses on the engineering aspect of solar energy.	7
GRAD	MECH	5280	Photovoltaics Manufacturing (Formerly 22.528)	Overview of the manufacturing processes used to make a typical crystalline solar cell. Detailed study of selected processes and manufacturing problems, such as solar cell testing, characterization, reliability issues, factors affecting yields, automated material handling, affect of impurities in crystal growth.	Focused	Course explores alternative energy sources compared to conventional electricity. New and clean energy ensure a sustainable industry.	7
GRAD	MECH	5285	Energy Policy and Energy Codes	Explore and codify the status of the world's energy infrastructure and discuss energy-related policies. Identify areas of energy inefficiency and examine pathways to a future dominated by renewable and sustainable resources.	Focused	Course focuses on how alternative energy can replace fossil fuels and thus hopefully increase environmental and economic sustainability.	7
GRAD	MECH	5290	Fuel Cell Fundamentals (Formerly 22.529)	The primary objective of this course is to understand the fundamental science and engineering of fuel cells and redox flow batteries (i.e., reversible fuel cells). The fundamental principles of electrochemistry, thermodynamics, and kinetics of electrochemical reaction processes, as well as mass transport in electrochemical energy systems will be considered. Emphasis will be placed on operating principles and the design and diagnostics of the proton exchange membrane fuel cell as a portable energy conversion system, and the vanadium redox flow battery as a large-scale energy storage system. Cell components and their influence on the overall performance of these systems will be discussed in detail. An introduction to the cost analysis of electrochemical energy storage will be presented.	Focused	Course analyzes the fundamentals on fuel cells and their application to the energy sector.	7
GRAD	MECH	5340	Green Combustion and Biofuels (Formerly 22.534)	Fundamentals of combustion and pollutant formations in application to internal combustion engines, turbines, and fire safety. Concepts include flame structure, flame speed, flammability, ignition, reaction kinetics, nonequilibrium processes, diffusion flames, and boundary layer combustion. Additional specific emphasis on combustion modeling, green approaches to energy production, and biofuels.	Focused	Course examines the fundamentals of combustion with emphasis on green approaches to energy production and biofuels.	7, 12
GRAD	MECH	5350	Fund. of Sustainable Energy	Introduction to scientific principles associated with sustainable energy technologies. Topics include: thermodynamic laws and engineering fundamentals in energy processes, thermodynamic energy conversion, wind and geothermal energy, photovoltaics, ocean thermal energy conversion, electrochemical energy, biomass, and selected emerging energy technologies.	Focused	Course focuses on how alternative energy can replace fossil fuels and thus hopefully increase environmental sustainability.	7
GRAD	PCST	5270	Sustainable Housing Development and Land Use: Conflict, Policy, and Practice (Formerly PCS 527)	Housing is fundamental to the quality of life in communities, and housing conflict, policy and practice shape the availability of this fundamental good. This course will examine the economic, environmental, social, and cultural factors that shape housing and its sustainability. The contentious nature of housing and land use policy in the United States will be summarized, with students learning how housing policy impacts communities, states, and regions. The course will then give students a detailed understanding of the conflictive process through which housing is developed and the role the market, government, funders, workers, and housing consumers play in influencing the creation and development of housing. The course will highlight ways in which current housing development policy and practices are not sustainable, and will examine more recent efforts to establish standards and practices that enhance consensus and sustainability. Students will learn how to manage conflict and take a housing project through the various stages, such as project conceptualization, market analysis, design, site acquisition, financing, construction, and occupancy. While the course focuses on the U.S. context, students will learn of international efforts to achieve greater sustainability in housing. The course will provide students with both practical and theoretical knowledge of housing and land use conflict, policy and development practices. Case studies of actual projects will be presented.	Focused	Examines the economic, environmental, social and cultural factors that shape housing and its sustainability.	1, 5, 9, 11
GRAD	PLAS	5330	Green Coatings Science and Technology I (Formerly 26.533)	This course reviews the basic principles of design and formulation of water-borne, high-solids and powder resins used for the development of solvent-less "green" coatings and the use of bio-derived resins, mostly based on soybean oil and other renewable raw materials. The mechanisms and methods of curing and of polymerization for polymers used as coatings will also be covered. The basic principles of formulation of coatings will be introduced. Permission of instructor for Plastics Engineering Undergraduates seeking to take course as technical elective.	Focused	Course primary focus is intersection of production/consumption and environmental impacts.	6, 8, 9, 11, 12, 14, 15
GRAD	PLAS	5970	Plastics & Environment	This course investigates the waste management solutions for different types of plastics. Both traditional and emerging recycling methods will be highlighted. Accumulation of plastic waste in the natural environment and the toxicology of plastics as well as their additives will be discussed. Further, analysis methods and instrumentation to characterize recycled plastics, and the differences in virgin polymers and recycled polymers will be introduced. Potential degradable, biodegradable or biobased alternatives will be reviewed along with the concepts of life cycle assessment and Green Chemistry for designing the most sustainable plastic materials.	Focused	Course focuses on the impacts that plastics have on the environment, and ways in which biodegradable or other alternatives can alleviate that impact.	9, 12
GRAD	PSYC	6250	Advanced Community Dynamics: Lowell (Formerly 47.625)	An examination of principles that influence community structure, function, and evolution over time. Students will learn how community patterns and activities can best be understood and how community problems and concerns can best be addressed, employing psychological and other conceptual frameworks and perspectives. Specific emphasis will be placed on the historic and diverse city of Lowell. Prerequisites: 47.500 and 47.512.	Focused	Course focuses on the relationship between people of Lowell and incorporates the social aspects of sustainability.	11
GRAD	PUBH	5061	Introduction to Environmental Health (Formerly 19.506)	This course will survey the rapidly growing field of environmental health through an introduction to the links between human activities and environmental systems and how these interactions can impact the sustainability of ecosystems and human/public health. The course will explore human and industrial activities that impact the environment and result in human diseases such as population, food production, air and water pollution, waste, the built environment, toxic substances, pest control, and global climate change. Understanding the links between human activities and environmental systems is essential to developing effective prevention strategies and building sustainable communities.	Focused	Course focuses on the dynamics of sustainability within communities and globally in relation to the field of environmental health.	2, 3, 6, 12, 13, 14, 15

GRAD	RADI	5240	Environmental Health Physics (Formerly 98.524 & 94.424)	Natural and man-made sources of environmental radioactivity and radiation; environmental transport in air, water, and soil; exposure pathways; environmental standards and regulations; environmental monitoring and surveys (MARSSIM); contaminated site characterization, and site remediation; environmental radiological impact of industry, accidents, and natural and man-made disasters.	Focused	Course focuses on environmental radioactivity, transport standards and regulations.	7, 12
UGRD	AEST	2250	History of Photography (Formerly 79.225)	Less than 200 years old, photography seems to span millennia. With 1839 as the invention's launch date, there is no photograph of George Washington, but very soon we are flooded with the faces of composers, painters, and presidents: we know and are reminded of the ravages of civil and world wars, industrial progress and social injustice, or the beauty of pristine landscapes and their ecological demise. In this course, students will become familiar with some 100 notable photographers, from the beginning years of its invention to contemporary times with works by major artists and forgotten visionaries, all serving as a foundation for inspiration and understanding of the art worlds most visible medium. Grading in the course is based on a mid-term and final exam along with a major research paper.	Related	The focus on social injustice, industrial progress and civil/world wars relates to the social-economic and social-environmental element of sustainability.	11, 15, 16
UGRD	AMST	2480	Values in American Culture	Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists. Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists.	Related	Course examines how American ideals impact the environment and society.	10, 11, 14, 15
UGRD	ARHI	3130	American Art (Formerly 58.313)	The study of American painting, sculpture, and architecture from the Colonial period to the end of the nineteenth century seen in relation to European developments and American social and technological changes. Emphasis is placed on New England architecture.	Related	Course examines the correlation between American art and societal changes and movements and integrates the social/cultural aspects of sustainability in art.	9, 11
UGRD	ARHI	3140	American Architecture (Formerly 58.314)	This course begins with a discussion of native American building traditions and proceeds chronologically from the 17th through the 20th centuries. Students will gain a familiarity with the major movements in American architecture (such as Colonial, Greek Revival, Victorian, Arts and Crafts, City Beautiful, International Style, Postmodern) as well as the leading architects such as Frank Lloyd Wright and Frank Gehry. The architecture is discussed in its historical context with attention to the inventions, materials and aesthetic assumptions that made it possible.	Related	Course examines the history and changes of American architecture in relation to the social/cultural aspects of sustainability and social movements.	9, 11
UGRD	ARTS	3150	Packaging and Point of Purchase	This course explores design in a physically three-dimensional space, such as packaging and environmental graphics. Through multiple projects students learn packaging systems, the billboard effect and how designs live and interact in their physical space. Improving form, industrial design and sustainability are challenges this course will explore. This course expands to touch on printing techniques and constraints, die lines and conceptual design beyond the screen.	Related	Sustainability of packaging decisions.	12
UGRD	ARTS	3711	Place/Visual Explor. of Lowell	This studio course is designed for students who have an interest in making images to explore the concept of "place", using the landscape of Lowell as a creative resource. Open to all university students, the course is structured for students who are new to the arts as well as students who have previous studio art experience. Drawing upon the unique features of the particular landscape that is the city of Lowell, students will build a body of images that is a response to the geographical and cultural histories evident in the city's physical attributes. From its history as the center of industry and textile design to the present day, the city will be viewed as raw material for the conceptual foundation of the work produced in this course. (Class will meet both on and off-campus.)	Related	Course takes a place based approach to Lowell and examines the social, cultural, and environmental factors that make the city what it is.	11
UGRD	ARTS	3765	Adaptive Devices for Better Life	In this interdisciplinary course, students and professors from Art and Design and Physical Therapy and Kinesiology will collaborate with a hospital partner to create adaptive devices to improve the lives of children with disabilities. Students will work in small, interdisciplinary teams to invent devices to better facilitate the daily activities of children with disabilities, such as customized spoons and creating VR wheel chair training. Class time will consist of demonstrations, studio/production, visits to the hospital for testing and consultation, and final presentation to patients, therapists, and potential investors. Numerous production work flows, including 3D modeling, 3D scanning, 3D printing, VR sculpting, and physical object making with various materials will be utilized.	Related	Application of several disciplines to solve barriers reducing children's full participation in society.	3, 10
UGRD	ASAM	2120	Introduction to Asian American Studies	This course provides students with an overview of the multidisciplinary field of Asian American Studies from two distinct disciplines. The course begins with the history of Asian American Studies and the methods used to advance the field. Next, various aspects of the Asian American experience, such as gender and sexuality, are examined. Students also participate in service learning in partnership with Asian-serving community organizations in and around Lowell, MA.	Related	Course integrates cultural and social justice aspects of sustainability via historical processes and sociocultural phenomena that define Asian-American populations in the U.S.	5, 11
UGRD	ATMO	1410	Weather and Climate (Formerly 85.141)	Serves as a general meteorology course for the non-science major. Topics include: atmospheric composition, solar radiation, temperature, moisture and condensation relationship between air pressure and wind, weather patterns, severe weather, optical phenomena in the atmosphere, and the behavior and possible change of climate.	Related	Course offers an understanding of basic principles of the atmosphere, severe weather and climate change.	13
UGRD	ATMO	3400	Tropical Meteorology (Formerly 85.340)	An introduction to the tropical atmosphere including tropical climatology, structure and dynamics of easterly waves, tropical cyclones and monsoonal circulations.	Related	Class relates to the dynamics of the tropical climate and how it differs with others around the world.	13, 14, 15
UGRD	ATMO	4080	The Climate System (Formerly 85.408)	The course covers the main elements of the climate system—the atmosphere, ocean, biosphere, solid earth, and cryosphere—and the primary source of energy, the sun. The elements are examined in terms of observed structure and important physical processes, the ways in which they interact, and how they can be modeled. The global energy budget is discussed and both natural and human-caused climate change are considered.	Related	?? Is this the undergrad version of 4080? Different course?	Already in inventory?
UGRD	BIOL	1110	Principles of Biology I (Formerly 81.111)	Introduces topics such as the chemical and physical basis of life, its evolution, diversity, distribution, and interrelationships of life forms. The central theme of genetic replication, translation, expression, and selection will be emphasized as a unifying principle which determines and integrates structure and function at the cellular, individual population, and community levels of organization. Designed for those students who intend to pursue career options in the biological sciences, biotechnology or related areas such as medicine, biomedical research, radiological sciences or environmental sciences. It is the first-semester course of a two-semester sequence.	Related	Class introduces students to relationships between life forms and the environment.	3, 14, 15
UGRD	BIOL	1120	Principles of Biology II (Formerly 81.112)	Serves as a continuation of the 81.111/81.112 sequence for those students who intend to pursue career options in the biological sciences or related professional areas such as medicine, biomedical research or environmental sciences. Molecular energy exchange in organisms (photosynthesis and respiratory metabolism), the common functional needs of support, locomotion, nutrition, internal communication and the maintenance of homeostasis are considered. Control and regulation of organisms at levels beyond the individual are considered through discussions of population and community ecology.	Related	Aspects of biology including medicine and environmental science are examined through a sustainable lens.	3, 14, 15

UGRD	BIOL	1160	Freshman Seminar in Biology (Formerly 81.116)	This course is designed to acclimate incoming students to their new University environment. Students will learn about the Biology program, its faculty and staff members, University resources, and other information useful for success.	Related	Course includes discussion of University's environmental programs and benefits, resources and ways to get involved.	3
UGRD	BIOL	1220	Biology for Health Sciences (Formerly 81.122)	Develops a basic understanding of biological topics relevant to students in the health sciences. Course will introduce students to biochemistry, cell biology, cellular respiration, cell replication, genetics, inheritance and molecular biology. Introduction to prions, viruses, prokaryotic and eukaryotic biology will also be covered.	Related	Students will gain an understanding of the relationship between basic biology, the environment, and the social aspect of sustainability.	3
UGRD	BIOL	2100	Biology for Engineers (Formerly 81.210)	Develops a basic understanding of the science of biology for engineering students, including and introduction to biochemistry, cell biology, metabolism, genetics, genomics, molecular biology, cell growth, and nutrition. Both eukaryotic and prokaryotic biology will be covered.	Related	Course examines the relationship between biology and engineering in a sustainable way.	3
UGRD	BIOL	3150	Principles of Ecology (Formerly 81.315)	A series of lectures concerned with the interrelationships of organisms with their abiotic environment with emphasis on the New England area. Selected current topics will supplement the text.	Related	Course examines the relationships between organisms and the environments in which they live.	14, 15
UGRD	BIOL	3200	Botany (Formerly 81.320)	Serves as an introduction to the study of the plant kingdom dealing with the structure, function, and diversity of plants with an emphasis on seed plants. The physiology, morphology, and taxonomy of plants is emphasized.	Related	Introductory course relates the correlation between plants and the environment.	14, 15
UGRD	BIOL	3240	Economic Botany (Formerly 81.324)	Discussions on how humans use plants. Topics will include: Structure and characteristics of woods and their uses in construction of various items, agricultural uses of food plants and spices, poisonous plants, medicinal plants, plants used in religious ritual and plants used as hallucinogens, plants that have altered human history.	Related	Course integrates the social, environmental and economic aspects of sustainability through evaluation of how humans use plants and how they have altered human history.	2, 3, 12, 14, 15
UGRD	BUSI	1500	Business 101 (formerly 66.017, MGMT 150, BUSI 150)	This course will provide a foundational understanding of business, the various types of business organization, the key functional areas of business and how these functional areas are interconnected. Crucial skills such as use of technology, team-building, information literacy and communication will be emphasized. In addition, the course will provide an overview of contemporary business issues such as ethics and globalization. A major course goal is to enable students to gain a basic understanding of career opportunities particularly in relation to the areas of specialization within the Manning School of Business undergraduate curriculum.	Related	Course integrates economic and global aspects of sustainability.	8, 9, 12
UGRD	BUSI	1500	Business 101 (formerly 66.017, MGMT 150, BUSI 150)	This course will provide a foundational understanding of business, the various types of business organization, the key functional areas of business and how these functional areas are interconnected. Crucial skills such as use of technology, team-building, information literacy and communication will be emphasized. In addition, the course will provide an overview of contemporary business issues such as ethics and globalization. A major course goal is to enable students to gain a basic understanding of career opportunities particularly in relation to the areas of specialization within the Manning School of Business undergraduate curriculum.	Related	Course includes work on the ethical considerations for globalized business and supply chain.	8, 9, 12
UGRD	CHEM	2040	Introduction to Organic and Polymer Chemistry (Formerly 84.204)	This course is a one-semester overview of organic chemistry for plastics engineering majors. Organic chemistry and its associated principles underscore a broad component of the plastics engineering curriculum. It is desirable therefore for such students to develop a basic appreciation of the fundamental reactions in organic chemistry, as well as an understanding of the interaction of organic compounds with their environment. Students will therefore be expected to secure a basic understanding of, e.g., chemical bonding, the chemistry of alkanes, alkenes, alkynes, aromatic compounds, substitution and elimination reactions, reactions of organic alcohols, ethers, epoxides, aldehydes and ketones, carboxylic acids, and amine compounds. When appropriate, examples will be provided that relate to those typical polymerization reactions (e.g. free-radical or ionic) employed to manufacture commercial polymer materials. Coverage will include synthesis of organic chemicals and polymers from natural and sustainable materials.	Related	Course provides students with an understanding of how organic compounds interact with the environment and also includes synthesis of organic chemicals from sustainable materials.	9, 12
UGRD	CHEN	1010	Technology and Human Built World (Formerly 10.101)		Related	Managing the built environment is a critical component of sustainability.	9
UGRD	CHEN	2050	Fundamentals of Electricity (Formerly 10.205)	An introduction to direct current and alternating current of electric circuits with emphasis on practical application.	Related	Fundamentals of electricity are examined to better understand its impact on economic and environmental sustainability.	7
UGRD	CHEN	4090	Engineering Economics and Process Analysis (Formerly 10.409)	This course brings together all the Chemical Engineering core principles applied to the development of economic process designs. Economic evaluations of manufacturing operations and projects including essential concepts in accounting, depreciation, time value of money, and the evaluation of investment alternatives are applied for process analysis and design objectives. The impact of management and production costs, product markets, regulatory, environmental and safe production practices, the analysis of corporate annual reports including balance sheets and income statements, and capital and operating costs are all considered in regard to efficient and economic processes. In addition to lecture materials students are required to complete comprehensive projects.	Related	Course integrates the economic and environmental, health & safety aspects of sustainability via the application of chemical engineering principles to the development of process designs.	8, 9, 12
UGRD	CIVE	2250	Surveying I (Formerly 14.225)	A presentation of the basic instruments used in survey processes including distance, angle and level measurements. Analysis and adjustment of random errors. Principles of closed and open traverses. Fieldwork practice in instrument use and office-type projects in contour mapping and the application of contoured topography to highway and water-control projects.	Related	Course relates surveying to economic and structural stability.	6, 9, 11
UGRD	CIVE	2260	Geomatics (Formerly 14.226)	Principles and practice of route surveys and designs. Topics include simple and compound circular curves, intersections of straight and curved baselines, vertical alignment principles including parabolic easement curves, earthwork operations and determination of volumes. Includes office-type projects illustrative of the application of surveying information to Civil Engineering projects such as water resources, sanitary sewers and property subdivision. Fieldwork instruction in basic traverse surveys, gathering of topographic information, and the staking-out of buildings and circular curves.	Related	Course relates to economic dynamics of sustainability.	6, 9, 11
UGRD	CIVE	3110	Engineering Materials Laboratory (Formerly 14.311)	Experiments and written reports. Testing and measurement techniques and material standards illustrating behavior of materials, including metals, wood, and Portland cement concrete.	Related	Related to the experimentation and application of finite resources.	9
UGRD	CIVE	3300	Soil Mechanics (Formerly 14.330)	Development of the fundamental principles of soil mechanics as utilized in soil and foundation engineering. Topics include: classification, index properties, strength and stress-strain behavior, effective stress principle, permeability, flow and consolidation. Introduction to basic soil mechanics laboratory practice.	Related	Course examines soil and its various engineering parameters, such as classification, permeability, compressibility, and shear strength.	9
UGRD	CIVE	3400	Transportation Engineering (Formerly 14.340)	Development of the basic principles pertaining to the movement of people and goods by modern transportation systems. Techno-economic characteristics of the various transportation modes. Aspects of planning, design and operation of land, air and water transportation facilities. Development, structure and function of the U.S. transportation system.	Related	Systems of transportation engineering are examined in a sustainable context.	9, 11
UGRD	CIVE	3500	Structural Analysis I (Formerly 14.350)	Principles of structural analysis applied to typical civil engineering structures as the initial step in the total design concept. Emphasis on the classical methods of analysis of statically determinate and indeterminate structures. The personal computer as an analytical tool.	Related	Methods of structural engineering draws a blueprint for future sustainable infrastructure.	9

UGRD	CIVE	3720	Civil Engineering Systems (Formerly 14.372)	Introduction to methods of operations research, management science and economic analysis used in the design, planning and managing of engineering systems. Main topics covered: systems modeling, optimization concepts, network analysis, mathematical programming, critical path analysis, decision analysis, economic consideration.	Related	Course integrates the economic and social responsibility aspects of sustainability in engineering systems.	8, 9, 11
UGRD	CIVE	4310	Foundation and Soil Engineering (Formerly 14.431)	The application of soil mechanics to the design and analysis of foundations and soil structures. Topics include: soil origin and deposition, subsurface exploration, bearing capacity and settlement analyses, design of shallow foundations, earth pressures, retaining structures, and slope stability.	Related	Basic foundations of soil engineering links to sustainable agriculture.	9
UGRD	CIVE	4750	Construction Management I (Formerly 14.475)	Development of management skills and techniques to plan, schedule, supervise, and control construction projects. Project estimating; labor costs and productivity; construction plans, specifications and contracts; labor relations; time, cost and quality control; construction equipment and project decision making and financing.	Related	Construction management relates to the economical factor of sustainable infrastructure	8, 9, 10, 11
UGRD	COMP	4650	Introduction to IoT Security and Privacy	The Internet of Things (IoT) has broad application domains including healthcare, smart home, retail, manufacturing, agriculture, environmental monitoring and industrial automation. This course introduces different aspect of IoT security and privacy on hardware, software, network, and data. The key objectives include: understanding IoT frameworks, applications and security and privacy concerns; being familiar with IoT hardware security; understanding IoT system security; mastering IoT network security; understanding the IoT data security and privacy.	Related	Course discusses environmental monitoring which measures the impact an activity has on an environment.	14,15
UGRD	CRIM	2010	Systemic Issues in Criminal Justice	This course is designed to inform students about the legacy of bias, discrimination, and inequality in the United States, and how this is particularly reflected in our criminal justice system. Drawing on a number of disciplines the course will explore theories of bias and discrimination both individually and collectively, what common stereotypes and misconceptions exist, and how they impact contemporary criminal justice practices. Evidence-based solutions to the reduction of these systemic issues will be discussed.	Related	Course focuses on racial inequality and how it impact society and social sustainability.	10
UGRD	CRIM	2130	Emergency Management (Formerly 44.213)	The purpose of this course is to introduce the student to the various ways in which a corporation and local municipality can plan for a disaster before it occurs. Topics covered include risk identification and assessment of multi-hazards whether natural and man-made, violence in the workplace, development of crisis and disaster incident management programs, and business/agency continuation planning.	Related	Course relates to the economic and socio-economic relationship with Emergency Management.	11, 16
UGRD	CRIM	3500	Institutional Correction (Formerly 44.350)	This course provides an in-depth examination of the history, function, structure, and operation of American adult and juvenile correctional institutions.	Related	Course analyzes the effect that correctional institutions have on helping or hindering social sustainability.	16
UGRD	CRIM	3600	Gender, Race, and Crime (Formerly 44.360)	This course examines gender and racial implications of criminal laws, criminal justice practices and programs will be examined. The position of women and racial/ethnic minorities will be assessed from the different perspectives of victims, offenders, and criminal justice practitioners.	Related	Course relates social interactions and implications to the social dynamics of sustainability.	5, 10, 16
UGRD	CRIM	3650	Hate Crimes (Formerly 44.365)	Hate crimes illustrate bigotry plus criminal acts. This course examines prejudice as a motivation for criminal behavior. The criminological theory for hate crime is reviewed, as well as historical perspectives of this crime category. This is a rich and comprehensive exploration that begins with understanding the psychology of prejudice and ends with reviewing genocide as a mass hate crime.	Related	Course focuses on crime and how it impact society and social sustainability.	10,16
UGRD	CRIM	3660	Miscarriages of Justice	This course will provide a critical analysis of our Criminal Justice system, focusing specifically on policies and practices that lead to errors and unjust outcomes. Students will also explore the factors that contribute to miscarriages of justice, and the impacts on victims, their families, and society. Socio-political and socio-economic factors that contribute to miscarriages of justice will be specifically addressed.	Related	Course integrates the social aspects of sustainability by examining law and equality.	16
UGRD	DGMD	2310	Media, Law and Ethics	This course primarily is designed to explore key legal issues you are likely to confront as a journalist, mass media professional or student interested in learning more about the relationships between law, media and ethics in this global community. Nonetheless, you will be challenged to think critically about the applicability of those issues to individuals and to media institutions that transmit information via spoken communications, writing, traditional media, text messages, social network sites, or e-mail messages.	Related	Course explores the laws and ethics behind media and how it's used through societies across the globe.	10, 16
UGRD	ECON	2010	Economics I (Microeconomics) (Formerly 49.201)	Studies the principles of production and exchange. An introduction to demand, supply, pricing, and output under alternative market structures. Derived demand and resource markets are introduced.	Related	Class integrates an understanding of economic sustainability including aspects related to growth, production, and distribution.	8
UGRD	ECON	2020	Economics II (Macroeconomics) (Formerly 49.202)	Studies the principles governing the level of national income and employment. Also examines the commercial banking system, monetary and fiscal policy, the international economy, and alternative economic systems.	Related	Course focuses on the economic aspects of sustainability such as maintaining stability.	8
UGRD	ECON	3020	Labor Economics (Formerly 49.302)	An introduction to the economic analysis of behaviors and institutions in the labor market: labor supply and participation, labor demand by firms, wage determination under different institutional settings, and gender, race or ethnicity as determinants of different labor market outcomes. The course presents microeconomic models, empirical findings and their public policy implications on topics such as minimum wage, affirmative action, social insurance programs, workplace safety, and subsidized day care.	Related	Course focuses on the dynamics of the labor market and relating it to the social, economic, and environmental elements of sustainability.	1, 8, 10
UGRD	ECON	3450	Health Economics (Formerly 49.345)	An introduction to the economic analysis of health care market The course presents microeconomic models, empirical findings and public policies referring to the following topics: the production and demand for health (the investment/consumption aspects of health and the relationship between socio economic status and health status), the issues of moral hazard and adverse selection in the insurance market, the role of information in the physician-patient relationship, the different regulation and payment systems for providers, the Medicare and Medicaid programs, and the comparisons between the US system and the health systems of other western economies and developing countries. This class aims to help students becoming more informed future citizens and consumers or producers of healthcare.	Related	Course focuses on an overview of the economic implications of the U.S health care systems.	3, 8, 10
UGRD	ECON	4020	Industrial Organization (Formerly 49.402)	The field of Industrial Organization studies the behaviors of firms in imperfectly competitive markets. Its importance is best illustrated by understanding limitations of perfect competition. By definition, a perfectly competitive firm takes the market determined price as given and therefore has absolutely not control on price. Consequently, there is no room for any pricing strategy, not room for advertisement, and the firm has little incentive to conduct R&D or merge with other firms. All these business practices that we see every day must be discussed and analyzed in a setting of imperfect competition - the main focus of Industrial Organization.	Related	Course examines the competition between industrial organizations through an economic lens.	8
UGRD	ECON	4030	International Trade Theory (Formerly 49.403)	The classical and modern theories. International payments, exchange and trade controls, and international trade policy determinants. Prerequisites: 49.201, 49.202.	Related	Course examines theories related trade both domestic and international.	8

UGRD	ECON	4090	Innovation and Development	This course integrates ideas from the history of economics with national development experiences to construct a theory of development. Fundamental to economic development is the innovation process through which business enterprises, situated in particular nations, generate productivity. The first part of the course focuses on the advanced nations, particularly Britain, United States, and Japan. Then we look at the emergent economies of South Korea, Taiwan, Singapore and Hong Kong, followed by the emerging economies of China and India. We explore why Russia is lacking in innovative enterprise. We conclude by asking how the integration of the theory and history of economic development can inform strategies to promote economic development characterized by stable and equitable growth.	Related	Course explores innovation and development characterized by stable and equitable growth across the global economies.	8, 9
UGRD	ECON	4100	Economic Growth and Development (Formerly 49.410)	In this course, we try to solve the puzzles of why some countries are so rich and some are so poor and why some countries grow so quickly and some grow so slowly. After introducing the basic analytical framework, we will investigate various possible reasons in explaining the observed country differences. Those possible explanations include differences in countries' investment rates, population growth rates, human capital accumulation rates, production technologies, openness to international trade, and government policies. Issues of income inequality and their effect on economic growth will also be addressed.	Related	Course focuses on the economic dynamics that make some countries wealthy, while others struggle to catch up.	8
UGRD	ECON	4150	Introduction to Environmental Economics (Formerly 49.315/415)	This course provides an introduction to the field of environmental and natural resource economics. It is designed to give students an overview of how economic principles can be applied to environmental management and policy. Topic areas and applications include evaluation of environmental policies, valuation of environmental goods and services, climate change, and management of renewable and non-renewable resources. Students will learn to critique articles and other media and have intelligent discussions related to the topics listed above.	Related	Course looks at the economics of the management of renewable resources, climate change, and environmental policies	8,12
UGRD	EDUC	2050	Connecting Loc.&Glob.Iss.in Ed	This educational minor course explores how we prepare students to thrive in a world of volatility, uncertainty, and complexity. Does the traditional view of what students need to know and be able to do by graduation provide the competencies needed to navigate that world? What to graduates need to be successful in a world we cannot even envision, in jobs that have yet to be created? This hybrid course is an elective.	Related	Course focuses on local hoals and global issues in health.	4
UGRD	EDUC	2060	Inclusion in Education and Society	This course focuses on the how students with disabilities are included in education and society The course offers multiple perspectives, strategies and readings to consider how inclusive schools and societies that provide supportive, context-appropriate conditions for learning can lead to more positive outcomes for all students and community members. Within the context of special education, students will be introduced to different types of disabilities and services that can be provided in schools, communities and in society to ensure effective inclusion of people with disabilities. This course ma be taken for the education minor.	Related	Course examines schooling through a social lens of sustainability focusing on inclusion and reducing inequalities.	4,10
UGRD	EDUC	2100	Introduction to Moderate Disabilities	This foundational course consists of two major components. The first provides candidates with a comprehensive examination of special education laws and legislation and the characteristics of students with moderate disabilities. The second component provides an overview of instructional models that have empirical support for their effectiveness in teaching students with moderate disabilities. Candidates also gain exposure to IEP writing and lesson planning.	Related	Course examines schooling through a social lens of sustainability focusing on inclusion and reducing inequalities.	4,10
UGRD	EDUC	4050	Children with Disabilities in the Classroom (Formerly 01.505)	This course examines the nature of cognitive emotional, developmental, sensory, and physical disabilities that compromise student capacity to make adequate academic progress without special intervention. Legal and ethical responsibilities of the educator in inclusive classroom settings and as an active member of a multidisciplinary learning team are emphasized.	Related	Course examines schooling through a social lens of sustainability focusing on inclusion and reducing inequalities.	4,10
UGRD	EECE	2110	Fundamentals of Electricity I (Formerly 16.211/213)	Serves as an introduction to direct current and alternating current analysis of electric circuits, with emphasis on energy and power. Covers design and use of multi-range voltmeters, ammeters, and ohmmeters, the use of bridges and oscilloscopes, phasor analysis of AC circuits, Trigonometric Fourier series, BODE plots, transformers, relays, solenoids, mechanical analogs and magnetic analogs with the application of Fourier and BODE techniques. Students will also be introduced to DC and AC motors and generators, residential circuits, equipment protection, and introduction to digital logic including minimization techniques. Availability and cost of instruments and components is stressed throughout this course. Not for EE majors. Engineering Science (100%).	Related	Course covers an overview of fundamental electricity and the application to suitable practices.	7
UGRD	EECE	4440	Power Distribution System (Formerly 16.444)	An intermediate course in analysis and operation of electrical power distribution systems using applied calculus and matrix algebra. Topics include electrical loads characteristics, modeling, metering, customer billing, voltage regulation, voltage levels, and power factor correction. The design and operation of the power distribution system components will be introduced: distribution transformers, distribution substation, distribution networks, and distribution equipment. Prerequisite: 16.355	Related	Course covers the operations of electrical power distribution and the relationship to the economic and environmental dynamics of sustainability.	7, 9
UGRD	ENGL	2400	Literature and Women (Formerly 42.240)	A survey of literary attitudes toward women from the Judaic and Hellenic periods through the present.	Related	Course integrates the social aspect of sustainability by examining the literary attitudes towards women throughout history	4,5, 11
UGRD	ENGL	2430	Contemporary Women Writers (Formerly 42.243)	Contemporary Women Writers introduces students to American women writers of the last fifty years. We examine the historical,socio-cultural, political, and personal influences on these writers' work by studying trends and events in recent American history and themes reflected in the works. By studying contemporary women's writing in this contextualized fashion, students can appreciate larger trends in our society, the role writing plays in examining such trends, and the value of literature as an exploration of human growth and struggle. Through discussion, group collaboration, critical analysis, and by designing their own graphic organizers, students gain a breadth of knowledge in the following areas: the themes and stylistic concerns of contemporary American women writers; the key historical events that influence contemporary American women's writing; the critical reading of literary texts.	Related	Course integrates the social aspect of sustainability by examining the socio-cultural influence of women writers' work and trends in American history reflected in the works.	4, 11, 5
UGRD	ENGL	2580	Disability in Literature (Formerly 42.258)	This course explores how texts -- including novels, short stories, poems, memoirs, essays, plays, and videos -- portray people with disabilities. We will consider the problematic stereotypes about disabilities that sometimes appear in popular culture and literary depictions, and read texts that provide insight into a diverse community of people with a range of disabilities.	Related	Course integrates the social aspect of sustainability by examining the portrayal of people with disabilities in texts.	4,10,11
UGRD	ENGL	2740	The Literature of the Beat Movement (Formerly 42.274)	Explores both the writings and the personal lives of a loose confederation of poets, novelists, and essayist who emerged onto the American literary and cultural scene following World War II and who came to be known as the -Beat Generation.+ The primary focus will be on the life and writings of Lowell native Jack Kerouac (1922-1969) with others of the -beat circle+ included as well, i.e., Allen Ginsberg, William Burroughs, Diana DiPrima, etc.	Related	Course relates to social change following World War II.	4, 11
UGRD	ENGL	2770	American Ethnic Literature (Formerly 42.277)	The course addresses the literature of America's immigrant and cultural groups and how it contributes to defining our national character.	Related	Course integrates the social aspect of sustainability by examining the how literature of immigrant and cultural groups contributes to a national character.	4, 11

UGRD	ENGL	2772	Introduction to Latinx Literature	Describing a wide range of racial and ethnic denominations, Latinx is a complicated term which this course will examine the trouble. This course emphasizes the historical and aesthetic networks established in the Latinx literary canon that continue into the present, while also exploring the relationship between genre and socio-historical issues. Reading from a diverse tradition that reflects the contested definition of "Latinx" and its shifting demographics in the U.S., this course investigates how U.S. Latinx literature speaks to and expands "American" literary traditions, and how unique ethnic identities such as the Mexican American, Dominican American, Cuban American, or mainland Puerto Rican offer different yet interconnecting representations of what it means to be Latinx in the U.S.	Related	Course integrates the social aspect of sustainability by examining the how latin literature expands american literature.	4,11
UGRD	ENGL	2820	American Literary Traditions (Formerly 42.282)	A survey of American Literary history from early contact between Native American populations and European colonists through contemporary American writing.	Related	Course integrates social aspects of sustainability.	4, 11
UGRD	ENGL	3080	Structure and Variation of the English Language	This course introduces students to a variety of approaches to the contemporary English language, with a focus on both structure and variation. Students will explore how English works in terms of its sounds (phonetics and phonology), words (morphology), sentence structures (syntax), meanings (semantics), and uses (discourse). Areas of variation may include social and regional dialects, World Englishes, accents, pidgins, creoles, multilingualism, language acquisition, registers, style, literacy, media, power, and identity. The course will also address attitudes towards language (language ideology), and the implications of language issues for education, work, policy, and everyday life.	Related	Course addresses attitudes towards language (language ideology), and the implications of language issues for education, work, policy, and everyday life.	4,11
UGRD	ENGL	3130	Realism and Naturalism American Fiction (Formerly 42.313)	A study of realism and naturalism in fiction from the end of the Civil War to World War I.	Related	Course incorporates several aspects of sustainability by exploring naturalism in literature during a complex period in American history.	4, 11, 16
UGRD	ENGL	3240	Writing About Place (Formerly 42.324)	Writers throughout time have been thoroughly grounded in place. Students in this course will read and write on a variety of topics: travel, cities, suburbs, dwelling places, nature, environmental issues, etc., in a variety of genres: creative non-fiction, essays, journalism, short stories, poetry, journals. This course will be held in a workshop format with strong emphasis on revision.	Related	Course incorporates social and environmental aspects of sustainability.	4, 11, 14, 15
UGRD	ENGL	3350	American Women Novelists (Formerly 42.335)	A study of selected novels by American women. Focus on the female voice within the American tradition. Treatment of such issues as domesticity, education, and authorship.	Related	Course integrates social and social justice aspects of sustainability via selected women novelists on issues such as domesticity and education.	4, 5, 11
UGRD	ENGL	3640	African American Drama (Formerly 42.364)	A study of the history and development of African American drama, with emphasis on major aesthetic, political, and social movements in African American culture. Meets Core Curriculum Essential Learning Outcome for Diversity and Cultural Awareness (DCA) and Social Responsibility & Ethics (SRE).	Related	Course integrates social and social justice aspects of sustainability within the african american culture.	4,11
UGRD	ENGL	3765	Native American Renaissance	Students in this course will examine and discuss fiction, poetry and autobiographical writings by four of the seminal figures of the Native American Renaissance: N.Scott Momaday, Leslie Marmon Silko, Joy Harjo and James Welch. Collectively, these writers helped restore modes of traditional cultural expression and historical perspective long imperiled by the histories of European and U.S. Colonialism in the Americas. Their work is also deeply imbued with concerns for the landscape and ecology, including in regards to conditions within the reservation system. Additionally, we'll pay sizeable attention to critical assessments of the Native American Renaissance as offered in the work of figures such as Paula Gunn Allen, Louis Owens, Gerald Vizenor and others.	Related	Course incorporates social and environmental aspects of sustainability as it related to colonialism in the US with regards to concerns for the landscape, ecology, and the native american culture.	4,11,15,16
UGRD	ENGL	3780	Asian American Literature (Formerly 42.378)	Asian Americans hold an intriguing place in the cultural imagination: as perpetual foreigners, as so-called 'model minorities' that serve to maintain hegemonic power relations, and as living embodiments of America's memory of its involvement in recent wars. As artists, however, Asian Americans have contributed and impressive body of literary work, and we'll examine some of the most enduring and provocative of these texts. We'll explore themes such as trauma and the immigrant experience, issues of exile and dislocation, Asian Americans' embattled place in our country's history, and the intersections of race and ethnicity with gender and sexuality. Meets Core Curriculum Essential Learning Outcome for Diversity and Cultural Awareness (DCA) and Social Responsibility & Ethics (SRE).	Related	Course integrates the social aspect of sustainability as it Explores asian american's place in US history and the intersections of raceand ethnicity with gender and sexuality.	4,5,11,16
UGRD	ENGL	3920	Visual Rhetoric (Formerly 42.392)	This course introduces students to the theory and practice of visual communication. Students will explore what scholars mean by terms such as visual rhetoric and visual literacy in order to think concretely about how these concepts apply to the communication practices they will engage in their academic, professional, and everyday life. Special attention will be paid to the ways in which visual representations communicate culturally-specific meanings about race, gender, class, sexuality, age, nationality, and difference. Assignments include contributions to a course blog, rhetorical analyses of visual texts, design modules, and a multimodal project.	Related	Course integrates the social aspect of sustainability by discussing visual representations in which visual representations communicate culturally-specific meanings about race, gender, class, sexuality, age, nationality, and difference.	4,5,10,11,16
UGRD	ENGL	3925	Rhetorics of Social Movements	This course examines the communication strategies used to build social movements and agitate for social change: What genres and persuasive tactics are used to identify social problems and attract people to participate in a social movement? What means of communication sustain the energy around and investment in social movements? How do people use language to silence or otherwise reject calls for social change? What role d journalists play in bringing attention to social movements? Students are introduced to social movement studies and analyze the rhetoric of historical movements in order to ultimately evaluate the persuasive strategies used in social movements happening today.	Related	This course examines the communication strategies used to build social movements and agitate for social change:	4,11,16
UGRD	ENGY	4350	Nuclear Reactor Engineering	This course provides an overview of pertinent topics in basic nuclear heat generation and removal in a nuclear reactor, power conversion, and overall system integration and safety.	Related	Course examines Nuclear reactor engineering and how to keep the systems safe.	7, 9, 12
UGRD	ENTR	4100	Global Entrepreneurship and Innovation - I (Formerly ENTR /64.410)	The Course is offered as a 2-week intensive experiential learning of Global Entrepreneurship and Innovation. It is designed to help students to understand the importance of entrepreneurship and innovation in today's global economy and to cultivate an entrepreneurial mind-set among the students in the UMass Lowell. Students will work in inter-disciplinary, multi-cultural environments exploring problem solving techniques, opportunities identification, business concept development & venture planning using standard business model framework and bringing ideas to reality.	Related	Course focuses on the importance of innovation and entrepreneurship in relation to a sustainable global economy. Integrates cultural and economic aspects of sustainability.	8, 9, 17
UGRD	ENTR	4110	Global Entrepreneurship and Innovation - II (Formerly ENTR /64.411)	The Course is offered as a 2-week intensive experiential learning of Global Entrepreneurship and Innovation. It is designed to help students to understand the importance of entrepreneurship and innovation in today's global economy and to cultivate an entrepreneurial mind-set among the students in the UMass Lowell. Students will work in inter-disciplinary, multi-cultural environments exploring problem solving techniques, opportunities identification, business concept development & venture planning using standard business model framework and bringing ideas to reality.	Related	Course focuses on the importance of innovation and entrepreneurship in relation to a sustainable global economy. Integrates cultural and economic aspects of sustainability.	8, 9, 17

UGRD	FAHS	2130	Foundations in Liberal Studies (Formerly 59.213)	The Foundations course is a required course for all BLA majors. The course examines the value and importance of drawing on various academic disciplines to understand issues that are too complex to be addressed effectively using any single discipline. Using a case study approach, the course will explore how the elements of various environment, governance, peace and conflict, etc. Upon completing the course, the student will be able to view the courses in his/her two BLA Concentrations from an interdisciplinary perspective by observing how elements of a give discipline can contribute to the understanding of global problems. These skills will be applied in the BLA Capstone course.	Related	The course uses interdisciplinary methodology to understand complex problems dealing with environment,health, economic and social issues, etc., in order to propose sustainable solutions that would not be possible using a single disciplinary perspective.	14, 15, 16
UGRD	FINA	4550	Fin.Reg.,Compliance, & Ethics	This course will provide: 1.) an introduction to ethical standards held to be best practices in the financial services industry; 2.) a survey of some of the major regulatory regimes within which this global industry operates; and, 3.) exposure to principles and procedures for establishing and maintaining an effective compliance regime consistent with good ethical practice and regulatory compliance. The course will rely heavily upon examination of real-world examples in the application of the principles surveyed.	Related	This course examines the regulations in the global market and focuses on good ethical compliance.	8, 16
UGRD	GEOL	1010	General Geology (Formerly 89.101)	Presents a study of the earth with emphasis on earth materials, earth structure (crustal and internal), earth history, and the development of life. Designed for the general student.	Related	Course presents a study of the Earth explores the use of Earth's materials for eco-environmental benefits.	14, 15
UGRD	GEOL	3070	Earth Materials I (Formerly 89.307)	An introduction to the basic principles that control the arrangement of atoms in crystalline solids (minerals) and their physical and chemical properties. Topics include crystal chemistry, crystal symmetry, macroscopic mineral identification, and the use of polarizing light microscopy and X-ray diffraction to identify and characterize minerals.	Related	Course focuses on the physical and chemical properties that make up the Earth's materials.	15
UGRD	GEOL	3080	Earth Materials II (Formerly 89.308)	Origin and properties of igneous, metamorphic, and sedimentary rocks. The rock cycle is used as a unifying concept. The role of rock properties in environmental, economic, and engineering applications is considered.	Related	Course examines the role of rock properties in environmental, economic and engineering applications.	15
UGRD	GEOL	3140	Hydrogeology (Formerly 89.314)	This course investigates the science of water in a geologic setting with special emphasis on the distribution, movement, and chemistry of the water. The course will include the following topics: techniques for measuring elements in the hydrologic equation, accuracy of hydrologic measurement, statistical studies of floods, and study of groundwater for both steady-state and transient conditions.	Related	Course explores the dynamics of hydrology through a sustainable lens.	14, 15
UGRD	GEOL	3150	Environmental Geochemistry (Formerly 89.315)	Application of geochemical principles to environmental problems including air pollution and atmospheric processes, climate change, water chemistry and water-rock interactions, and the transport and dispersal of organic and inorganic pollutants.	Related	Course integrates geochemical principles to environmental issues and climate change.	6, 12, 13, 14, 15
UGRD	GEOL	3190	Earth Surface Processes (Formerly 89.319)	A study of the physical and chemical processes that create landforms on the Earth's surface. Emphasis is placed on physical and chemical weathering, fluvial erosion, glacial processes, soil formation, mass movements, slope stability and tectonic geomorphology.	Related	Course examines forces that continuously shape the Earth's surface	15
UGRD	GEOL	3250	Geology for Engineers (Formerly 89.325)	This course will introduce basic geological principles with an emphasis on engineering applications. Topics covered include minerals and rocks and their properties, surface processes, earthquakes and rock deformation, dynamic processes that affect the earth's surface, geological hazards and their mitigation, earth resources.	Related	Course integrates engineering applications of geological principles with focus on earth's resources.	15
UGRD	GEOL	4560	Applied Geophysics (Formerly 89.456)	Application of geophysics to problems in geology and environmental science. Principles and techniques of gravity, magnetic, electrical, and seismic methods. Field projects and surveys.	Related	Geophysics are applied to environmental problems.	15
UGRD	GNDR	2400	Introduction to Gender Studies (Formerly GNDR 240)	This course is an interdisciplinary introduction to the field of Gender Studies that examines both commonalities and differences among diverse groups of women. A variety of topics are presented such as past and present stratification in work and family, sexual identities, medial representations of women, and violence against women. Social movements for women's equality and feminist theories and methods are also introduced.	Related	Course integrates social justice aspect of sustainability.	5, 16
UGRD	HIST	1050	Western Civilization I (Formerly 43.105)	This course surveys some important issues and tendencies in the history of	Related	Course traces the origins and evolution of civilizations relating to the social dynamics of sustainability	11
UGRD	HIST	1070	World Civilization I (Formerly 43.107)	This class examines societies and cultures from ancient until early modern times with the underlying assumption that world history is an important conceptual tool for understanding our interdependent world. Course topics analyze the nature of the earliest human communities, the development of the first civilizations and the subsequent emergence of cultures in selected areas of Eurasia, Africa, and the Americas. This course also offers a consideration of issues related to the connections and relationships that shaped civilizations as a result of migration, war, commerce, and the various cultural expressions of self, society, and the cosmos before 1500.	Related	Course explores societies and cultures from ancient to early modern times including the various cultural expressions of self and society.	8, 11, 16
UGRD	HIST	1080	World Civilization II (Formerly 43.108)	This course will introduce you to the study of world history, its relevance for living in the present, and the challenge to think critically about the emergence and subsequent development of the modern world since 1500. Participants in this course will examine experiences that transcend societal and cultural regions, focus on processes of cross-cultural interaction, and investigate patterns that influenced historical development and continue to impact societies on a global scale.	Related	Course offers an in depth understanding of factors that shape modern civilizations and examines experiences that impact societies on global scale.	8, 11, 16
UGRD	HIST	1110	United States History to1877 (Formerly 43.111)	This course surveys United States history from the early settlement of North America through the Civil War and Reconstruction. It considers the role of the political and economic leadership in the building of the nation as well as actions of ordinary people whose energies and aspirations constitute the fabric of United States society.	Related	Course examines early United States and the political and economic factors that contributed to the growing nation.	11, 16
UGRD	HIST	1120	United States History since 1877	This course surveys the history of the United States from the end of Reconstruction to the present. It covers significant developments in the politics, economy, culture, and other aspects of American life during that period.	Related	Course incorporates political, economic and cultural aspects of sustainability in American life from 1877 to the present.	11, 16
UGRD	HIST	2040	China & the Modern World (Formerly 43.204)	This course introduces China's interactions with the world since the 1840s. With theOpium War as the starting point, students are ushered into a traditional China whosepolitical system, cultural values, and an economic structure stood in sharp contrast to those of the outside world. The main focus of the course is to explore the process inwhich China fought for its survival as a sovereign nation and searched for its road tomodernization.	Related	Course examines China as a global power and its influence on global economies since the mid 1800s.	8, 11, 16
UGRD	HIST	2070	Women in China (Formerly 43.207)	From Confucian texts to current conditions, the course examines the evolution of Chinese women's status throughout the centuries. The course will ask questions such as whether Confucianism dictated oppression against women, what factors influenced the changes of status for women, how Western feminism is connected with Chinese women, what roles women played in transforming China, and how ordinary women lived and are still living in China.	Related	Course integrates social and cultural aspects of sustainability.	5, 11
UGRD	HIST	2090	Colonial Latin America (Formerly 43.209)	This class examines the history of Latin America from 1492 until the early nineteenth century. After considering the rise of the Aztec and	Related	Course integrates political, social and economic aspects of sustainability.	1, 10, 11, 16

UGRD	HIST	2120	Modern Latin America (Formerly 43.212)	Modern Latin America, a 200-level course, surveys Latin America from independence in the early nineteenth century to the present using primary sources, a textbook, and scholarly works. It begins with an understanding of the political, social, and economic context from which ideas of independence emerged and considers the wars for independence. We will spend a significant part of the course studying nation-building: how did the leaders of new nations define their nations and the values that would guide them? Who was included and who was excluded in the process of nation-building? The next part of the course examines the demands of groups originally excluded: the indigenous population, women, and the poor. The portion of the course covering the twentieth century emphasizes Latin America's international connections, focusing on influence from the United States and the effects of world wars on the region. Mass politics also emerge, and are expressed in the Mexican Revolution and in Peronism. We also will consider the Cuban Revolution and its wider effects in the region. We will conclude our survey of the region by considering how historical trends continue to affect politics today. For example, the Bolivian political scene continues to be affected by the events and outcome of the War of the Pacific (1879-1883) and by a strong indigenist movement.	Related	Course integrates the political, social and economic aspects of sustainability.	1, 5, 10, 16
UGRD	HIST	2140	Early Am.Through Mat. Culture	This class examines American history from the period before European contact to the early stages of the Industrial Revolution in the nineteenth century through the lens of material objects. Comparisons will be drawn between the objects and cultures used by European, Native American, and African American peoples, as well as over time.	Related	This class examines early American culture though looking at material objects from the time and examines how they exemplify the sociopolitical tensions of the time.	11
UGRD	HIST	2310	Renaissance and Reformation (Formerly 43.231)	The history of Europe in the time of transition between the late Middle Ages and the Early Modern Period. Two principle topics are the intensification of cultural change which began in Italy around 1300 and spread slowly northward and the disruption of the unity of the Western Christian Church.	Related	Course integrates cultural aspect of sustainability with focus on cultural change.	11, 16
UGRD	HIST	2400	World War I (Formerly 43.240)	The course will cover the wide range of causes of this major conflict, the difficulties and changing dynamics of waging this massive war and the effects of all this on both the internal political and social conditions and external consequences for the combatants with the peace settlement.	Related	Course integrates political and social aspects of sustainability.	16
UGRD	HIST	2420	World War II (Formerly 43.242)	The Second World War transformed states and people from East Asia to the United States to Europe. We examine diplomatic and military aspects of the war and how it affected the lives of people in the countries involved. Topics include the prelude to the war, military campaigns in Europe and the Pacific, collaboration and resistance, the home front, the Holocaust, science and the atom bomb, and the consequences of the war.	Related	Course integrates political and social aspects of sustainability including science and the atomic bomb and consequences of war.	9, 16
UGRD	HIST	2700	Women in American History (Formerly 43.270)	This course surveys the history of women in the British North American colonies and United States with a special focus on social and economic change. It examines women as a distinct group but also attends to divisions among them, particularly those based on class, ethnicity/race, and regional diversity. Course themes include concepts of womanhood, the development and transgression of gender roles, unpaid work and wage labor, social reform and women's rights activism, as well as changing ideas and practices with respect to the female body.	Related	Course integrates social and economic aspects of sustainability with a focus on women in American history.	5, 11
UGRD	HIST	2740	Native American History (Formerly 43.274)	A comprehensive study of the Native Americans through historical and first-hand accounts of their lives. Designed to enlighten students and to represent fairly the Native Americans, dispelling some of the existing myths about them.	Related	Course integrates social and cultural aspects of sustainability.	1, 10, 11, 16
UGRD	HIST	2750	African-American History (Formerly 43.275)	This course surveys African American history in the United States from colonization to the present. It begins with a study of life in West Africa and traces the forced migration of Africans to the Americas. It explores West African transmissions, the freedom struggle, the great migrations from the South, the Harlem Renaissance, the modern Civil Rights movement, and the continuing impact of African Americans on life in the 21st century.	Related	Course integrates social and cultural aspects of sustainability.	1, 10, 11, 16
UGRD	HIST	2790	History of Lowell (Formerly 43.279)	This course will provide an overview of the growth, decline, and rebirth of the city of Lowell, Massachusetts. Topics will include the Industrial Revolution, role of women and unions in the workplace, immigration and the formation of ethnic neighborhoods, urban renewal, and historic preservation. The survey will also discuss notable personalities such as labor activist Sarah Bagley, Civil War general Benjamin Butler, writer Jack Kerouac, Senator Paul Tsongas and boxer Micky Ward. The foregoing names may differ over time.	Related	Course integrates social, economic, political and cultural aspects of sustainability.	5, 8, 9, 11, 17
UGRD	HIST	2810	Sub-Saharan Africa (Formerly 43.281)	This course provides a basic introduction to the history of the African continent. It will expose students to the processes and patterns that have shaped modern African history. The course examines the historical roots of the many challenges that the continent faces today. But, at the same time, it will also provide students with the knowledge to shatter the myths and stereotypes about Africa.	Related	Course integrates social and cultural aspects of sustainability.	11
UGRD	HIST	2960	United States Diplomatic History (Formerly 43.296)	Although the course takes the entire United States diplomatic history as its field of historical study, its focus is on the American foreign policy in the twentieth century. The course first explores domestic and international factors that made the United States a world power by 1898. It will then consider the goals, the practices, and the results of the twentieth century American foreign policy. The course challenges students to view American diplomacy in a global context.	Related	Course integrates social, economic, and political aspects of sustainability.	11, 16, 17
UGRD	HIST	3010	The World of Things: Consumer Cultures in the Modern West (Formerly 43.301)	This course will examine the emergence and historical impact of consumer cultures in the modern West, from the eighteenth century through the present. Topics to be covered will include the emergence of spaces of consumption (the home, the commercial/spectacular metropolis, the department store, the shopping mall, the tourist site), changing attitudes toward shopping and spending, the construction of modern social identities of class, gender, generation and race through consumption, and political struggles over consumption.	Related	Course focuses the state of economic stability of Western culture through consumerism, both past and present.	5, 10, 12, 16
UGRD	HIST	3040	European Economic & Social History (Formerly 43.304)	Europe has been transformed in the last 250 years from an agricultural society to a post-industrial one. We study the processes by which this happened, from the Industrial Revolution of the 18th and early 19th century to the wars and depressions of the early 20th century and the collapse of the communist system and European unification in the late 20th century. Students learn basic concepts and methods of history and economics.	Related	Class focuses on the transformation of Europe incorporating environmental, social, and economic aspects of sustainability	8, 11, 16
UGRD	HIST	3220	Chinese Foreign Policy (Formerly 43.322)	Chinese foreign policy since 1949 with a strong emphasis on tracing the links between historical, ideological, and cultural influences, on the one hand, and pragmatic and nationalistic considerations on the other. While tracing these links, the course explores the intricate process of policymaking in the People's Republic of China.	Related	Course integrates political and cultural aspects of sustainability.	11, 17
UGRD	HIST	3500	Colonial America: History and Culture (Formerly 43.350)	The early modern period brought enormous change to the Americas as Native American, European and African peoples encountered each other, often clashing, sometimes coexisting. This class opens by examining their responses to each other and to their surroundings in the sixteenth and seventeenth centuries. The class will then transition toward the cultural, material, social and economic revolutions which helped pave the way for the American Revolution at the end of the eighteenth century.	Related	Course examines the social and economic revolutions that took place in colonial America, leading to independence.	8, 10, 11, 16

UGRD	HIST	3550	Jacksonian America (Formerly 43.355)	An investigation of the social, political, and economic developments in the United States from 1815 to 1848. Special emphasis is placed on the spread of capitalism, the growth of reform movements, the development of cities, and the conflict over slavery.	Related	Course integrates social, political and economic aspects of sustainability.	1, 8, 10, 11, 16
UGRD	HIST	3560	Civil War and Reconstruction (Formerly 43.356)	This course surveys the increasing political, social, and economic tensions between the North and the South during the first half of the nineteenth century; the explosion of those tensions into secession and conflict; the four years of war; and the postwar struggle to reconstruct the South and forge a new union.	Related	Course integrates social, political and economic aspects of sustainability.	1, 10, 11, 16
UGRD	HIST	3570	American Civil War in Memory (Formerly 43.357)	Students analyze how Americans have remembered the American Civil War in the years after the war ended in 1865. By looking at novels, memoir films, National Park Service Battlefields, and monuments, students discover how remembrances are influenced by views of race, gender, patriotism, regionalism, and economic forces.	Related	Course integrates social, political and economic aspects of sustainability.	1, 5, 10, 11, 16
UGRD	HIST	3620	The Twenties and the Thirties (Formerly 43.362)	An examination of the emergence of the corporate and governmental institutions of modern America set in two turbulent decades of cultural and political ferment that involved both booming prosperity and the economic collapse of the Great Depression.	Related	Course integrates political and social aspects of sustainability	2, 8, 11, 12, 16
UGRD	HIST	3650	United States History since 1960 (Formerly 43.365)	Discusses Cold War politics and civil rights upheavals during the 1960's and 1970's, the decline of American economic and political power, and the resurgence of conservative politics in the 1980's.	Related	Course integrates political and social aspects of sustainability	11, 16
UGRD	HIST	3920	United States Immigration History (Formerly 43.392)	The course focuses on the experiences of women, men, and children who came to the U.S. from the colonial era through the 21st century. Their emigrations will be examined in a global context. Irish migration, the mass European migrations during the mid and late 19th /early 20th centuries, and post-Second World War immigration particularly from Asian and African countries are discussed. The Lawrence, Lowell, and Boston immigration stories are also considered.	Related	Course focuses on the experiences of men, women and children immigrating to the U.S. in a global context incorporating cultural, social and political aspects of sustainability.	1, 2, 10, 11, 16, 17
UGRD	HIST	3932	Environmental History of Middle East & North Africa	This course examines the history of the Middle East and North Africa from an environmental angle. We will think about how a focus on environmental factors enables alternative perspectives on colonialism, nationalism, capitalism, gender and sexuality, empire, race, and class. What are some of the benefits of these interpretations? Are there also drawbacks? We will also consider what it means to talk about the impacts of climate change in the region when thinking historically.	Related	looks at history through an environmental and social sustainability lens.	5,10,13,16
UGRD	HIST	3940	Imm. & Assimilation Cont. Europe	This course examines contemporary European dilemmas of immigration, assimilation and multiculturalism, within the context of the larger history of European imperial decline after 1945. It will aim at providing fuller historical understanding of Europe's ongoing crises of integration, while also exploring the textures of individual and community life among those of immigrant descent within contemporary Europe. For purposes of focus and continuity, greatest attention will be dedicated to South Asian, Turkish, and North African communities in Britain, Germany and France, respectively.	Related	Cours examines some challenges with global immigration issues and explores how assimilation happens.	1, 10, 17
UGRD	HONR	1100	First Year Seminar in Honors: Text in the City (Formerly HON 110)	The First Year Seminar in Honors (FYSH) uses Lowell as its text. Rich in history and culture, and the students' home for the next four years, the City of Lowell offers a perfect topic to promote connections while learning how to view the city through the lens of the Humanities. Students will develop library research skills, including facility with primary and secondary sources, and an appreciation for the narratives that lie in buildings, objects, and what people leave behind. Activities include field trips, readings, writing, and an artistic interpretation. As important, students will have the opportunity to form strong connections to each other, to the faculty, and to the community. Note: New course, but combination of current 59.102 and 59.103 in one semester.	Related	Course examines the social and economic dynamics of sustainability to the city of Lowell.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
UGRD	HSCI	2060	Pandemics: How Do They Occur?	This course focuses on the global challenge posed by infectious diseases. In the past 50 years, many previously unknown infectious diseases have emerged, while others have reemerged at an unprecedented rate. Despite tremendous strides in science, technology, and medical advances, and primary prevention strategies, infectious disease continue to plague humanity. This course will feature the global challenges posed by select pathogens. To do this, we will explore pandemics through a few different lenses. We will review the sources of and risk factors that lead to pandemics, and methods to prevent and control infectious disease outbreaks from becoming pandemics. Infectious diseases discussed in this course include: Cholera, Ebola, HIV, Influenza, SARS, MERS, COVID-19, among others.	Related	Class integrates environmental and human health aspects of sustainability from global perspective.	3, 8, 10, 11
UGRD	HSCI	2220	Health and Disease Across the Lifespan (Formerly 30.222)	This course will introduce the basic principles that promote health of individuals throughout the lifespan. Physiological, socioeconomic, economic, and behavioral factors that impact health, disease, and quality of life across the lifespan will be examined. Health assessment tools will be reviewed. The course emphasizes the role of nutrition and physical activity for health promotion and disease prevention across different life stages and the impact of aging on health and disease. Major causes of morbidity and mortality in the United States will be discussed.	Related	Class relates to the socio-environmental aspect of sustainability.	3
UGRD	HSCI	3060	Introduction to Gerontology (Formerly 30.306)	This course examines human aging from a multidisciplinary and developmental perspective. The course will focus on the adult years of the life span. The social-psychological factors involved in adjustments to the aging process, to retirement, to family, to leisure, to aloneness, to death and bereavement will be discussed together with such special concerns of the elderly as widowhood, finances, religion, sexuality and health problems. Rehabilitative strategies such as remotivation and reality orientation are included.	Related	Class integrates social and human health aspects of sustainability as they related to human aging.	3, 5, 8, 11
UGRD	HSCI	3080	Global Health (Formerly 30.308)	The focus of this course is on examining health issues from a global perspective including issues related to maternal and child health, aging, infectious diseases, sanitation, and health inequality. Nutritional and environmental health issues in diverse societies are analyzed. Social determinants of health and access to health care in developing and developed countries are emphasized.	Related	Class integrates environmental and human health aspects of sustainability from global perspective.	3, 5, 6, 10
UGRD	HSCI	3090	Universal Design in the Promotion of Health (Formerly 30.309)	This is a three-credit interdisciplinary undergraduate blended course (face-to-face and online). The is course is designed to examine the principles of universal design and investigate challenges of equity, access and inclusion in healthy communities. Undergraduate students from a variety of disciplines will examine universal design and Assistive Technology (AT) that enhances the participation of individuals with a physical, emotional, sensory or intellectual and cognitive disability in education, community development, health care, recreation and public policy. The course reviews design concepts and the use of Assistive Technology as it relates to education, communication, vocation, recreation, and mobility for individuals with disabilities. Laws focusing on assistive technology in the home, school, community, and the work place will be examined. The course explores both 'low tech' and 'high tech' types of assistive technologies that are available to support people with disability, based on the ICF model of disability. Interaction with users of assistive technology is accomplished through an experiential learning project. Students will engage in a team project that completes a thorough examination of a particular access or functional challenge and the use of universal design and AT to increase participation and minimize the effects of the person's impairments.	Related	Class relates to the socio-environmental aspect of sustainability.	3, 8, 10

UGRD	HSCI	4020	Global Health Experience (Formerly 30.402)	The Global Health Experience provides an experiential learning experience in health within a country outside of the United States. Students will study the health issues of a given country while examining the socio-cultural, economic and environmental determinants of health within that society. The strengths and weaknesses of the existing health care system will be analyzed. Students will explore the culture, environment, and health care system under the direction of School of Health and Environment faculty.	Related	Class integrates environmental and human health aspects of sustainability from global perspective.	3, 5, 6, 10
UGRD	HSCI	4100	Interprofessional Approaches in Community Health	This is an advanced course in interprofessional education and collaborative practice that provides a critical foundation for current work in community health, including clinical and public health fields. It allows students to increase their understanding of how each profession contributes to the team by exploring current health issues. It provides opportunities to practice effective comm. and team collaboration in decision making related to health and wellness. It is designed to provide hands on experience for students to deliberately and intelligently work together in clinical and community health settings and simulations. Key concepts include importance of best practices in professionalism, roles and responsibilities, teamwork, comm., and ethics in all health-related careers.	Related	Class relates to the socio-environmental aspect of sustainability.	3
UGRD	IENG	4080	Human-Machines Systems Design	Designing human-machine systems involves the inclusion of humans in the design of products, processes, and systems. The goal of human factors is to reduce human error, increase productivity, and enhance safety and comfort with a specific focus on the interaction between the human and the environment. This is an introductory course that will focus on the cognitive considerations of the human in system design.	Related	Course examines the connection between work and hazards.	3, 8, 12
UGRD	INFO	2260	Intro to Blockchain Technology and Applications	Blockchain is an emerging technology that can radically improve security in banking, supply chain, and other transaction networks. This course explores the fundamentals and applications of blockchain technology. Students will learn about the decentralized peer-to-peer network, distributed ledger, and trust model that define blockchain technology. We will examine the basic components of blockchain, its operations, underlying algorithms, and the essentials of trust. By the end of the course, students will understand the inner workings and applications of this disruptive technology and its potential impact on all aspects of the business world and society.	Related	Course includes work on the ethical considerations for global social impacts	8, 9, 12
UGRD	LGST	3600	Legal Issues in Racism (Formerly 41.360)	This course presents a study of racial discrimination in the United States. Emphasis is placed on relevant constitutional provisions, statutory provisions, and on United States Supreme Court cases.	Related	Course integrates social justice aspect of sustainability.	10, 16
UGRD	LGST	3630	Corporate and Property Law (Formerly 41.363)	This course studies the law pertaining to business entities and structures. Partnerships, limited partnerships, and joint ventures are studied at the outset of the course. The main emphasis is on elements of the corporate structure. The last part of the course deals with personal and real property with coverage of wills and trusts. This course is highly recommended for pre-law students, CPA students, and paralegal students.	Related	Course relates to the economic dynamic of sustainability.	8, 9
UGRD	LGST	3660	International Law (Formerly 41.366)	This course introduces the body of international rules, customs, and regulations which are in force between nations. Specific legal issues involving a study of multinational, cultural, political, economic, and ethnic perspectives are addressed. Topics covered include human rights, war prevention, foreign policy, tort and criminal liability, business trade practices, and dispute settlement.	Related	Course integrates social, cultural and political aspects of sustainability as they relates to legal interactions between nations.	8, 9, 10, 11, 12, 16, 17
UGRD	LGST	3700	Real Estate Law (Formerly 41.370)	This course examines contracts for the sale of real estate, deeds, title examinations, security for real estate transactions, methods and problems of co-ownership, zoning ordinances, brokerage contracts, leases and landlord, and tenant rights and liabilities.	Related	Course relates to law that has economic impact in the United States.	8, 16
UGRD	LGST	3760	Family Law (Formerly 41.376)	This course studies the critical family law issues facing society today. Subject matter examined may include the law of marriage, custody, adoption, divorce, child support, juveniles, right to die, fetal tissue transfer to prolong the life of another, reproduction control, and surrogate parenting. This course is taught from a legal and human values perspective.	Related	Course integrates social and ethical aspects of sustainability.	3, 5, 10, 16
UGRD	LGST	3790	The Relationship of Law, Logic, and Ethics (Formerly 41.379)	This course examines the impact of ethical viewpoints on the structure of legal doctrines. It stresses the fact that the study of law is a study of ethics as well as logic.	Related	Course integrates social and ethical aspects of sustainability.	16
UGRD	LGST	3810	Women and the Law (Formerly 41.381)	This course presents legal issues that often or particularly affect women. Topics may include sex discrimination, sexual harassment, rape, marriage, divorce, reproductive control, surrogate motherhood, and custody.	Related	Course integrates social and ethical aspects of sustainability with focus on legal issues that particularly affect women.	5, 16
UGRD	LGST	3850	Immigration Law (Formerly 41.385)	Studies the immigration, nationality, and naturalization laws of the United States. The topics discussed are: the immigrant selection system, the issuance of immigrant and nonimmigrant visas; grounds of excludability of aliens and waiver of excludability; grounds for deportation of aliens and relief from deportation; and change of status within the United States including legalization, refugee, and asylum status.	Related	Course integrates social justice and economic aspects of sustainability.	10, 16
UGRD	LIFE	1010	Life Science I (Formerly 83.101)	Presents environmental and organismal structural interrelationships and relates these to the chemical evolutionary basis of life.	Related	Course examines relationships between environments and organisms.	13, 14, 15
UGRD	LIFE	1020	Life Science II (Formerly 83.102)	Emphasis is on systems structure and function. The cellular organization of plants and animals leads into physiological processes of higher organisms with great emphasis on humans. Among topics considered are nutrition and digestion, cellular metabolism, circulation, respiration, excretion, nervous and skeletal-muscular systems. Also considered are the chemical interactions of these systems with immunity, hormonal and reproductive processes.	Related	Course focuses on how certain environments shape organisms.	13, 14, 15
UGRD	LIFE	1100	Microbes and Society: Good, Bad and Ugly (Formerly 83.110)	Examines historical aspects of microbial interactions with human society, including the use of microbes in food production, agriculture, biotechnology, industry and environmental preservation; explores bioterrorism, the problem of antibiotic resistance and surveys some historical and contemporary microbial diseases.	Related	Course relates the microbial interactions with humans and the impact on health.	3, 16
UGRD	MECH	4860	Ocean Engineering (Formerly 22.486)	Summary of the ocean environment. Fluid mechanics of ocean waves. Modeling and scaling laws for ships, submarines, and river and estuary flows. Hydrodynamics of offshore and coastal structures. Floating and submerged body hydrodynamics. Marine propulsion. Introduction to various underwater systems.	Related	Course provides a summary of the ocean environment including hydrodynamics and mechanics of ocean waves.	14
UGRD	MGMT	3800	Business Ethics	This course will explore the intersection between business leadership and ethics in various context. It provides the opportunity for students to explore complex issues in societal and professional contexts while engaging in probing conversations with classmates.	Related	Course integrates economic and social/ethical aspects of sustainability.	8
UGRD	MGMT	4350	International Management (Formerly MGMT/66.435)	Comparison of management concepts, systems and practices in different societies, and institutional settings. The impact of economic, social, political, and cultural variables on management styles, processes and organizational structures.	Related	Course integrates economic, social, political and cultural aspects of sustainability as they relate to management practices and organizational structures.	17
UGRD	MGMT	4400	International Business (Formerly MGMT/66.440)	Special problems of overseas operations of American firms. Financial, marketing, human resource, and legal problems of the multinational enterprise. State trading, economic integration and international regulatory agencies.	Related	Course examines factors that contribute to competitive and sustainable organizations in a global environment.	8, 17

UGRD	MGMT	4500	Managing Diversity in Organizations (Formerly MGMT/66.450)	This course explores the opportunities and challenges of working within an increasingly diverse workforce. Examines the knowledge and skills that employees and managers must develop to diagnose and address diversity-related conflicts and dilemmas and to leverage differences and commonalities as a catalyst for organizational learning and effectiveness. Special attention is paid to the effect of gender, socioeconomic, and racial diversity on individuals, work groups, and the organization as a whole.	Related	Course examines factors that contribute to socially responsible and sustainable organizations in a global environment.	8, 17
UGRD	MGMT	4550	International Import/Export Management	International trade and globalization has grown significantly over the last century, and importing and exporting of goods and services has become increasingly complex. This comprehensive course emphasizes real-world applications of international trade concepts and processes. Strategies and guidelines for how to successfully manage and control regulatory compliance issues in business is addressed. Topics covered include organizing your compliance department, international trade terminology, procedures and documentation, regulatory controls and licenses, classification and valuation, country of origin, trade agreements, and global customs considerations.	Related	Course examines factors that contribute to competitive and sustainable organizations in a global environment.	8, 17
UGRD	MIST	4070	Electronic Business (Formerly 63.407, MIST 407)	This course familiarizes students with current and emerging electronic commerce technologies using the Internet. Focus is on both Web Design and E-Business. The web design portion provides a foundation for designing dynamic interactive websites for electronic commerce. It addresses planning and developing well-designed websites that combine effective navigation with the balanced use of graphics, text, color, and database access. The electronic business section covers both the theory and practice of doing business over the Internet including issues relating to Internet technology for business advantage; managing electronic commerce funds transfer; reinventing the future of business through electronic commerce; business opportunities in electronic commerce; electronic commerce website design; social, political and ethical issues associated with electronic commerce; and business plans for technology ventures.	Related	Course integrates social, political and ethical issues associated with electronic commerce	8, 9, 17
UGRD	MKTG	2010	Marketing Principles (Formerly MKTG 201/62.201)	The role of marketing in the economy. The elements of the marketing mix—product, price, distribution, and promotion—are discussed in the context of social and political constraints on marketing activity.	Related	Course integrates social and political aspects of sustainability as they relate to the role of marketing in the economy.	16
UGRD	MKTG	4120	Global Marketing (Formerly MKTG 412/62.412/62.303)	Course number was formerly 62.303. Focuses on the marketing aspect of global business. Emphasis is given on cultural dynamics and economics as well as political, social and regulatory constraints as they affect the global marketing practice and strategy implementation.	Related	Course integrates the health aspect of sustainability by analyzing health care policy and its impact on the health of populations.	8, 16
UGRD	MTEC	2410	Elements of Thermodynamics I (Formerly 23.241)	This course presents a thorough treatment of the concepts and laws of thermodynamics. The first law (energy) and the second law (entropy), properties of liquids and gases, and common power cycles (Rankine and Otto) are covered. Included is an overview of the global energy problem and power generation technologies, both established and novel	Related	Course integrates overview of the global energy problem and power generation technologies.	7, 9
UGRD	MTEC	2430	Elements of Thermodynamics II (Formerly 23.243)	This course is a continuation of Thermodynamics I analyzing in more detail various real world, practical power generation cycles, such as Rankine, reheat, regenerative, Otto, and Diesel. Also covered are refrigeration cycles, the basics of psychrometry, and the thermodynamics of combustion.	Related	Course covers the global energy problem by providing an understanding of the laws of energy and entropy.	7, 9
UGRD	MTEC	4140	Engineering Economics (Formerly 23.414)	This course introduces students to accounting and finance operations and principles, and how they impact engineering and manufacturing activities in both analytical and forward looking planning activities. Topics covered include financial statements, costing, depreciation, time value of money, cash flows, capital budgeting, and capital recovery with the objective of building working financial models for a technical environment.	Related	Course focuses on the economic dynamic of sustainability.	7, 8, 9
UGRD	NURS	3080	Health Promotion in Nursing (Formerly 33.308)	This course is designed as a transition course for registered nurse students pursuing a baccalaureate degree with a major in nursing. It introduces the theory and research related to the concepts of health/ promotion and risk reduction. These concepts are presented as essential components of professional nursing practice. This course includes a clinical practicum which focuses on the development of interventions to promote the health of individuals and families. This course aims to refine critical thinking skills and analyze nursing's unique contribution to health care. Consideration is given to the interrelationships of theory, research and practice.	Related	Course integrates health and social aspects of sustainability.	3
UGRD	NURS	3100	Health Promotion Risk Reduction Families I (Formerly 33.310)	This course focuses on health promotion and risk reduction with young individuals and families who are responding to potential or actual physical and psychosocial health problems. Content is centered on holistic nursing care from a lifespan perspective beginning in pregnancy and ending with adolescence.	Related	Course integrates health and social aspects of sustainability.	3
UGRD	NURS	3140	Health Promotion Risk Reduction Families II (Formerly 33.314)	This course focuses on health promotion and risk reduction with adults and their families who are responding to potential or actual biopsychosocial health problems. Content is centered on holistic nursing care throughout the adult lifespan.	Related	Course integrates health and social aspects of sustainability.	3
UGRD	NURS	3200	Community-Focused Health and Policy (Formerly 33.320)	This course provides a foundation to community health nursing with the community, family and individual as Client. This course presents an overview of the US health care delivery system with an emphasis on the role of government in healthcare, Medicaid, and current efforts at healthcare reform.	Related	Course focuses on community health and the role the government plays in offering health care to families.	3, 11
UGRD	NURS	3240	Community-Focused Project Implementation (Formerly 33.324)	This course focuses on improving the health of one aspect of the community. Students analyze health problems in identified communities. Interventions for community as client are developed and implemented and the effectiveness of applied interventions is evaluated.	Related	Course identifies community health problems and provides solutions to these problems.	3, 11
UGRD	NURS	3250	Community-Focused Project Dissemination (Formerly 33.325)	This one credit course focuses on the dissemination of the results of a community based program. Students develop presentations which describe methods used to identify, intervene and evaluate the health problems of a community. Students are required to present their findings at a formal dissemination venue identified by faculty.	Related	Course focuses on the results of identifying and solving community health problems.	3, 11
UGRD	NURS	4100	Health Promotion and Risk Reduction of Families III (Formerly 33.410)	This course addresses the nursing care of adults with acute and chronic conditions. Particular attention is paid to nursing care of adults with increasing complex illnesses and acuity levels.	Related	Course integrates health and social aspects of sustainability.	3
UGRD	NUTR	1100	Nutrition and Wellness (Formerly 35.210 and NUTR.2100)	This course is an introductory course to the science of nutrition as it applies to everyday life and health. Focus will include the six major nutrients: carbohydrates, lipids (fats), protein, vitamins, minerals, and water and their importance in the human body. Digestion, absorption, and metabolism in the human body will be introduced. The course will also examine energy balance and weight management as they relate to nutrition and fitness. The impact of culture, demographics and ethnicity on nutritional intake will be discussed. Students will explore the relationship between nutrition and health through laboratory experiences.	Related	Course focuses on nutrition's impact on health and disparate health outcomes due to socioeconomic factors to integrate health and social aspects of sustainability.	2, 3, 12
UGRD	NUTR	2060	Human Nutrition(Formerly 35.206)	This course provides an overview of nutrition and the components of a nutritious diet during the various stages of the life cycle. It emphasizes the impact of nutrition on the major contemporary health problems in the United States. Nutrition issues, trends and research, and their effect on society and the legislative process will be explored.	Related	Course integrates nutrition and human health. Students study current social health issues in the United States.	2, 3

UGRD	NUTR	2100	Nutrition and Health(Formerly 35.210)	This course is an introductory course to the science of nutrition as it applies to everyday life and health. Focus will include the six major nutrients: carbohydrates, lipids (fats), protein, vitamins, minerals, and water and their importance in the human body. Digestion, absorption, and metabolism in the human body will be introduced. The course will also examine energy balance and weight management as they relate to nutrition and fitness. The impact of culture, demographics and ethnicity on nutritional intake will be discussed. Students will explore the relationship between nutrition and health through laboratory experiences.	Related	Course examines the relationship between proper nutrition and the good health.	2, 3
UGRD	NUTR	3360	Life Cycle Nutrition	Biology of the life cycle including development, growth, maturation, and aging and its impact on nutritional requirements of humans from the zygote to the elderly is considered. How to meet these nutritional requirements is discussed relative to the feeding issues and context of each major life stage. Course emphasizes the critical analyses of beneficial and adverse outcomes of various nutrient intakes and dietary patterns of the nutritional status and well-being through integration of nutrition and other health sciences in understanding nutritional needs during the life cycle. Analysis of cultural, environmental, psychosocial, physical, and economic factors affecting nutritional status through the life span will also be discussed. Methods of nutritional assessment for each stage of the life cycle will be examined.	Related	Course integrates cultural, environmental, and economic aspects of sustainability as they relate to nutritional status.	3, 8, 10
UGRD	NUTR	3450	Community Nutrition (Formerly 36.345)	This course explores the role of the nutrition professional in community needs assessment, intervention development and evaluation, and in forming domestic nutrition policy. Nutrition problems in contemporary communities and of selected target groups in the United States and in developing countries are examined. Programs and strategies to meet nutrition needs outside the acute care setting, such as nutrition education and food assistance are explored. Local, state, and national nutrition policy and initiatives in nutrition will also be examined.	Related	Course relates to the health of communities and nutrition policies established in the United States and other countries.	2, 3, 11
UGRD	NUTR	3700	Intro to Food Safety	This course focuses on food safety from a 'farm to fork' perspective. The class will cover a comprehensive overview of the food safety system addressing the biological, chemical and physical agents with emphasis on domestic food-borne outbreaks, public health significance, disease control, and the microbial spoilage of foods. The history and fundamental principles of food safety will be addressed including the risk and hazard analysis of different foods and the important advances in food system that are necessary for controlling hazards in the modern food industry.	Related	This course explores food safety throughout the 'farm to fork' process.	3
UGRD	NUTR	3720	Obesity & Weight Control(Formerly 36.372)	Etiology, pathophysiology, and treatments of obesity, anorexia nervosa, and bulimia are reviewed. Role of hereditary, neurological, metabolic, and environmental mechanisms are discussed. Particular emphasis on obesity.	Related	Class relates environmental factors that contribute to health issues	2, 3
UGRD	NUTR	4720	Nutrigenetics (Formerly 36.472)	Regulation of eukaryotic gene expression by specific nutrients, hormones, and metabolites will be discussed including transcriptional, post-transcriptional, and translational mechanisms with emphasis on disease development or prevention. Application of material will include determining how human dietary requirements are affected by gene variants and inherited biochemical characteristics. This course will enable students to link their knowledge of nutrition with the growing discipline of the effects of diet on the human genome and specific hereditary diseases.	Related	Class relates environmental factors that contribute to health issues.	2, 3
UGRD	PCST	1250	Introduction to Peace and Conflict Studies (Formerly PCS 125)	This course will focus on the causes of conflict, conflict resolution methods, and ways to sustain peace. The course will explain and define each of those areas. A mid-term will be administered to examine the students' grasp of the concepts and key terminology. The second part of the class will emphasize student participation and the application of concepts learned earlier in class. The final is a take home exam that will require the application of theory and praxis in the field of Peace and Conflict Studies.	Related	Course integrates the social aspects of sustainability by focusing on the means to contain and continue peace between countries.	16
UGRD	PCST	4750	Comm Conflict Resolution	This course gives students an understanding of the main issues and solutions involved in community level conflict resolution; e.g., in neighborhoods, workplaces, and other institutions. It develops students' skills in practicing conflict resolution and/or evaluating programs in the field of dispute resolution. It is important to understand why conflict happens and how to resolve conflict.	Related	Course focuses on how community conflict resolution works for generating strong societies.	16
UGRD	PHIL	2030	Introduction to Ethics (Formerly 45.203)	Examines the basic issues and problems of ethics and values and a survey of some important alternative answers to the questions raised, on both an individual and a social level, by our necessity to act and to live in a rational and human way.	Related	Class examines the social context of ethics.	10, 11
UGRD	PHIL	2060	Introduction to Political Philosophy (Formerly 45.206)	Political philosophy is concerned with basic questions about community, public life, and social organization. This course will address issues such as the rights of the individual in relation to the power of the state and society; the nature and legitimacy of political authority and democracy; the significance of power, economics, justice and equality in social life; and the duties and responsibilities of citizens. We will also consider the philosophical meaning of communitarianism, liberalism, and republicanism, individualism, capitalism, and socialism, as well as the role of class, race, and gender in politics.	Related	Class integrates the social dynamics of sustainability, specifically human rights in relation to state power.	5, 8, 10, 11, 16
UGRD	PHIL	3080	Philosophy of Race and Gender (Formerly 45.308)	This course will focus on issues of identity and difference. We will discuss the ways in which group identities are formed and break down. We will discuss how differences are constituted and reconstituted. These issues are central to theories of race and gender, racism and sexism. Some of the questions which we will raise are these: What motivates forming group identities? How are they formed? How is identity used within oppressive social structures? How can it be used to transform society? Why do some differences make a difference and others don't? Can we choose our group identities?	Related	Class relates to the social dynamics of gender, race and equality.	5, 10, 16
UGRD	PHIL	3106	Public Health Ethics	In this course we examine contemporary issues in public health ethics. Utilizing historical and recent cases we unpack the core conceptual issues and emerging trends in bioethics. In doing so, we'll discuss issues such as quarantine, surveillance, isolation, behavioral interventions, and criminalization of health. We discuss the ethical and public health implications of nutrition, vaccinations, occupational health, pandemics, and bioterrorism, among many other cases.	Related	Class integrates the social and health aspects of sustainability by examining ethical implications of sociopolitical factors.	3, 8, 10
UGRD	PHIL	3340	Engineering and Ethics (Formerly 45.334)	A philosophical analysis of the ethical dimensions and responsibilities of the engineering profession. Specific case studies and ethical issues are analyzed through the application of some of the basic concepts and principles of traditional and contemporary ethical theories.	Related	Class integrates the social aspects of sustainability by examining ethical responsibilities in the field of engineering.	8, 9, 10, 12
UGRD	PHIL	3350	Ethical Issues in Technology (Formerly 45.335)	This course will examine important ethical issues and value conflicts emerging in contemporary science and technology. Through readings and class discussions students will not only have an opportunity to explore the manner in which ethical and technical problems are related, but to develop insight into areas of ethical philosophy and modes of reasoning essential to an intelligent understanding of such issues.	Related	Class integrates the social aspects of sustainability by examining ethical responsibilities in the technology field.	8, 9, 10, 12

UGRD	PHIL	3610	Equality, Justice and the Law (Formerly 45.361)	This class investigates the American fascination with the "rule of law." Questions to be considered include the following: What do we mean by the rule of law? What is the relation between law and morality? How does the rule of law promote justice, and what is its connection with the ideal of equality? What is the role of a written Constitution in protecting the rule of law? Special emphasis will be given to the Equal Protection clause of the Constitution and its role in prohibiting discrimination against disadvantaged groups, including racial minorities, women, and the handicapped. We will also consider in detail some theories of constitutional interpretation, including the Original Intent theory.	Related	Course integrates the social aspects of sustainability by examining law and equality.	5, 10, 16
UGRD	PHIL	3890	Immigration and Global Justice	This course addresses the question of justice in regards to immigration policy. We consider a variety of views including Communitarianism, Liberalism, Nationalism, Cosmopolitanism, and Democratic Theory. We will look at how these different positions have answered the following sorts of questions: Do we have duties to strangers or foreigners that are of equal weight to the duties we owe to members of our family, our circle of friends or our nation? Does part of the definition of "self-determined state" include the right to unilaterally reject petitions of inclusion from non-citizens? Does a commitment to equality demand that borders be open?	Related	Course integrates the social and ethical aspects of sustainability by examining immigration and justice.	5, 10, 16
UGRD	PHYS	1210	Exploring the Universe (Formerly 95.121)	Addresses topics that include: Planet Earth, its structure, plate tectonics, greenhouse effect, ozone layer, craters and dinosaurs; our satellite Moon; other planets; our star Sun and its energy source; other stars, the HR diagram and stellar evolution, white dwarfs, neutron stars, supernovae, black holes; our galaxy, the Milky Way, its structure; other galaxies; the universe, its structures and expansion; evolution of galaxies, quasars, cosmology, the Big Bang and Unification of the forces of nature. Satisfies Gen Ed science requirements for non-science majors. Does not satisfy science requirements for Science majors but may be used as a free elective by Science majors.	Related	Course explores the concepts of space and societal connections to the greater world for non science majors.	
UGRD	PHYS	2450	Physical Properties of Matter (Formerly 95.245)	Fluid statics, dynamics of fluids, properties of solids, advanced topics in waves and vibrations, temperature and heat flow, kinetic theory of gases, thermodynamics, and the limits of classical physics.	Related	Course examines the physical properties of matter and its relationship to sustainability.	7, 9
UGRD	PHYS	3160	Science and Technology in an Impoverished World (Formerly 95.316)	Intended for junior-level science and engineering majors, this is a one-semester 3-credit course focused of the impact of science and technology in poverty stricken regions of the world. Students will be challenged to consider the implementation of past and present technologies for solving resource shortages, evaluate and strengths and limitations of these solutions while developing alternatives to address future barriers to positive change. Encouraged to work toward these issues, students will; 1) Pursue and evaluate topics in science and technology through the skills of inquiry, research, critical thinking and problem solving. 2) Demonstrate the knowledge for quantitative and qualitative analysis of problems in science and technology. #0 Analyze and interpret issues in interdisciplinary areas of science and engineering developing a level of comfort with solving unfamiliar problems using acquired knowledge and skills.	Related	This course focuses on resource management and the impact of science and technology in poverty stricken regions. Students are challenged to develop new concepts for sustainable and scalable technologies applicable to impoverished world regions.	7, 8, 9, 10, 17
UGRD	PLAS	1070	Introduction to Plastics Engineering (Formerly 25.107/26.107)	This course is designed to teach basic principles of technical drawing, fundamentals of design, fundamentals of computer aided design (CAD), dimensioning and tolerances. Basic concepts of manufacturing, rapid prototyping and 3D printing are covered. The lecture component covers theoretical information, and the lab component covers hands-on learning, where students learn to use a commercial CAD software.	Related	Course relates plastic engineering industry to sustainable practices.	8, 9, 12
UGRD	PLAS	2010	Polymer Materials I (Formerly 26.201)	This introductory course in plastics materials first evaluates how commercial plastics were developed, characterized and compared throughout the relevant industry. Various ASTM testing protocols are reviewed followed by an initial study of commodity plastic materials, including polyethylene, poly (vinyl chloride), polystyrene, diene rubbers and other selected and relatively high-volume resins. Applicable commercial polymerization methods are introduced along with comparative structure/property relationships. Initial comparisons are drawn as between commodity thermoplastic resins and thermoset compositions. Comparative end-use applications are continuously discussed along with a consideration of selected environmental issues (recyclability).	Related	Class incorporates the economics and environmental considerations associated with the plastics industry including the study of plastic materials and recyclability.	8, 9, 12
UGRD	PLAS	2020	Polymer Materials II (Formerly 26.202)	A critical review of the commercial family of materials known as engineering thermoplastics including an examination of relatively important thermoset polymer systems. Major commercial polymerization reactions are reviewed (e.g. applicable chain growth or step-growth polymerizations) including comparative market performance based upon mechanical, thermal, chemical properties and environmental considerations. Also considered are selective high performance plastic materials suitable for use at elevated temperatures and in other relatively extreme working environments. Recommended Pre-Req: 26.201 Polymer Materials I.	Related	Course integrates the environmental aspects of sustainability by examining environmental considerations associated with polymer systems.	8, 9, 12
UGRD	POLI	1010	Introduction to American Politics (Formerly 46.101)	An introduction to the politics, structure, and behavior of the American National Political Community	Related	Course integrates the social and political aspects of sustainability	10, 16
UGRD	POLI	1120	Introduction to Comparative Political Systems (Formerly 46.112)	A cross-cultural analysis of various governmental systems; elements common to all forms of government are emphasized and variations among contemporary political systems are discussed. Balance between developed and Third World countries.	Related	Course incorporates the social aspects of sustainability by emphasizing the role of governmental systems in third world nations.	10, 16
UGRD	POLI	1210	Introduction to International Relations (Formerly 46.121)	Surveys some recent methods and approaches used in the study of international politics and provides an introduction to current problems of foreign policies of major world powers.	Related	Course examines the social relationships between international communities.	16, 17
UGRD	POLI	2120	American Media and Politics (Formerly 46.212)	This course explores the role of the media in American politics and the role of politics in the American media. We focus first on the historical evolution of newspapers, radio, television, and the internet as vehicles of political news reporting. Next, we look at instances of journalistic bias and distortion in order to explore how corporate consolidation and commercial competition have affected the news industry. Finally, by studying a selection of major stories in depth, we will gain a better understanding of the factors involved in the conversion of political events and developments into seemingly significant news.	Related	Course incorporates the social aspects of sustainability by examining the relationship between the media, politics and the public.	9, 10, 16
UGRD	POLI	2150	African Politics	The images of Africa most commonly seen in the US flood our minds with inconsistent messages. Africa is portrayed and discussed as a locus of ancient tribal conflicts, disease, famine, and suffering. While struggles do occur - just as they do in all places - understanding the diverse experiences of the peoples of Africa requires engagement with the cultures, politics, religions, and perspectives of people in more than fifty countries across a vast continent. While such engagement can hardly be accomplished in a semester, we will attempt to scratch at the surface in different ways that reveal ideas, experiences, and thoughts that reflect political life and culture in Africa south of the Sahara in a more reflective manner. Throughout this course, I challenge you to remember that politics as we usually conceive them - the policies, programs, and posturing of government and public organizations - are a backdrop to the way real people live their lives every day. Policies and political systems are less important for the fact that they exist than for the ways in which they affect the lives of those they govern. With this approach, I hope we will be able to pick apart government structures, political organizations, and policy issues in ways that will shed light on the construction and culture of African politics. This requires a focus on power - who has it, how they use it, and to what ends.	Related	Course examines how complex societal policies in Africa are connected with sustainabilities.	11, 16

UGRD	POLI	2510	Politics of Identity (Formerly 46.251)	This interdisciplinary course considers the way we construct self-identity through our affiliation with various cultural and political groups- from the "Red Sox nation" to linguistic, economic, nationalistic and ethnic groups. It examines the central role of nationalism; its symbols, traditions and expectations; the role of the media; and the benefits and risks of our allegiance to these groups.	Related	Course relates to the social dynamics of sustainability by examining identity in American society.	10, 11
UGRD	POLI	2530	Introduction to Public Administration and Policy (Formerly 46.253)	An examination of the little studied fourth branch of government. Bureaucratic power in the American political system is reconsidered.	Related	Course relates to the social dynamics of sustainability by examining public policy and administration.	16
UGRD	POLI	2650	State and Local Politics (Formerly 46.265)	Examination and study of politics and government at the state and local levels, with emphasis on Massachusetts and New England. Practitioners from state and local government will meet with the class.	Related	Course incorporates the social aspects of sustainability by examining levels of government.	16
UGRD	POLI	3200	Gender Law and Politics (Formerly 46.320)	Explores legal constructions of gender by examining Supreme Court cases, federal legislation, historical documents, news stories, and scholarly essays on sexual inequality in the United States. Topics include the evolution of the family as a legal (and illegal) reality; political regulation of reproduction and sexual activity; feminist critiques of economic inequality; the rise and fall of affirmative action; the changing role of gender in class consolidation; and ongoing debates about the relationships between public and private life.	Related	Course integrates the social aspects of sustainability by examining sexual inequality in the legal system.	5, 8, 10, 16
UGRD	POLI	3350	Constitutional Law and Politics (Formerly 46.335)	A study of constitutional law focused on the principles and structures of American government. The course will discuss the Constitution, the Bill of Rights, the origins of judicial review, and the principles of federalism, natural law, ordered liberty, limited government, separation of powers, equal protection, and due process.	Related	Course will provide an understanding of constitutional law through a social and political context.	10, 16
UGRD	POLI	3370	Constitutional Law: Rights & Liberties (Formerly 46.337)	A study of constitutional law focused on the evolution of the civil liberties decisions of the Supreme Court. The course will discuss the case law on freedom of religion, freedom of speech, freedom of the press, gun rights, search and seizure, rights of the accused, privacy, and other controversies that reflect the balance of liberty and authority in a free society.	Related	Course integrates the social aspects of sustainability by examining civil liberties.	10, 16
UGRD	POLI	3490	Politics of Race and Ethnicity (Formerly 46.349)	A study of the politics of race and ethnicity, focusing primarily on American society, and the racial and ethnic groups of the region.	Related	Course relates to the social dynamics of sustainability by examining race and ethnicity in American society	10, 11
UGRD	POLI	3530	Public Policy and Administration (Formerly 46.353)	An examination of the little studied fourth branch of government. Bureaucratic power in the American political system is reconsidered.	Related	Course relates to the social dynamics of sustainability by examining public policy and administration.	16
UGRD	POLI	3740	Democracy and Development (Formerly 46.374)	Explores the theories and experiences of countries newly converting to democracy in Asia, Africa, Latin America and the former Eastern Bloc. Also examines the strategies and prospects for development among the same countries.	Related	Course examines the social dynamics of sustainability, specifically development pattern changes in new democracies.	16, 17
UGRD	POLI	3870	Politics of International Organizations (Formerly 46.387)	This course will address the history, functioning, structure and politics of international organizations in world politics. International Governmental Organizations as well as Non-Governmental Organizations on the global and regional level will be analyzed and discussed. In a participatory and interactive class format students will develop analytical and critical thinking skills.	Related	Course examines the social dynamics of sustainability, specifically international organizations.	16, 17
UGRD	POLI	4200	Reading and Simulation Experience International Organization (Formerly 46.420)	Students take part in a simulation of the proceedings of a regional or international organization, e.g., U.N., O.A.S., O.A.U., or the Arab League. They study all aspects of the selected institution but concentrate on key economic, social and security issues discussed in the body's debates. The course aims to give the student a clearer understanding of the forces and constraints which shape the foreign policies of individual states.	Related	Course integrates the social and political aspects of sustainability by simulating the proceedings of an international organization.	8, 16, 17
UGRD	POMS	4010	Logistics and Transportation (Formerly 63.469/POMS 401)	This case-based course will examine methods and strategies for managing and controlling material movement, with particular emphasis on international operations, from the purchase of production materials to the control of work in process to the distribution of the finished product. Strategies that will be discussed include the design of international distribution networks, the use of third-party logistics providers, and the creation of links between logistic systems and marketing to create competitive advantage. The course will also explore tactical issues that must be managed to pursue a logistics strategy successfully, including choices regarding means of transportation, packaging, and inventory policies. Underlying themes of the course will be the use of information technologies (such as electronic data interchange and bar coding) and mathematical models to support logistics decision-making.	Related	Course examines the dynamics of transportation and the socioenvironmental impact.	9, 11
UGRD	POMS	4020	Global Supply Chain Management (Formerly POMS 402/63.402)	A supply chain consists of all of the activities and organizations required to produce and deliver a good or service from raw materials to the final end user. Global Operations and Supply Chain Management (GOSCM) involves the coordination of this complex network of organizations and flows of materials, funds, and information among and between the stages of a supply chain. GOSCM integrates the traditional business functions of operations, marketing, logistics, finance, and information systems in an international business context. The course traces the flow of products and services from development through delivery to the final user and will address topics such as global sourcing strategies, managing demand and supply uncertainties distribution strategies and logistics network design for global operations, global strategic alliances, and the role of information technology and Enterprise Resource Planning (ERP) in managing global supply chains.	Related	Course examines global operations and the impact on economies and national communities.	8, 9, 12, 17
UGRD	PSYC	1010	Introduction to Psychological Science (Formerly 47.101)	An introduction course that focuses on application of the scientific method to major areas of psychology: biological, cognitive, developmental, social and personality, and mental and physical health. The course addresses the importance of social and cultural diversity, ethics, variations in human functioning, and applications to life and social action both within these areas and integrated across them. The research basis for knowledge in the field is emphasized.	Related	This course addresses the importance of social and cultural diversity and ethics.	11,16
UGRD	PSYC	2090	Social Psychology (Formerly 47.209)	Presents an introduction to the study of social behavior in interpersonal relationships, groups, organizations, and the community: Diversity in regard to groups of peoples, cultures, and views is emphasized. Topics include non-verbal communication, social attraction, attitudes and attitude change, group dynamics, prejudice, labeling, stereotyping, interpersonal influence, and applications to social problems.	Related	Course focuses on social attributes contributed to sustainability.	3, 10, 11
UGRD	PSYC	2550	Community Psychology (Formerly 47.255)	Surveys the nature and practice of community psychology, including principles of community organization and change as seen in such areas as education, mental health, the workplace, health care, justice system, corrections and social services. Students may participate in field research or practice under the direction of an assigned agency, and classroom work will include discussion of the field experiences of the participants.	Related	Course integrates the social aspects of sustainability by examining interactions between groups of people in various settings.	3, 10, 11, 16
UGRD	PSYC	2720	Abnormal Psychology (Formerly 47.272)	Presents an introduction to the study of various patterns of mental, behavioral, and personality disorders including diagnosis, etiology, and treatment. Current research-based theoretical approaches will be discussed as a means to gain a better understanding of psychological, biological, and sociocultural causes. Emphasis will be placed on the important notion that mental health problems are not only linked to individual factors, but also to family, community/social, cultural, societal, political, and historical factors.	Related	This course addresses mental health problems linked to individual factors and family, community/social, cultural, societal, political, and historical factors.	3,5,10,11
UGRD	PSYC	3350	Psychology and Women (Formerly 47.335)	Considers such topics as: the psychology of sex differences; biological bases of psychological sex differences; the nature of female sexuality; clinical theory and practice concerning women; women as mental patients and mental health consumers; implications for psychology and for women's status.	Related	Class relates to social education regarding women related topics.	3, 5, 11

UGRD	PSYC	3360	Culture and Psychology (Formerly 47.336)	Provides an analysis to the impact of culture, socio-historical, and social influences on psychological processes and outcomes. Students will also learn about techniques for studying the influence of culture including cross-cultural methods and population-specific methods. Through careful analysis of research literature, this class will examine a variety of contexts within the U.S. and internationally. Topics will include identity development, immigration, acculturation, socialization, and social interactions among groups.	Related	Course explores the impact of culture and social influences on populations of people.	3, 11
UGRD	PSYC	3600	Adult Development and Aging (Formerly 47.360)	Begins with an overview of recent theoretical perspectives on adult development and aging. In chronological sequence, it presents the stages of adulthood and concludes with death and dying. Topics covered include personal, family, and vocational development through adulthood, gender pattern differences, and the impact of changing demographics, including the lengthening of the life span.	Related	Course integrates social and developmental aspects of sustainability.	3, 11
UGRD	PSYC	3620	Psychology of Developmental Disabilities (Formerly 47.362)	This course examines a range of developmental disabilities, their etiology, consideration of underlying brain function, assessment procedures, and current diagnostic, treatment and educational approaches. In addition, the impact of disability on individuals and the families of those affected, cultural and social aspects of disability, and current practices in service provision will be considered.	Related	This course addresses cultural and social impacts of disability	10,11
UGRD	PSYC	3640	Family Systems	This course presents a systems model in considering families as they influence, and are influenced by, their members. We will explore theoretical foundations and examine empirical evidence to consider a variety of family systems, structures, and dynamics in the social context and across development, including topics such as culture, gender, sexual orientation, socioeconomic status, disability, foster care, adoption, education, work, and community.	Related	This course examines factors that influence family dynamics i.e.; culture, gender, sexual orientation, socioeconomic status, disability, foster care, adoption, education, work, and community.	1,3,4,5,8,10,11
UGRD	PSYC	3680	Psychology of Decision-Making	We spend billions of dollars every year to address issues caused by poor decisions: jurors convict innocent defendants, employees do not adequately contribute to retirement accounts, young adults smoke cigarettes, etc. Why do people make irrational decisions? This course will provide a comprehensive overview of decision making with an emphasis on applying psychological theory and research to tackle issues in the areas of law, economics, health, etc. Students will learn theoretical concepts to improve their own decision-making as well as help them to positively influence the decisions of others.	Related	Course focuses on psychological approaches to increase better decision-making and consequently increase sustainability.	3, 8
UGRD	PSYC	4712	Seminar in Community Psychology: Immigration	An advanced seminar to consider special topics in community psychology with focus on critique of the theoretical and empirical literature, identification of future research pathways, and the potential for application with consideration of ethics and social responsibility. The topic of this seminar is immigration, a very important issue in the United States and around the world. In this seminar we will study the complex process of migration from a community social psychological point of view. Motivations, expectations, acculturation, immigrant status, deportations, policy and more will be covered. This is a writing-intensive course.	Related	This course examines immigration as its main topic and discusses related topics such as deportation, immigration status and policy.	11,16
UGRD	PSYC	4713	Seminar in Community Psychology: Prevent Youth Violence	An advanced seminar to consider special topics in community psychology with focus on critique of the theoretical and empirical literature, identification of future research pathways, and the potential for application with consideration of ethics and social responsibility. The topic of this seminar is youth violence, which continues to be a major public health concern in the United States. Preventing youth violence is an important component of creating peaceful and safe neighborhoods and just communities. In this course, we will use ecological and multicultural perspectives to understand different types of youth violence, the contexts in which they occur, and intervention strategies to address the violence. This is a writing-intensive course.	Related	This course addresses community environments around youth violence.	3,11
UGRD	PSYC	4714	Seminar in Community Psychology: Bridging Differences	An advanced seminar to consider special topics in community psychology with focus on critique of the theoretical and empirical literature, identification of future research pathways, and the potential for application with consideration of ethics and social responsibility. This course explores dilemmas that can emerge when working to bridge diverse groups in community-based work. The seminar will be organized around narratives that address multiple dimensions of diversity including race, ethnicity, gender, class, sexual orientation, disability, and religion. Too often, guidelines for addressing very complex diversity dynamics are presented as neatly packaged lists of recommendations. However, it is within the stories of the challenges and dilemmas that the complexity of the political, historical, social, and psychological dynamics of diversity are most evident. Students will explore examples of everyday diversity challenges and utilize psychological theories to better understand how the challenges can be shaped by struggles over limited resources, deep historical conflicts between groups, privilege dynamics, intragroup dynamics, organizational cultural norms, and/or other issues. This is a writing-intensive course.	Related	This course addresses community diversity with a focus on the effects of limited resources and privileges.	1,4,10,11
UGRD	PSYC	4730	Seminar in Social Psychology (Formerly 47.473)	Presents an intensive study of one or more of the following special topics in social psychology: small group interaction; social aspects of health and illness; conformity; attitude formation and prejudice; patterns of communication, including nonverbal communication; psychology of sex roles; methods of social action and social change in the community.	Related	Course examines the social aspects of health and illness	3, 5, 11
UGRD	PSYC	4735	Seminar in Social Psychology: Workplace Diversity	An advanced seminar to consider special topics in social psychology with focus on critique of the theoretical and empirical literature, identification of future research pathways, and the potential for application with consideration of ethics and social responsibility. Over the course of our lives, many of us will be working in organizations that include diverse workers, and thus it is important to understand the issues that shape interpersonal and system dynamics within such settings. In this seminar, we review theories and research relevant to how race, ethnicity, class, gender, sexual orientation, and disability dynamics affect workplace systems. Classes will be highly interactive and discussion-oriented as students learn about the challenges diverse organizations face in fostering positive working relationships and about strategies adopted to enhance the effectiveness of the diverse workplace. This is a writing-intensive course.	Related	This course examines how race, ethnicity, class, gender, sexual orientation, and disability dynamics affect workplace systems.	5,8,10,11
UGRD	PTEC	4400	Commercial Development	The concepts of industrial marketing will be reviewed for research, pricing strategies, and product planning for market segmentation, place (distribution), and promotional activities. Topics will include creating a demand, selling, and servicing base resins and additives.	Related	Course focuses on how commercial development is integral for societies.	8
UGRD	PUBH	2040	Intro to Health Promotion (Formerly 31.204)	This course focuses on the role health education plays in the development of healthful patterns of living. A philosophy of health education emphasizing holistic health will be generated. The organization and administration of school, community, health care facility, and workplace health education programs are introduced.	Related	Course promotes living a healthy lifestyle through education and understanding of healthful living patterns.	3
UGRD	PUBH	2050	Social Determinants of Health	Presents students with detailed knowledge of major contemporary health problems and issues. Assessment of individual health needs is discussed and a model for self-directed behavior change is developed. The role of health education in the prevention of disease is covered. Juniors only.	Related	Course focuses on the interconnections of health and society.	3

UGRD	PUBH	2210	Health Policy (Formerly PUBH.221)	This introductory course will provide students with an overview of the healthcare systems that are currently utilized to provide coverage to Americans with emphasis on existing disparities. Students will also review policies that are developed and implemented to enhance the current health care system. An analysis of how healthcare coverage and costs differs between the US and other developed nations will also be covered in this course.	Related	Class focuses on the social, environmental, and economic factors related to social health.	3, 16
UGRD	PUBH	3011	Program Planning/Health Promo	Focuses on education methods and the various aspects and dimensions of curriculum development and planning, importance and ramifications of needs assessments, current trends and issues in the field of health education and health promotion teaching strategies, and the development of a viable health curriculum. Juniors only.	Related	Course focuses on improving and managing health care planning. An important trend in sustainable society.	3, 4
UGRD	PUBH	3020	Health Communication (Formerly 31.302)	This course explores the uses of a variety of established and emerging health communications strategies, techniques, and modalities. Students will consider the ethical considerations pertinent to the use of assorted health communications approaches in health promotion. The course discusses the concepts of health literacy and eHealth literacy. Awareness and sensitivity toward cultural, ethnic, and religious diversity will be particularly emphasized when discussing various communication techniques in relation to particular health issues. Meets Core Curriculum Essential Learning Outcome for Written and Oral Communication (WOC).	Related	This course looks at health communications and issues related to ethnic, cultural and religious diversity.	3,10
UGRD	PUBH	3030	Social Determinants of Health (Formerly 31.303)	This course introduces students to the concept of social determinants of health, and strongly emphasizes the influence of social power relations on public health. An examination of a set of major health issues, at both the international and national levels provides the framework for students to learn and understand these concepts. A set of learning modules begins with identifying major contemporary health problems, definitions of health and health promotion as established through the World Health organization, and an exploration of social power relations and how they can shape public health. The course then moves to examine a set of specific health issues to see how they have been shaped by their social determinants. Juniors only.	Related	Class focuses on the social, environmental, and economic factors related to social health.	3
UGRD	PUBH	3040	Politics of Health (Formerly 31.304)	The course addresses a range of contemporary health problems (primarily in the U.S.) that are described and analyzed in their social context. Areas for consideration will include: political, economic, scientific/technological, environmental, and cultural factors. Students will be introduced to health education theories and methods that support the development of strategies for social change. Juniors only.	Related	Course focuses on the dynamics between the issues in both politics and public health.	3, 8, 16
UGRD	PUBH	3050	Introduction to Epidemiology (Formerly 31.305)	This course is designed to introduce basic epidemiological methods used in the study of current major health problems. Content includes explanation of the scope and focus of epidemiology, simple measures of disease frequency and association used in the study of the distribution and determinants of disease, types of epidemiological study designs, and practical applications. Emphasis on interpretation of epidemiological information and application of findings Prerequisite: Community Health and an elementary statistics course. Required for seniors in Community Health Education; open by permission to other upper division students in Health Professions. Meets Core Curriculum Essential Learning Outcome for Information Literacy (IL) and Quantitative Literacy (QL).	Related	Looks at epidemiological study designs and practical applications.	3,11
UGRD	PUBH	3070	Introduction to Public Health Policy (Formerly PUBH.221 and PUBH.2210)	One of the core functions of Public Health is developing policies and plans that support individuals and community health efforts. This course introduces students to the legal, ethical, economic and regulatory dimensions of healthcare and public health policy. Students will explore local, state and national governmental agency roles in public health policy. Students will learn about the implications of laws and regulations that impact Community Health and Safety.	Related	This course provides an overview of public health policy and introduces concepts such as national government roles, ethics, and economic factors.	3,8
UGRD	PUBH	3210	Health Care Systems (Formerly 31.321)	This course describes and analyzes the nature and functions of health care services and health professionals. The course examines the impact of social, political, economic, ethical, professional, legal, and technological forces on them and the system they comprise. Juniors and Seniors only.	Related	Course integrates the economic and social aspects of sustainability in regard to the functions of health care services.	3, 8, 9, 10, 16
UGRD	ROTC	4500	Leadership in a Complex World (MSL 402) (Formerly 28.450)	Leadership in a Complex World explores the dynamics of leading in the complex situations of current military operations in the contemporary operating environment (COE). Students will examine differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism. This course places significant emphasis on preparing students for their careers in the military. It uses various case studies and scenarios to prepare students to face the complex ethical and practical demands of leading as a commissioned officer in the United States Army.	Related	Course integrates the social aspects of sustainability by examining complex ethical issues as a commissioned U.S. Army officer	16
UGRD	SOCI	1020	Social Anthropology (Formerly 48.102)	Using the comparative approach to society, this course examines several distinct cultures as a means of understanding both the universal constants and the variations in human societies.	Related	Course examines sustainable dynamics that influence societies.	11
UGRD	SOCI	1150	Social Problems (Formerly 48.115)	This entry level course uses the core concept of social problems to introduce basic social science reasoning-how social scientist define research questions, develop systematic methods to study them, gather evidence, search for pattern, in link findings to existent knowledge. Cases provide opportunities to discuss how private problems develop into public issue, illustrating sociology as a discipline that evolves in response to social conflicts and inequalities. The course also meets General Education requirements for Ethics and Diversity.	Related	Course integrates social problems into a broader understanding of society.	1, 2, 3, 4, 5, 10, 16
UGRD	SOCI	2004	Introduction to Multiracial Studies	What does it mean to be biracial or multiracial? How is being bi/multiracial shaped by other identities? We will explore these important questions. You will also learn about the experiences, identities, and unique struggles of bi/multiracials. You will develop the analytical skills to challenge rigid racial binary. Bi/multiracial Americans are a growing population in the United States, and therefore, you are statistically more likely to befriend, date, work with and/or parent a bi/multiracial American than any other generation in American history. Consequently, this course was developed to enhance your racial consciousness by acknowledging the complexities of racial inequality in a population that is often assumed to be evidence of racial harmony in America.	Related	Course examines racial identity in the United States incorporating the social aspects of sustainability.	10,11
UGRD	SOCI	2050	Public Sociology (Formerly 48.205)	Public sociology includes sociological initiatives targeting non-university audiences and serving the public good. This course will 1) introduce and critique the various conceptualizations of public sociology linking them to broad schools of sociological theory; 2) explore alternative field models and methods, preparing students for field projects in future semesters; and 3) expose students to sociological practitioners and practices compatible with the mission of the university and department. From a liberal arts perspective, the course stresses critical thinking and communication skills.	Related	Course relates the social dynamic of sustainability.	11, 17
UGRD	SOCI	2110	Sociology of American Education (Formerly 48.303/SOCI.3030)	Course introduces students to ongoing debates in the field of Sociology regarding the American educational system, its structures and functions and how it relates to issues of inequality by race, class and gender. Students are expected to explore, examine and evaluate the current issues relating to the system of education in the United States.	Related	This course addresses issues of inequality in the American education system incorporating the social elements of sustainability.	4,5,10,11

UGRD	SOCI	2120	Cultures of the World (Formerly 48.212)	Focuses on a different country or region each time it is given. Students examine the traditional culture, recent history, economic development, class structure, and international relations of the area covered.	Related	Course examines the socio-economic dynamics of cultures around the world.	8, 10, 11, 17
UGRD	SOCI	2130	Sociology of Immigration	The United States is frequently described as a country with a proud history of immigration. As a result, citizens and residents of the U.S. often identify their home as a nation of people who make up a melting pot country. While useful and insightful, the melting pot metaphor requires comparison with additional explanations of immigration and immigrant experiences. In order to provide deeper comprehension of the topic matter, this course offers sociological examination of immigration processes, laws, and debates. Three areas compose the main portion of class content: historical accounts and theories, legislation, and the social, economical, and political experiences of immigrants.	Related	Course focuses on how immigration impacts the social and political climate.	10, 16, 17
UGRD	SOCI	2160	Sociology of War and Peace (Formerly 48.216)	The purpose of this course is to examine critically the social forces that contribute to war, war's social consequences, and the possibilities for creating a more peaceful world.	Related	Course examines the relationship between social interactions and war	16
UGRD	SOCI	2170	Social Movements	Considers organized action undertaken to alter the social position of a group. Organization, techniques of action, motivation of participants, and group ideologies are studied. Materials from historical, social, psychological, and sociological sources are used.	Related	Course focuses on how society is impacted by social movements.	10, 16
UGRD	SOCI	2340	Race and Ethnicity (Formerly 48.234)	This course locates and studies the sociological dynamics of race and ethnic relations in the United States as it pertains to all groups. The course material presents theories and models that explain periods of conflict and cooperation between diverse sets of people. While providing some historical background, the course focuses primarily on recent and contemporary situations.	Related	Course explores the relationship between races incorporating the social aspects of sustainability.	10, 16
UGRD	SOCI	2400	Sociology of Gender (Formerly 48.240)	This course is an interdisciplinary introduction to the field of gender studies. A variety of topics are presented, such as gender stratification, work and family, sexual identities, media representations of women and men, women's movement, and violence against women. Feminist theories and methods are also introduced.	Related	Course focuses on gender as a social dynamic of sustainability.	5, 16
UGRD	SOCI	2450	Introduction to Labor Studies (Formerly 48.245)	This foundational course has two overarching learning objectives: (1) to give students basic empirical knowledge and analytical tools to understand the context of work in the United States at the dawn of the twenty-first century and (2) to give students an understanding of how labour unions work, what has been their impact historically, and what their role is in contemporary society. The course will be explicitly interdisciplinary, drawing on readings from history, sociology, economics, political science, and psychology to offer an introduction to understanding work and labor through and analytic lens. In addition, the course will include a service-learning component in collaboration with the UML Labor Education Program.	Related	Course focuses on labor relations between workers and the institution.	1, 8, 10
UGRD	SOCI	3020	Seminar on Homelessness: Lowell and Mumbai	This course will focus on understanding housing insecurity by looking closely at what it means to be homeless in two very different cities, located across the world from each other: Lowell, USA and Mumbai, India. In doing so, we will use this comparison to highlight the root causes of homelessness within a global context, including how certain social situations, policies and innovations may exacerbate and /or improve this situation. Simultaneously, students will gain a first-hand understanding of homelessness in Lowell through performing 3-4 hours of service per week at a local shelter and/or drop-in center.	Related	This course gives students a firsthand experience with housing insecurity through volunteering service at a local shelter on a weekly basis. The course also explores the aspects of homelessness at the global level, and at the city level by comparing and contrasting Lowell and Mumbai, India.	1,2,6,8,10,11
UGRD	SOCI	3160	Youth and Society (Formerly 48.316)	Youth (or adolescence) constitutes a historically and socially constructed stage of the life course between childhood and adulthood. Since the early twentieth century, society's view of this life period has been ambivalent, at once glorifying the age of youth while also fretting over the problems that youth face. This course takes a sociological view of the study of youth/adolescence with particular attention to: (1) how this stage of the life course intersects with race, gender, immigration status and sexuality; (2) how society has responded to youth over time through a range of youth-serving organizations and media representations; and (3) how youth have responded as agents in their own public representations and development.	Related	Course explores the social changes that comes about between generations.	5, 8, 10, 16
UGRD	SOCI	3450	Urban Sociology (Formerly 48.345)	Deals with issues related to the quality of life in American cities. Students taking this course may engage in research projects on the city of Lowell and the role of the University of Massachusetts Lowell within that city.	Related	Course focuses on societal issues within the urban community	3, 11
UGRD	SOCI	3510	The Sociology of Health and Health Care (Formerly 48.351)	With the passage of the Affordable Care Act, the U.S. Health Care system is undergoing a radical change as profound as any in U.S. history including those for minority and woman's rights. A large segment of the population has struggled to obtain even basic health care coverage. The changes taking place are analyzed in a historical and comparative context by examining health care in other countries. Special attention is given to understanding the professions in medicine and the role medical professions have had in shaping medical care. At the micro level, the course examines evolving health care provider/patient relationships to better understand the level of control patients can exert over their health care decisions.	Related	Course examines the changes occurring in the U.S Health Care systems over recent years and compares the current Health Care system to others around the world in a historical and social context	3, 16
UGRD	SOCI	3620	Social Welfare Policy (Formerly 48.362)	The course examines the development of social welfare policy in the United States as well as alternative strategies for social welfare provision. Particular attention is paid to the role of race/ethnicity, class, and gender in the formation of social welfare policy.	Related	Course examines the social health of people with a focus on race/ethnicity, class and gender.	3, 5, 10, 16
UGRD	SOCI	3740	Race and Families	This course will explore the "traditional" definition of family throughout American history as well as how now more than ever, many families challenge the conventional definition. We will discuss how different political, economic and social factors (i.e. enslavement, immigration policies, etc.) have shaped the experiences, structure and dynamics of how families function in the United States. We will analyze families of diverse racial backgrounds as well as other families that have been constructed as outside of the "norm," such as LGBT families, military families and adoptive and foster families. We will also outline specific societal changes (e.g. assisted reproductive technology) that have contributed to how families form, bond and experience family life.	Related	The purpose of this course is to address how the meaning and definition of "traditional" family in the United States has changed across generations. This course explores racial diversity, gender equality and how social, political and economic factors have influenced family structures over time incorporating social aspects of sustainability.	5,8,10,11
UGRD	SOCI	4050	Feminist Methodologies (Formerly 48.405)	Despite the recent growth of feminist methodologies, there is no one way of doing feminist methodologies. The growing body of literature in this area addresses the distinctive challenges and strengths of doing this research. Gender Studies scholars especially seek to question the framing of a study, managing of emotions, and ethical dilemmas. We will explore feminist strategies for creating, implementing, and analyzing a project that is grounded in the everyday lives of people while situating them in a social, political, and economic context. We will explore the interdisciplinary intersections where these challenges push at the boundaries of the disciplines of your major field of study. We will also investigate how to use as variety of qualitative approaches while doing a feminist project and the ways in which feminism can enlighten understandings of ""traditional"" qualitative methods.	Related	Course focuses on women and how they connect with society.	5
UGRD	SOCI	4690	Seminar on Global Society (Formerly 48.469)	Considers the spread of industrial society globally. Emphasizes economic, political and cultural changes in various parts of the world and in the USA.	Related	This course addresses the social, political and economic factors that have influenced industrial society in the United States and across the world.	9,11

UGRD	WLCH	3150	Chinese Culture and Civilization (Formerly 53.215)	An in-depth study of culture, civilization, and literature from the Chinese-speaking world. The emphasis of the course is not only on understanding China's history in general chronological terms, but also on understanding the cultural qualities that have made China a great yet distinctive country. Course taught in English.	Related	This course explores the history of Chinese culture and pinpoints the factors that have made China a standout country in the world.	9,11
UGRD	WLCH	3200	Chinese Cinema and Culture	This course offers an insight into the social, economic, and political transformation of China, particularly in the past century, through a cinematic lens. Selected films of different genres from Mainland China, Hong Kong as well as Taiwan, and even the U.S., including Hollywood films portraying China and films made by Chinese Americans, will be examined to decipher its regional differences, the urban-rural gap, daily lives, gendered identities, and the belief system as well as the cultural landscape of contemporary and modern China. Taught in English.	Related	This course discusses the development of China over the past century and how social, economic and political factors have influenced those changes.	5,8,9,10,11,16
UGRD	WLFR	3200	Contemporary French Civilization and Culture (Formerly 50.320)	In this course we look closely at some fundamental issues reflecting the rapidly changing parameters of French culture and society today; the question of national identity and cultural hybridity, the relationship between the evolving types of family relations and new forms of social and political contracts; the crucial personal problems faced by the young, the poor, the immigrant and the elderly in an increasingly multicultural Hexagone attempting to define its place, role and function within the recently defined Europe unit and the new global world order; the current status of women; the relationship between cities and ghettos, violence and crime; the nature of emerging forms of cultural production within new trends and styles of modernity.	Related	Course incorporates the social aspects of sustainability by examining French culture and society	5, 10, 11, 16
UGRD	WLFR	3825	Migration of Francophone Literature & Visual Arts	The long history of migration in France, and its current visibility in politics and society make studying this theme in literature, film, and other cultural production fundamental to our understanding of mainland France today. This course focuses on written and visual texts connected to both France, and other regions of departure (including but not limited to North Africa and West/Central Africa). We examine key themes in texts focused on migration: labor, education and assimilation, family/next generations, and clandestine immigration. In addition to primary texts, secondary critical reading will ground discussion in postcolonial theory, gender studies, and francophone studies in order to understand the long tradition of these themes in francophone literature and film.	Related	This course focuses on key themes of migration that include education, labor, gender amongst other topics. Students are taught this course through multiple forms of media.	1,4,5,8,10
UGRD	WLKH	2100	Introduction to Cambodian Culture (Formerly 59.210)	This course focuses on the development of Southeast Asian art and culture from ancient times to the present. As a diverse region that is home to Muslims, Catholics and other Christians, Buddhists, Hindus and animists, examining arts and culture in Southeast Asia provides fascinating insight into the region's societies. This course examines performance, architecture and material culture from a variety of Southeast Asia, its contacts with neighboring regions, and the breadth of societies in the region and their motivation for creating art. Students will be introduced to theater, dance puppetry, martial arts and music of Southeast Asia. We will examine artistic forms influenced by ancient Hindus, Chinese, Arabs, Europeans during the colonial era, and other influences on the arts in Southeast Asia. Students will also explore how various art forms have political, social and religious functions in such regions as Thailand Indonesia (Bali and Java), Vietnam and Cambodia.	Related	Course relates to the social aspects of sustainability, specifically the southeast region of Asia.	11
UGRD	WLKH	3490	Literature, Politics and Genocide in Cambodia (Formerly 59.349)	This course will examine various literary and political responses to the Cambodian genocide, particularly personal accounts or literary testimony by survivors and government sanctioned legal proceedings. The course will consider how the literary and political responses to the Cambodian genocide have at different times paralleled, complimented and opposed each other. The course will also ask whether their overall effect contributes to or detracts from the serving of justice and the process of healing for the survivors. To pursue these questions, we will read selections from novels and poetry written by Cambodian survivors side by side with accounts of political activities of the Cambodian government and the international community to bring the perpetrators of the genocide to justice.	Related	Course focuses on the response to the Cambodian genocide through a political and social point of view	11, 16, 17
UGRD	WLPO	3050	Culture and Civilization of Brazil	This course is an introduction to Brazilian culture and society. Attention is given to history, geography, cinema, literature, art, and issues of race, gender, and social inequality as they lead toward a fuller understanding of Brazil. This course will cover major aspects of Brazilian society. The main texts review significant events and forces that have helped shape Brazil today. A variety of films and videos will be used. Course will be taught in English.	Related	This course explores different aspects of Brazil and addresses how the geography, arts, and social inequalities influence Brazilian culture.	1,5,9,10,11,14,15
UGRD	WLSP	3005	LGBTQ and the Hispanic World	This course will examine relevant works of 20th and 21st century LGBTQ+ Spanish speaking literature and visual representations, including selections from well-known authors and a new generation of writers. We will explore these works within broad social and political contexts that extend from the beginning of the twentieth century to the present day. In this course, we will study how literature serves as a tool both for the expression of same-sex desire and for questioning political and social practices that have traditionally silenced non-heteronormative identities. Finally, we will discuss how LGBTQ+ literature defies aesthetic conventions to expand existing cultural frameworks and to create new ones that align with social and political progress. Taught in Spanish.	Related	This course explores the contexts of the LGBTQ+ community and how social and political aspects have influenced and impacted hispanic cultures.	5,10
UGRD	WLSP	3150	Latin American Civilization and Culture (Formerly 54.315)	Considers significant intellectual, artistic, historical, and sociopolitical aspects of Latin America from the beginning of its history. Through audiovisual aids and selected readings, the student will explore the Latin American way of being and expressing.	Related	Course includes a cultural and social understanding of Latin America.	11
GRAD	ACCT	6220	Globalization and Accounting (Formerly ACCT/60.622)		Related	Globalization and the social, cultural, and economic implications it entails has a significant impact on the accounting practices needed to support businesses.	8, 17
GRAD	ACCT	6220	Globalization and Accounting (Formerly ACCT/60.622)	What role do accountants play in the globalizing business environment? This course will explore this topic, emphasizing global capital markets and financial reporting, the impact of global organizational structures and information systems on managerial accounting, and complex issues of audit and taxation that emerge in this global environment. To appreciate the impact of globalization, the course will consider such aspects as variations in the currencies, cultures, history, ethical issues and legal systems of different regions of the world, emphasizing how managers need to consider global opportunities and risks in their decision-making manage effectively.	Related	Focus on ethical overlap of culture and development.	1, 8, 9
GRAD	ATMO	5290	Advanced Forecasting (Formerly 85.529)	This course builds on the student's basic understanding of storm systems and extends their theoretical knowledge to particular weather patterns. Topics include nowcasting, long-range forecasting, snow squalls, sea breeze, and especially deep convection. Particular attention is paid to the structure and development of supercells. Students will also be required to write a special report on a topic assigned by the professor, and present this in class as a special lecture.	Related	Course integrates climate aspect of sustainability via comprehensive analysis of forecasting severe storms that impact populated regions all over the world.	13, 14

GRAD	ATMO	5710	Air Pollution Phenomenology (Formerly 85.571)	The course centers on transport, dispersion and transformation of air pollutants in the atmosphere. Atmospheric structure and dynamics are reviewed. The atmospheric dispersion equation is developed for instantaneous and steady-state releases of pollutants, including the Gaussian Plume Equation for point, line and area sources. The sources and transport of particulate matter are discussed, including haze and visibility impairment. Other topics are photooxidants (ozone), acid deposition, stratospheric ozone depletion and the greenhouse effect.	Related	Class focuses on dispersion of air pollution in the environment and examines the greenhouse gas effect leading to climate change.	12, 13, 14
GRAD	BMBT	5300	Ergonomics and Work	An overview of the scientific basis for design of the workplace to optimize physical and mental interaction of workers with machines, tools, and work methods. Topics include work measurement, anthropometry, biomechanics, work physiology, cumulative trauma disorder and information presentation and processing.	Related	The course explores creating a healthy work environment.	3, 8, 9
GRAD	BMEN	5400	Occupational Safety Engineering (Formerly BMBT.5400)	The purpose of this course is to introduce students to the principles of safety hazards in the work environment. This course is primarily designed to emphasize the safety aspects to the hazards at work. It begins with the historical development of occupational safety and health and progressively examines the fundamentals of recognition, measurement, evaluation, and control of occupational safety hazards.	Related	Course explores creating a healthy working environment.	3, 8, 9
GRAD	BMEN	6380	Methods of Work Analysis (Formerly BMBT.6380)	Criteria for selection of an approach to ergonomic job analysis depend on the combination of exposures (Micro- and Macro-level ergonomic stressors) observed to be present as well as the analytical goal. Many ergonomic analysis techniques are based on traditional industrial engineering approaches (time-motion study and work sampling), applied to the identification and evaluation of potential risks to workers' health. A variety of methods, both observational and instrumental, will be discussed; laboratory sessions will permit hands-on application of several of these for critical evaluation.	Related	Course explores creating a healthy working environment.	3, 8, 9
GRAD	BOST	630MSIS	Project & Change Management	Inter-campus Course -- Please refer to UMASS Boston Course Catalog for details. (MSIS 630)	Related	Course focuses on projects and change management and how it can be implemented to the real world.	8
GRAD	CHEM	5190	Environmental Chemistry (Formerly 84.519)	Covers chemical processes and measurements in marine and estuarine systems. Emphasis is placed on water column processes; however, air-water and sediment-water interface phenomena are covered as well. Topics include but are not limited to: ionic equilibria, trace metal complexation, redox processes, mathematical modeling applied to chemical systems, and oceanographic sampling.	Related	Explores chemical processes that occur in the marine environment.	14
GRAD	CHEM	5850	Modern Organic Chemistry	This course aims to provide deepened and widened knowledge of concepts, reactivity, and synthesis in modern organic chemistry. It encompasses: main group chemistry, carbonyl/enol/enolate chemistry, heterocyclic compounds, fragmentations, rearrangements, frontier molecular orbital theory, pericyclic reactions, reactive intermediates, organometallic chemistry, selective synthesis, stereochemistry, catalysis, asymmetric synthesis, and multi-step synthesis.	Related	Course examines the fundamentals of modern organic chemistry and how they are utilized in industry.	9, 12
GRAD	CHEN	5290	Recent Advances in Nanotechnology and Green Chemistry (Formerly 10.529)	This course is designed to expose students to a variety of concepts in chemistry and challenge them to think critically about experiments used to interrogate these concepts. Organic polymer chemistry with an emphasis on electronically conducting polymers will be the main area of focus. Students would first be introduced to scientific subject matter outside their realm of familiarity and be expected to identify new concepts and links to existing experimental paradigms. The course is divided into 3 parts: (i) introduction to nanotechnology and green chemistry with a focus on nanoscale electronic polymers, (ii) green chemistry and the overlap area with nanotechnology, and (iii) green engineering.	Related	Course examines the elements and role of soil in an eco-sustainable way.	8, 9, 12
GRAD	CHEN	5340	Industrial Bioprocessing	Students will learn principles and concepts of industrial bioprocessing. The course covers key concepts and practices of upstream, downstream and analytical bioprocessing technologies. In addition, recent FDA initiatives of Process Analytical Technology (PAT), Quality by Design, and Emerging Technologies will be covered. The course consists of 14 modules. Each module will cover subject matter provided by industry experts.	Related	Course covers strong foundation for industrial bioprocessing to learn how to prevent environmental disasters and limit pollution.	9, 12
GRAD	CHEN	5460	Biomaterials Science & Eng.	The goal of this course is to provide an understanding for design, synthesis, fabrication, and characterization of biomaterials for medical applications. The course will also cover biomimetic engineering strategies to generate materials that can be used for improving human health such as drug delivery, tissue engineering, and regenerative medicine. Example topics include biocompatibility, protein adsorption, degradation, swelling, mechanical properties, biomaterial-tissue interactions, vaccines, micro/nano technologies, instructive biomaterials for stem cells, medical devices and implants, performance of implants, and modulation of cell behavior and function through biomaterial strategies.	Related	Course focuses on how biomaterials support responsible material development.	3, 9, 12
GRAD	CIVE	5110	Inspection and Monitoring of Civil Infrastructure (Formerly 14.511)	In this course, principles and applications of inspection and monitoring techniques for the condition assessment of aged/damaged/deteriorated civil infrastructure systems such as buildings, bridges, and pipelines, are introduced. Current nondestructive testing/evaluation (NDT/E) methods including optical, acoustic/ultrasonic, thermal, magnetic/electrical, radiographic, microwave/radar techniques are addressed with a consideration of their theoretical background. Wired and wireless structural health monitoring (SHM) systems for civil infrastructure are also covered. Applications using inspection and monitoring techniques are discussed with practical issues in each application.	Related	Course relates the dimensions of civil engineering to sustainable progress.	9
GRAD	CIVE	5270	Geotechnical and Environmental Site Characterization (Formerly 14.527)	This course is designed to give students a comprehensive understanding of various site investigation and site assessment technologies employed in geotechnical and environmental engineering. The course begins with introduction to site investigation planning and various geophysical methods including: seismic measurements, ground penetrating radar, electrical resistivity, electromagnetic conductivity, time domain reflectometry. Drilling methods for soil, gas and ground water sampling; decontamination procedures; and long term monitoring methods are studied. Emphasis in this course is placed on conventional and state-of-the-art in situ methods for geotechnical and environmental site characterization: standard penetration test, vane shear test, dilatometer test, pressuremeter test and cone penetration tests. Modern advances in cone penetrometer technology, instrumented with various sensors (capable of monitoring a wide range of physical and environmental parameters: load, pressure, sound, electrical resistivity, temperature, PH, oxidation reduction potential, chemical contaminants) are playing a major role in site characterization. Principles underlying these methods along with the interpretation of test data will be covered in detail. The course will also look into emerging technologies in the area of site characterization. (3-0)3	Related	Course focuses on investigative technologies used in environmental engineering. Methods examined relate to sustainable and environmental practices.	9, 12
GRAD	CIVE	5340	Soil Dynamics and Earthquake Engineering (Formerly 14.534)	This course addresses the dynamic properties of soils and basic mechanical theory of dynamic response. It will apply these results to analysis and design of dynamically loaded foundations. A basic understanding of earthquakes - where they occur, their quantitative description, how the complicated patterns of motions are captured by techniques such as the response spectrum, and how engineers design facilities to withstand earthquakes, will be addressed. In particular, the course will consider three topics of current professional and research interest: probabilistic seismic hazard analysis (PHSA), soil liquefaction, and seismically induced displacements. The emphasis will be on geotechnical issues, but some time will be devoted to structural considerations in earthquake resistant design.	Related	Course offers an analysis of the relationship between properties of soil and earthquakes in an eco-sustainable way.	9

GRAD	CIVE	5400	Urban Transportation Planning (Formerly 14.540)	Objectives and procedures of the urban transportation planning process. Characteristics and current issues of urban transportation in the United States (both supply and demand). Techniques of analysis, prediction and evaluation of transportation system alternatives. Consideration of economic, environmental, ethical, social and safety impacts in the design and analysis of transportation systems.	Related	Course integrates economic, environmental, ethical, social and safety impacts in urban transportation planning and design.	9, 11
GRAD	CIVE	5405	Adv.Highway Geometric Design	Development of the principals of modern roadway design while addressing context specific design requirements and constraints. Topics will include guidelines for highway design, design and review of complex geometry, geometric design to address safety and operational concerns, multi-modal design for signalized and un-signalized intersections, complete streets design concepts, and superelevation. Course-work will also include principals to present transportation designs to the public, transportation advocates, and private clients.	Related	Course examines how transportation and transit infrastructure and its importance to society.	9, 11, 16
GRAD	CIVE	5480	Traffic Management and Control (Formerly 14.548)	The course presents modern methods of traffic management, traffic control strategies and traffic control systems technology. Main topics covered, include: transportation systems management (TSM); traffic control systems technology; control concepts - urban and suburban streets; control and management concepts - freeways; control and management concepts - integrated systems; traveler information systems; system selection, design and implementation; systems management; ITS plans and programs. The course will also include exercises in the use and application of traffic simulation and optimization models such as: CORSIM, TRANSYT and MAXBAND/ MULTIBAND.	Related	Course relates to practices considered in traffic management in order to make it as efficient as possible.	11
GRAD	CIVE	5490	Traffic Flow Theory (Formerly 14.549)	Traffic flow theory seeks to describe through precise mathematical models (a) the interactions between the vehicle and the roadway system and (b) the interactions among vehicles. Such theories forms the basis of all the models and procedures used in design and operational analysis of streets and highways. The course examines the fundamental traffic flow characteristics: time headway, flow, time-space trajectories, speed, distance headway and density. In depth treatment of related analytical techniques including traffic stream modeling at both microscopic and macroscopic levels, supply and demand analysis, shock wave analysis, queuing analysis and simulation modeling of traffic systems.	Related	Course examines the dynamics of traffic flow theories in a sustainable way.	11
GRAD	CIVE	5610	Physical Chemical Treatment Processes (Formerly 14.561)	Course provides a theoretical understanding of various chemical and physical unit operations, with direct application of these operations to the design and operation of water and wastewater treatment processes. Topics include colloid destabilization, flocculation, softening, precipitation, neutralization, aeration and gas transfer, packed & tray towers, oxidation, disinfection, reverse osmosis, ultrafiltration, settlings, activated carbon adsorption, ion exchange, and filtration.	Related	Course integrates the environmental aspects of sustainability related to water and wastewater treatment facility design.	9
GRAD	CIVE	5620	Physical and Chemical Hydrology Geology (Formerly 14.562)	Well hydraulics for the analysis of groundwater movement. A review of the processes of diffusion, dispersion, sorption, and retardation as related to the fate and transport of organic contaminants in groundwater systems. Factors influencing multi-dimensional contaminant plume formation and migration are addressed. It is the goal of this course to provide environmental scientists and engineers with the technical skills required to understand groundwater hydrology and contaminant transport within aquifers. A term paper and professional presentation in class regarding a relevant topic is required.	Related	Course integrates the environmental aspects of sustainability related to hydraulic engineering including focus on environmental contaminant transport within aquifers.	6, 9
GRAD	CIVE	5660	Env.App.Imp. of Nanomaterials	This course will cover (I) novel properties, synthesis, and characterization of nanomaterials; (II) environmental engineering applications of nanomaterials, with an emphasis on nano-enabled water and wastewater treatment technologies such as membrane processes, adsorption, photo-catalysis, and disinfection; and (III) Health and Environmental impacts of nanomaterials, focusing on potential mechanisms of biological uptake and toxicity.	Related	Course focuses on the health and environmental implications of Nanomaterials.	9, 12
GRAD	CIVE	5670	Environmental Aquatic Chemistry (Formerly 14.567)	This course provides environmental understanding of the principles of aquatic chemistry and equilibria as they apply to environmental systems including natural waters, wastewater and treated waters.	Related	Course integrates the environmental aspects of sustainability related to environmental aquatic chemistry.	12, 14
GRAD	CIVE	5690	Micropollutants in the Environment	This course focuses on the generation, fate and transformation, transport, and the impacts of micropollutants in the environment, with emphasis on soil and water matrices. Topics will include nanomaterials and organic micropollutants such as pharmaceuticals, antimicrobials, illicit drugs, and personal care products. Course delivery will be a combination of lectures, experimental analysis, and discussions of assigned reading materials.	Related	Course integrates the environmental aspects of sustainability related to the fate and transport of micropollutants in the environment.	6, 12, 14
GRAD	CIVE	5760	GIS Applications in Civil and Environmental Engineering (Formerly 14.576)	This course is to introduce students to the basic concepts of Geographic Information Systems (GIS) and GIS applications in Civil and Environmental Engineering. Topics to be covered include GIS data and maps, queries, map digitization, data management, spatial analysis, network analysis, geocoding, coordination systems and map projections, editing. Examples related to transportation, environmental, geotechnical and structural engineering will be provided to help students better understand how to apply GIS in the real world and gain hands-on experience. This course will consist of lectures and computer work.	Related	GIS in relation to civil and environmental engineering is a critical tool to conveying and understanding sustainability concepts through real world applications.	9, 11
GRAD	CIVE	5780	Biological Wastewater Treatment (Formerly 14.578)	Course covers the theoretical and practical aspects of biological wastewater treatment operations. Topics include kinetics of biological growth and substrate utilization, materials balance in chemostats and plug flow reactors, activated sludge process analysis and design, sedimentation and thickening, nitrification and denitrification, phosphorus removal, fixed-film processes analysis and design, anaerobic processes analysis and design, aerated lagoons and stabilization ponds, and natural treatment systems.	Related	Course integrates the environmental aspects of sustainability related to biological wastewater treatment.	6, 9
GRAD	CIVE	5850	Transportation Safety (Formerly 14.585)	Transportation Safety goes beyond the accepted standards for highway design. Providing a safe and efficient transportation system for all users is the primary objective of federal, state, and local transportation agencies throughout the nation. This class addresses fundamentals of highway design and operation, human factors, accident investigation, vehicle characteristics and highway safety analysis.	Related	Course relates the transportation safety measures to current sustainable practices.	3, 11, 16
GRAD	CIVE	5950	Hazardous Waste Site Remediation (Formerly 14.595)	This course focuses on the principles of hazardous waste site remediation (with an emphasis on organic contaminants) using physical, chemical or biological remediation technologies. Both established and emerging remediation technologies including: bioremediation, intrinsic remediation, soil vapor extraction (SVE), in situ air sparging (IAS), vacuum-enhanced recovery (VER), application of surfactants for enhanced in situ soil washing, hydraulic and pneumatic fracturing, electrokinetics, in situ reactive walls, phytoremediation, and in situ oxidation, will be addressed. A term paper and professional presentation in class regarding a relevant topic is required.	Related	Course integrates the environmental aspects of sustainability related to hazardous waste site remediation technologies.	6, 12
GRAD	CRIM	5660	Transportation Systems Safety and Security (Formerly 44.566)	This course will look at safety, security and emergency management with regard to transportation operations; multi-modal transportation security threats, vulnerabilities, risk and strategies to mitigate and incident; and the security of supply chains and critical infrastructure. The course will use case studies to provide the student with the knowledge, skills, and abilities to effectively safeguard the movement of assets within interconnected transportation networks.	Related	Course explores the dynamics of transportation security management in relation to the economy and environment.	9, 11, 16

GRAD	CRIM	5730	Law and Public Policy (Formerly 44.573/CRIM 613)	The course is an introduction to crime and the efforts to control crime through public policy. We explore the foundations of the policy-making process at the federal, state, and local levels. The course also considers broad theoretical applications pertaining to public opinion, national culture, and comparative analyses among Western democracies and their differing approaches to crime. This course employs a variety of learning tools, from roundtable discussions to policy cases.	Related	Course explores the relationship between the roots of public law and the social dynamics of sustainability.	16
GRAD	CRIM	5740	Overview of Homeland Security	The U.S. has embraced the homeland security monolith without a full understanding of what it encompasses. This course provides a comprehensive overview of homeland security and homeland defense as undertaken in the United States since 9/11. The course critically examines the current body of knowledge with a specific focus on understanding security threats, the sources of these threats, and the reasons for these threats. The roles of the key players at the federal, state and local levels, the policies and procedures enacted since 9/11, and the homeland security system in practice are also examined.	Related	Course examines Homeland Security and how to program manages to mitigate threats and operates.	10, 16
GRAD	CRIM	6030	Correlates of Crime and Justice (Formerly CRIM 603)	This course examines the nature of the relationships among attributes and indices at the individual, situational, and aggregate levels to various forms of crime and systems of justice. The implications of criminal laws, criminal justice practices, and programs are examined with a focus on inequalities based on gender and race.	Related	The course integrates the social aspects of sustainability by examining gender and race inequalities.	16
GRAD	CRIM	6130	Law and Public Policy	Analysis of the inter-relationship of criminal justice system components and the political setting surrounding the formulation and administration of public policies for crime control.	Related	Course focuses on how law and public policy interact and what it's impacts are for society.	16
GRAD	CRIM	6500	Violence in America	This course provides students with an in-depth analysis of the causes, context, and control of a wide range of violent crimes .	Related	Course focuses on crime and how it impact society and social sustainability.	16
GRAD	CRIM	6640	Weapons of Mass Destruction	This course explores the threats that weapons of mass destruction (WMD) pose to the U.S. and its interests along with the strategies to meet those threats. The course will examine the technical aspects, history, and contemporary threat of each category of weapon Chemical, biological, radiological, and nuclear followed by a critical analysis of U.S. and global efforts to limit access to these weapons and prohibit their production, proliferation and use. The course will also review some aspects of WMD attack response, recovery, and mitigation.	Related	Course integrates the social aspects of sustainability and focuses on understanding a strong political system.	16
GRAD	CRIM	6680	Sci.&Techn.Dim.of Nat.Security	In this required course for the MS in Security Studies program, students will take this course to learn all about the efforts in the public and private sector to design new sensors, scanner, and the general role of science and technology in homeland and national security.	Related	Course focuses on connections between security and general society.	9, 10, 16
GRAD	DPTH	6420	Health Policy & Admin (formerly 34.642)	This course explores the social, political, and economic policies that impact the delivery of physical therapy services and health. The course underscores the issues of professionalism, leadership, management, and the advocacy to foster excellence in autonomous practice for the benefit of members and society. The course emphasizes leadership in promoting cultural competence, global health initiatives, social responsibility, effective application of technology, and health services research.	Related	Class relates to economic and social policies that impact the healthcare industry and public health.	3, 9, 11
GRAD	EDUC	5010	Teaching Diverse Populations (Formerly 01.501)	Students examine, confront and learn to manage the challenge of successfully educating all children, regardless of racial, cultural, linguistic, gender or physical differences.	Related	This course integrates the social aspects of sustainability by addressing racial, cultural, and gender differences in teaching diverse populations.	4, 10
GRAD	EDUC	5050	Children with Disabilities in the Classroom (Formerly 01.505)	This course examines the nature of cognitive emotional, developmental, sensory, and physical disabilities that compromise student capacity to make adequate academic progress without special intervention. Legal and ethical responsibilities of the educator in inclusive classroom settings and as an active member of a multidisciplinary learning team are emphasized.	Related	Course examines schooling through a social lens of sustainability focusing on inclusion and reducing inequalities.	4,10
GRAD	EDUC	5531	Lowell and Industrial Revolution (Formerly 04 553)	Participants in this National Endowment for the Humanities-sponsored Landmarks Workshop, offered through the Tsongas Industrial History Center, examine the causes and consequences of America's Industrial Revolution, using Lowell as a case study. The course covers the nineteenth-century shift from an agrarian to an industrial society, with a focus on water-powered factory systems, textile production and corporations, the issue of slavery in a cotton textile city, labor and women's history, environmental impacts, immigration, globalization, and literary responses. Limited to NEH participants only.	Related	Incorporates the social aspect of sustainability by examining slavery, labor and women's history, environmental impacts, immigration and globalization.	1, 4, 5, 7, 8, 9, 10, 11, 12, 14, 17
GRAD	EDUC	6300	Educating Diverse Populations (Formerly 01.630)	As the world becomes increasingly diverse, educators must be prepared to examine, confront, and manage the factors that affect the education of all children. This course addresses several central issues focusing on how teachers address the problems that confront students who differ from the majority population in language, ethnicity, culture, gender, and sexual orientation. Ensuring that their families and communities are actively involved in the educational process is also an important component of the course.	Related	Course examines the need for skilled educators to confront the challenge of educating diverse populations, taking into account the cultural and social aspects of sustainability.	4, 5, 10
GRAD	EDUC	6302	Education Policy and Law (Formerly 05.630)	The course provides students in the Ph.D. in Leadership in Education the opportunity for in-depth consideration of fundamental questions, seminal research, and theoretical perspectives related to education policy at all levels. Students who successfully complete this course will be able to explain major theoretical and legal perspectives in education policy research; discuss contemporary trends in education policy and law at state and federal levels; and identify key social, political, and economic factor that influence education policy and law.	Related	Reviews policy and law through a social lens as it relates to equitable quality education.	4
GRAD	EDUC	6320	The Inclusive School (Formerly 01.632)	School leaders must create environments that are welcoming to all students and their families and that capitalize on the strengths students bring to the learning environment as well as address the needs of students. As the population of students in our schools has continued to become more diverse, building an inclusive environment in which all are valued and in which all student can succeed has become increasingly complex. Participants in this course will explore their values and beliefs as well as the dominant culture and prevailing belief systems present in the majority of today's public schools. Participants will learn about ways in which many students, their families, and their communities may differ from this dominant culture, and the possible effects of this mismatch. Through readings and interactive discussions, participants will examine ways to build a school culture that is inclusive for all students and their families. Participants will develop detailed plans of action to actively and meaningfully involve parents and community members in all aspects of the school.	Related	Course addresses the learning environments for diverse populations of students and the need for skilled educators to bridge the cultural and social gaps.	4, 5, 10
GRAD	EDUC	6360	Sociocultural Contexts of Educational Communities (Formerly 01.636)	Examines the social, cultural, and political forces that shape the school environment and provide context for teaching and learning. Additionally, the types of existing and desired relationships among schools, families and communities will be discussed.	Related	Course examines schooling through a social lens of sustainability.	4, 5, 10, 11

GRAD	EDUC	6370	Historical and Contemporary Perspectives on Curriculum	This course focuses on developing a knowledge base of historical and contemporary perspectives on curriculum and schooling as they evolved in American society. The first part of the course addresses three concepts as they relate to curriculum. They are: 1.) School, literacy and society. 2.) Movements in schooling and 3.) Dimensions of diversity. The second part of the course addresses an examination of conflicting views on selected issues, identifying related underlying problems, and then developing feasible resolutions. The assignments consist of textbook and library readings as well as the writing of 5 reflection papers during the 10 week course. Students' final work will be submitted in a portfolio at the end of the semester for faculty evaluation and grading.	Related	Course looks at the history of curriculum in the American education system including topics of diversity and inclusion.	4,10
GRAD	EDUC	6601	Diversity in Higher Education 08.660)	Focuses on the preparation, admission, retention, and achievements of minorities in higher education, both past and present.	Related	Course explores minority education through a social lens of sustainability.	4, 5, 10
GRAD	EDUC	6751	History, Theory, & Contemporary Issues in Lang, Literacy & Culture (Formerly 06.675)	The purpose of this course is to engage students in the complexities and debates regarding theoretical perspectives and research on language, literacy, and culture that have affected language and literacy learning. This course will begin with introduction to the history of research done on concepts of language, literacy and culture. Students then look at the evolution of sociolinguistic and stenographic research language, literacy and culture as well as other modes of inquiry on language and literacies. Most of the course is spent closely examining studies for how they conceptualize the mutual construction of language, literacy, and culture, and for what they can tell us about the nature of literacy learning. In addition, students will explore the questions those studies raise such as cultural diversity, identity, learning, curriculum and instruction school-community relationships and social justice in literacy and language learning.	Related	Course relates to the social dynamics of sustainability, specifically language, literacy, and culture.	4, 10
GRAD	EDUC	6760	Exploring the Nature of Science (Formerly 06.676)	If you were asked to describe the characteristics of science what would you say and would you know whether professional scientists agree with you? National professional societies such as the NSTA and the AAAS, believe that if middle and high school students understand how science has been and is practiced, they will be more likely to question their own thinking, recognize the power of scientific theories and understand that there are no absolute truths. This course will take you on an exploration of some fascinating discoveries in the history of science, engage you in debate about controversial issues in science, and involve you in raising your own scientific questions.	Related	Course covers an overview of fundamental electricity and the application to suitable practices.	4
GRAD	EECE	5410	Introduction to Biosensors (Formerly 16.441/541)	This course introduces the theory and design of biosensors and their applications for pathology, pharmacogenetics, public health, food safety civil defense, and environmental monitoring. Optical, electrochemical and mechanical sensing techniques will be discussed.	Related	Course examines the relationship between biosensor technology and the possible public health benefits.	2, 3, 16, 13, 14, 15
GRAD	ENGL	5060	Writing in the Community (Formerly 42.506)	Students learn advanced writing techniques in the classroom and apply them to real writing tasks in the community. Assignments include a writing project designed to meet the needs of a local organization, along with research and reflective pieces.	Related	Course examines the application of writing techniques to the needs of communities.	4, 11
GRAD	ENTR	6100	Global Entrepreneurship and Innovation I (Formerly ENTR /64.610)	The Course is offered as a 2-week intensive experiential learning of Global Entrepreneurship and Innovation. It is designed to help students to understand the importance of entrepreneurship and innovation in today's global economy and to cultivate an entrepreneurial mind-set among the students in the UMass Lowell. Students will work in inter-disciplinary, multi-cultural environments exploring problem solving techniques, opportunities identification, business concept development and venture planning using standard business model framework and bringing ideas to reality.	Related	Course focuses on the importance of innovation and entrepreneurship in relation to a sustainable global economy.	8, 9, 17
GRAD	ENTR	6110	Global Entrepreneurship and Innovation II (Formerly ENTR /64.611)	The Course is offered as a 2-week intensive experiential learning of Global Entrepreneurship and Innovation. It is designed to help students to understand the importance of entrepreneurship and innovation in today's global economy and to cultivate an entrepreneurial mind-set among the students in the UMass Lowell. Students will work inter-disciplinary, multi-cultural environments exploring problem solving techniques, opportunities identification, business concept development & Venture planning using standard business model framework and bringing ideas to reality.	Related	Course focuses on the importance of innovation and entrepreneurship in relation to a sustainable global economy.	8, 9, 17
GRAD	FINA	6550	Global Fin Reg & Compliance	This course will provide an in depth survey of some of the major regulatory regimes within which the global financial services industry operates. Participants will learn the principles and techniques required to establish and maintain an effective compliance regime consistent with a strong ethical corporate culture. The course will rely upon examination of real-world examples; and, students will participate in a significant case study, requiring them to design an effective compliance program for a hypothetical firm operating in multiple jurisdictions.	Related	This course examines global institutions and the regulations and ethics that are built into them.	8, 16
GRAD	GEOL	5200	Structural Geology (Formerly 89.520)	An analysis of crustal deformation through detailed study of geologic structures with emphasis upon the response of geologic materials to stress and strain. Field techniques, tectonic principles, and geometrical analysis are employed.	Related	Course is focused on environmental evaluation of projects and policies and methods to make informed environmental decisions and conduct sustainability analyses.	15
GRAD	GEOL	5250	Groundwater Modeling	This course covers the concepts and practice of mathematical and numerical modeling of saturated groundwater flow and solute transport. Students will use industry-standard groundwater modeling software, including MODFLOW, MODPATH, MT3DMS, SEAWAT, and PHT3D for single- and variable-density flow, particle tracking, and solute and reactive transport. Emphasis will be on formulating mathematical representations of flow, use of groundwater models with graphical user interfaces, and post-processing and analysis of model results.	Related	Course integrates the environmental aspects of sustainability through topics on understanding groundwater.	6,15
GRAD	GEOL	5310	Isotopes in Environmental and Geosciences (Formerly 89.531)	The course will show how radioactive and stable isotopes can be used to understand environmental and geological systems. Topics to be covered include radiometric dating using short and long half-life isotopes, radiogenic isotopic tracers, and stable isotopes.	Related	Radioactive isotopes are examined to better understand environmental and geological systems.	15
GRAD	GEOL	5560	Applied Geophysics (Formerly 89.556)	Application of geophysics to problems in geology and environmental science. Principles and techniques of gravity, magnetic, electrical, and seismic methods. Field projects and surveys.	Related	Course applies fundamentals of geophysics to problems in geology and environmental science.	15
GRAD	GLST	7010	Global Studies I (Formerly GLS.701)	The focus of this course is the intersection of theory and practice in Global Studies. Students will be acquainted with the three fields of study that structure the Ph.D. Global Studies curriculum: Comparative Cultures, Security and Human Rights, and Socio-Economic Development and the interdependence of these fields.	Related	Course integrates social and economic aspects of sustainability on a global scale.	8, 11, 16, 17
GRAD	GLST	7012	Conflict, Cooperation, Security	This is an interdisciplinary course for the Global Studies PhD Program. Drawing from political science, this course investigates the major global threats to human security, including poverty, public health crises, environmental deterioration, terrorism, mass killings and war. These threats to human security can also be framed as violations of human rights. Drawing from economics, the class will explore the interactions that lead to these violations and security threats with a game theoretic approach. Employing game theory, the study of interdependent decision-making, will enable students to analyze and gain an understanding of the strategies that lead to violations of human rights, with the aim of developing policies to mediate these threats to human security.	Related	Goal focuses on how peace and justice is integral to healthy societies.	16

GRAD	GLST	7017	Int'l Pol Econ, Trade & Dev	Since the end of the cold war it seems that analysts of international relations have changed their focus from the politics of preserving the peace to the politics of the international economy. Reading any international newspaper one is now less likely to see a story on the arms reduction talks between states on the front page than seeing an article on the trade relations between states. The economic crisis of 2007-8, the European debt crisis and the rise of China has brought more attention to the relationship between global politics and economics. This course is intended to give an introduction to international political economy (IPE) and global economic relations. Students will study the theoretical perspectives that are used by analysts, the history of IPE, and some important issues	Related	Course examines the fundamentals of international policy, economics and Trade Development across the world.	8, 17
GRAD	HIST	5350	Immigration History (Formerly 43.535)	The course focuses on the experiences of women, men, and children who came to the U.S. from the colonial era through the 21st century. Their emigrations will be examined in a global context. Irish migration, the mass European migrations during the late 19th / early 20th centuries, and post-Second World War immigration particularly from Asian and African countries are discussed. The Lawrence, Lowell, and Boston immigration stories are extensively considered. Students will acquire an understanding of U.S. Immigration History - Both the experiences of immigrants and reactions to that immigration over time, including the frequent passage of federal legislation to block or impede immigration. Students will utilize area immigration archives to produce original research on the topic.	Related	Course focuses on immigration to the U.S since the colonial era incorporating social, cultural and political aspects of sustainability.	1, 8, 10, 16, 17
GRAD	HIST	5510	Reading Seminar on Modern China (Formerly 43.551)	The course explores the intersection of tradition and revolution in modern Chinese history. It is a seminar where students do assigned readings and come to class prepared to discuss the readings. The objective of the course is to gain a critical understanding of China's modernization process - the traditional and radical forces that shaped the process, the impact of the process on everyday life, and the blending of what is traditionally Chinese and what is modern or borrowed from the outside.	Related	Course integrates social and economic aspects of sustainability as they related to China's modernization process.	11, 17
GRAD	HSCI	5500	Human Development and Pathophysiology (Formerly 30.550)	The physiological steady state of the human body and disruptions that result over the life span will be examined as well as the pathophysiological mechanism manifested in disease states. The course addresses defense, compensating, and adaptive responses to the pathophysiological processes as they apply to the various systems rather than being a survey course of diseases.	Related	Class integrates the socio-environmental aspect of sustainability through a physiological lense.	3
GRAD	IENG	5080	Advanced Human Machines System Design	This course considers the design of human machine interfaces as it applies to industrial settings. Specific areas covered include safety, ergonomics, intended use, form factors, and regulatory standards. The application of simulation to facilities layout for manufacturing is emphasized.	Related	Course examines the connection between work and hazards.	3, 8, 12
GRAD	MECH	5100	Dynamics and Diagnostics of Rotating Machinery (Formerly 22.510)	Course provides the theoretical and practical background in the fundamentals of dynamics and diagnostics of rotating machinery. The course starts with an overview of rotating machinery components and systems with emphasis on their designs, and then builds and in-depth understanding of the dynamics of rotating systems by analyzing the design and dynamics of their component. Diagnostics, health monitoring, and associated signal processing theories regarding rotating machinery are emphasized, with applied examples such as aircraft engines, gas turbines, rotorcrafts, wind turbines, and automotive drivetrains, along with other turbomachines.	Related	Course relates the application of rotating machinery components including application in wind turbines and gas turbines.	7, 9
GRAD	MECH	5260	Transport Processes in Energy Systems (Formerly 22.526)	Course focuses on the development of a fundamental understanding of transport processes from a multi-scale and multi-physics perspective, and the application of such understanding to the analysis of energy engineering systems. Derivations of the equations describing the mechanisms for mass, momentum, and energy transport are presented, together with approaches for the evaluation of material properties and constitutive relations. Emphasis is placed on a holistic view of transport processes as combinations of transient, advective, diffusive, and reactive phenomena.	Related	Course focuses on development of analysis of energy engineering systems.	7, 9
GRAD	MECH	5490	Cooling of Electronic Equipment (Formerly 22.549)	This course focuses on teaching the primary techniques for cooling electronics, and methods for modeling their performance. Heat-transfer fundamentals: conduction, convection, radiation, phase change, and heat transfer across solid interfaces. Heat-generating electronic equipment: ICs, power converters, circuit cards and electrical connectors. Thermal management equipment: heat sinks, interface materials, heat spreaders including liquid loops, and air movers. System design: system packaging architectures, facilities, system analysis. Advanced Topics: spray cooling, refrigeration	Related	Course relates the fundamentals of electronic cooling systems to sustainable practices.	7, 9
GRAD	MECH	5840	Ocean Engineering (Formerly 22.584)	Physical Properties of the Ocean Environment, ocean wave mechanics, computer solutions of wave interactions, physical modeling of marine vehicles and coastal environments (modeling and scaling laws), resistance and propulsion of surface ships and submarines, and forces on floating and submerged objects such as buoys, pipelines, piers, and breakwaters. Research report required summarizing some aspect of ocean engineering.	Related	Course focuses on elements of the ocean in an engineering context.	7, 8, 9, 14
GRAD	MECH	5960	Composite Materials (Formerly 22.596)	Analysis of anisotropic lamina and laminated composites. Methods of fabrication and testing of composites. Other topics include environmental effects, joining and machining.	Related	This course focuses on plastics, elastomers and additives from renewable resources and the process of degradation and recycling of these materials.	9, 12
GRAD	MECH	5970	Processing of Composites (Formerly 22.597)	Methods of fabrication. Analysis of forming, fiber orientation, permeability, polymer rheology, flow through porous media, consolidation, cure kinetics, combined flow and cure models. Effect of manufacturing defects	Related	Course relates to the practice and analysis of fabrication and its impact on the manufacturing industry.	9
GRAD	MGMT	5110	Global Enterprise and Competition (Formerly MGMT/66.511)	To be taken as last course in foundation core. Is an integrated investigation of global competitive issues to help students understand the processes of organization and technological innovation which permit businesses to achieve competitive advantages in a global environment. This course also deals with the nature and techniques of industry analysis necessary to the formulation of effective global strategy for the firm.	Related	Course examines factors that contribute to competitive and sustainable organizations in a global environment.	8, 17
GRAD	MGMT	6150	International Business	This course addresses the issues involved in doing business overseas, and how it differs from purely domestic business. It surveys the changing international business landscape, focusing on the opportunities and challenges that company decision makers face in the global marketplace, and the factors that influence their decision to internationalize. Special attention is given to the broad concept of globalization - of markets and production - multinational enterprises include: governments, central banks, financial markets, regional and multilateral institutions (e.g., World Bank, IMF, WTO), and the role of individuals who shape the international environment.	Related	Course examines global business markets and multilateral institutions and how the shape the role and complexities of the international environment.	8, 17
GRAD	MGMT	6540	Managing Global and workforce Diversity	As business becomes increasingly global and U.S. demographics continue to change, leaders need specific knowledge and skills to navigate, manage, and develop a perspective that incorporates cross-cultural and demographic diversity. This course considers how employers respond to these new workforce realities, by examining the concepts, policies, and practices facing managers in a global, diverse workplace.	Related	Course examines factors that contribute to socially responsible and sustainable organizations in a global environment.	8, 17

GRAD	MGMT	6600	The Future of Work: Understanding the Global, Strategic and Managerial Implications	Automation, artificial intelligence, and other disruptive technologies are changing the fundamental nature and characteristics of work. This tidal wave of change is being referred to as the "future of work." The purpose of this course is to help students understand these shifts to make them become better managers, entrepreneurs and strategist. Specifically, it will enable students to: 1) identify and understand the technological drivers that are changing the nature of work; 2) assess the industry implications of such changes; 3 examine how these larger changes are affecting how we organize and strategize; 4) understand the challenges of implementing new approaches to work; and 5) assess the ways in which individuals can adapt to the new work environment.	Related	Course examines factors that contribute to socially responsible and sustainable organizations in a global environment.	8, 17
GRAD	MIST	7070	Electronic Commerce (Formerly 63.707, MIST 707)	This course provides a foundation on digital commerce and e-business research for PhD. students. It will cover both technological and managerial aspects of managing e-business operations in either a pure (Dot.Com) organization or traditional organization (bricks-and-click). Issues covered include interactive marketing and market-spaces, agent-based commerce and intelligent markets, electronic shopping carts, user interface issues, EDI transaction via Extranets, database interfaces, personalization and targeted communications, security, encryption, and payment systems, privacy and intellectual property. Students will be conducting literature review in each of these key e-business areas and identify potential future research directions.	Related	Course relates to the economic dynamic of sustainability.	8, 9, 17
GRAD	MLSC	5410	Introduction to Public Health and the Public Health Laboratory (Formerly 36.541)	This course is designed to provide an overview of public health and the public health laboratory covering topics such as the legal basis and history of public health, public health structure, communications and interactions, and epidemiology. Emphasis will be placed on the role of the public health laboratory and its core functions, its role in policy development, infectious disease, environmental issues, emergency preparedness, newborn screening, global issues, and public health research. Public health laboratory methodology, regulation and improvement, and quality assurance will also be examined.	Related	Course focuses on public health including environmental issues.	3
GRAD	MPAD	5020	Public and Non-Profit Budgeting	This course provides students with a conceptual and practical introduction to budgeting and financial management in the public sector. It examines the relationship between the budget and agency strategy, reviews the mechanics of the public budgeting process, and introduces students to the basics of financial management practice and financial analysis. It also emphasizes budgeting as a tool for performance management and accountability to the public. Topics covered in the course include an overview of the structure and sources of government revenue, the politics of the budget process, capital budgeting, intergovernmental fiscal relations, the process of budget formulation, performance-based budgeting, financial reporting, and an overview of generally accepted accounting principles.	Related	Course addresses the importance of public and non-profit management and budgeting to maintain strong social institutions.	8
GRAD	MPAD	5030	Public and Non-Profit Management	This course offers students an overview of the practical and theoretical foundations of managing, planning, and leadership within public and community-serving organizations. Topics and issues explored through the course include the role of professional managers within the public sector, the process of executive decision-making, employee incentives and motivation, conflict management, performance measurement, ethical challenges faced by managers, workplace diversity, strategic planning, and power dynamics. Course activities will include weekly critical readings and case studies, as well as individual and group problem-solving exercises.	Related	Course addresses the importance of public and non-profit management.	8
GRAD	MPAD	5100	Public Policy Analysis	Public Policy Analysis introduces students to the complex, intricate and messy world of public policy-making in democratic institutions. This course will be divided into two parts. In the first section of the course, we will (re)visit the hurdles to achieving policy goals in American democracy with its systems of separation of powers, checks and balances and federalism. How do we theorize about the policy process? How does a problem become something worthy of gaining agenda status? How are policies formulated and passed? The second part of the course will focus on strategies for analyzing the policy process including the role of and tools of the policy analyst including common tools such as cost-benefit analysis and applied microeconomics.	Related	Course focuses on policy making and how it is integral to modern society.	16
GRAD	MPAD	5150	Public and Non-Profit Personnel Management	Current issues in the management of public sector human resources recruitment, selection, work force training, and development, reward systems, employee health and safety, legal issues, managing diversity, performance evaluation, human resource planning, and labor-management relations.	Related	Course addresses the importance of public and non-profit personnel management.	8
GRAD	NURS	5520	Social, Cultural and Policy Issues in Health Care (Formerly 33.552)	This course links health and illness to other central domains of life: gender, kinship, and culture within the context of the family, community and the current health care system. It draws on concepts from the social, health, and policy sciences to critically examine factors relating to health and health-seeking behaviors across the life course. Ethical dimensions of health policy formation and implementation are analyzed.	Related	Course relates to the social and cultural aspects of sustainability to health care policy.	3, 11, 16
GRAD	NURS	5580	Geropsychiatric and Mental Health Nursing (Formerly 33.558)	The focus of this course is on the nursing care of older adults with psychiatric and mental health problems. This course promotes a holistic approach to mental health care of older adults within the community and long-term care setting. Nursing implications of psychopharmacology, behavioral, and complementary interventions will be discussed. Community resources for older adults with psychiatric and mental health problems will be explored.	Related	Course integrates health and social aspects of sustainability via discussion of community context and resources.	3
GRAD	NURS	6100	Adult Gerontological Nursing I (Formerly 33.610)	The focus of this course is on the advanced practice nursing role in the holistic assessment and management of health problems of the adult and older adult within a family and community context. Evidence-based strategies to prevent and treat common health problems and to maintain and promote health through the application of advanced knowledge, theory, relevant research and critical decision making are emphasized. Community resources, pharmacological therapies, and complementary strategies are addressed.	Related	Course integrates health and social aspects of sustainability via discussion of community context and resources.	3
GRAD	NURS	6110	Adult Gerontological Nursing II (Formerly 33.611)	The focus of this course is on health promotion and biopsychosocial well-being of young, middle aged and older adults from diverse cultures. Utilizing current scientific research, physical/natural sciences, social sciences, and the humanities, implications for advanced nursing interventions and health policy are identified. Principles of pharmacology and pharmacological therapies, and complementary therapies are addressed.	Related	Course integrates health and social aspects of sustainability via focus on health promotion and management of health issues pertaining to health care policy and legislation.	3
GRAD	NURS	6120	Adult/Gerontological Nursing III (Formerly 33.612)	This capstone course builds on the adult/gerontological nursing curriculum of the previous three semesters. Issues related to health care policy and legislation relative to their impact on the role of the nurse practitioner within primary care are analyzed. Advanced knowledge of the management of complex health issues is integrated in nursing practice. Transition to the role of the advanced practice nurse is examined and actualized through an intensive, precepted, clinical experience.	Related	Course integrates health and social aspects of sustainability via focus on health promotion and management of health issues pertaining to health care policy and legislation.	3

GRAD	NURS	6500	Family and Adult-Gerontological Advanced Practice Nursing I	Focus is on the advanced practice nursing role in the holistic assessment and management of health problems of the adolescent, adult, and older adults, within a family and community context. Evidence-based strategies are applied to the prevention, treatment, and management of acute and chronic health problems. Health promotion and maintenance are emphasized through the application of advanced knowledge, theory, research, and critical decision-making. Community resources, pharmacological therapies, and complementary strategies are integrated throughout the course.	Related	Course integrates health and social aspects of sustainability via discussion of community context and resources.	3
GRAD	NURS	6520	APRN Care of Adults	Focus is on the advanced practice nursing role in the holistic assessment and management of health problems of the adolescent, adult, and older adult, within a family and community context. Evidence based strategies are applied to the prevention, treatment, and management of acute and chronic health problems. Health promotion and maintenance are emphasized through the application of advanced knowledge, theory, research, and critical decision making. Community resources, pharmacological therapies, and complimentary strategies are integrated throughout the course.	Related	Course integrates health and social aspects of sustainability via discussion of community context and resources.	3
GRAD	NURS	6521	APRN Care of Children and Adolescents	This course focus is on the advanced practice nursing of children adolescents in the primary care setting. Health promotion, disease prevention, diagnosis and management principles are applied to alterations in health within a family and community context. Evidence-based strategies to prevent, assess, diagnose and treat common health problems are emphasized as the scientific foundation for independent practice. Additionally, this course emphasizes collaborative partnership development among individuals, families, and intra-professional teams.	Related	Course integrates health and social aspects of sustainability via discussion of community context and resources.	3
GRAD	NURS	6522	APRN Women's Health Across the Lifespan	The focus of this course is on health promotion and management of common health issues pertaining to women, from menarche to older adulthood. Based on current scientific research, students will develop knowledge to assess, diagnose and manage alterations in health ad develop holistic plans of care that address the health promotion, illness prevention, and primary care needs women across the lifespan. Sociocultural and political factors that affect the heath of women will be discussed.	Related	Course integrates health and social aspects of sustainability via discussion of sociocultural factors.	3
GRAD	NURS	6523	APRN Care of Older Adults	Focus is on the advanced practice nurse in the holistic assessment and management of heath problems of the adult and older adult in a family and community context. Evidenced-based strategies to prevent and treat common health problems and to maintain and promote health though the application of advanced knowledge, theory, relevant research and critical decision making are emphasized. Community resources, pharmacological therapies and complementary strategies are addressed.	Related	Course integrates health and social aspects of sustainability via discussion of community context and resources.	3
GRAD	NURS	6600	Family Health Nursing I (Formerly 33.660)	Focus is on the advanced practice-nursing role in the holistic assessment and management of health problems of the family across the lifespan within a family and community context. Evidence-based strategies to prevent and treat common health problems and to maintain and promote health through the application of advanced knowledge; theory, relevant research and critical decision-making are emphasized. Community resources, pharmacological therapies, and complementary strategies are addressed.	Related	Course integrates health and social aspects of sustainability via focus on health promotion and management of health issues pertaining to women, infants, children and adolescents.	3
GRAD	NURS	6610	Family Health Nursing II (Formerly 33.661)	The focus of this course is on health promotion and management of common health issues pertaining to woman and to infants, children, and adolescents. Based on current scientific research, students develop skills in analyzing data, differential diagnosis, and developing holistic plans of care that address the health promotion, illness prevention, and primary care needs of a wide-variety of client populations.	Related	Course integrates health and social aspects of sustainability via focus on health promotion and management of health issues pertaining to women, infants, children and adolescents.	3
GRAD	NURS	6620	Family Health Nursing III (Formerly 33.662)	This capstone course builds on the family nursing curriculum of the previous three semesters. Issues related to health care policy and legislation relative to their impact on the role of the nurse practitioner within primary care are analyzed.	Related	Course integrates health and social aspects of sustainability via focus on health promotion and management of health issues pertaining to health care policy and legislation.	3
GRAD	NURS	7020	Theoretical Foundations of Health Promotion (Formerly 33.702)	This course critically examines conceptual frameworks and theories of health promotion and health behavior. The content includes theoretical perspectives from multiple disciplinary perspectives including nursing, psychology, sociology, and public health. Health promotion orientations will include behavioral change and lifestyle modification, environmental enhancement and restructuring, and social ecological approaches.	Related	Course integrates health and social aspects of sustainability via focus on health promotion research.	3
GRAD	NURS	7070	Epidemiology of Health Promotion (Formerly 33.707)	This course provides an in-depth exploration of the concepts and methods of epidemiological research. Students will critique the principles of epidemiology with an emphasis on health promotion research. Students will analyze and develop epidemiological approaches, which seek to promote health and prevent disease.	Related	Course integrates health and social aspects of sustainability via focus on health promotion research.	3
GRAD	NURS	7310	Health Promotion Research (Formerly 33.731)	This course focuses on interdisciplinary health promotion research that targets diverse individuals, families, groups, and communities/society. Students will identify and analyze ethical issues, philosophical and conceptual underpinnings, measurement principles and major gaps in current knowledge in nursing and health promotion. Students will critique research approaches to health promotion studies and propose a research study in a topic relevant to health promotion.	Related	Course integrates health and social aspects of sustainability via discussion of community contextof diverse cultures and ethical considerations.	3
GRAD	NURS	7710	Advanced Nursing Leadership and Management (Formerly 33.771)	This course consists of a seminar and leadership experience. The seminar will explore the major concepts in leadership and management and their application in the health care setting. The role of DNP will also be discussed in terms of leadership in the health policy, education, and clinical settings. A leadership project will be completed by the end of the semester.	Related	Course integrates health and social aspects of sustainability via focus on health issues pertaining to health care policy.	3
GRAD	NURS	7730	Evidence Dissemination, Advocacy & Policy (Formerly 33.773)	This course will include a weekly seminar. The students will complete the scholarly project by undertaking dissemination activities. The student will analyze policies influencing DNP practice and quality, cost, and access to health care and participate in the policy making process.	Related	Course integrates health and social aspects of sustainability via focus on health issues pertaining to health care policy.	3
GRAD	NUTR	5820	Seminar in Advanced Nutrition(Formerly 36.582)	Review and analysis of contemporary research publications in human nutrition. Recently discovered nutrients that may be essential to human health will be evaluated. We will critically examine the benefits of dietary modification in controlled investigations. Course will focus on published studies of the relation of dietary practices to health and disease. We will examine nutrition policy, and the way scientific findings in nutrition translate into public health practice. This course will be of value to students who wish to critically examine literature in human nutrition, and who seek to develop new directions for nutrition research.	Related	Course integrates health and social aspects of sustainability via focus on nutrition policy.	2, 3
GRAD	NUTR	6000	Public Health Nutrition Practice	This course provides advanced study in public health and community nutrition. Concepts related to cultural competency, public health and nutrition policy, health promotion, and the nutrition care process will be learned through lectures, quest lectures, in-class activities, case studies, and peer-led discussions. Students will have the opportunity to practice skills in community and public health nutrition settings such as food pantries and senior nutrition centers.	Related	Focuses on the principles of public health and nutrition processes connected to it.	3, 8, 10

GRAD	NUTR	6020	Community Based Interventions (Formerly 36.602)	This course will examine a broad range of community-based nutrition research, programs and policies within the United States. Settings for public health nutrition programs have broadened to include non-profit agencies, worksites, health centers, clinics, hospitals, schools, churches, supermarkets, sports centers, senior centers, and emergency feeding sites. Students will engage in experiential learning and use case studies to practice innovative approaches to community nutrition. Field visits will allow students to interact with and learn from public health experts. Students will be required to write a funding proposal for a community nutrition program that they have developed in small groups.	Related	Course focuses on public health in relation to access to proper nutrition.	2, 3
GRAD	PCST	5010	Strategies of Conflict Transformation (Formerly PCS 501)	This course will examine the underlying connections between causes of conflict on the local, national and global levels and the processes that advance peaceful resolution. The course is designed to provide a cross-disciplinary approach to the relevant social, political, economic and cultural conditions leading to conflict and the variety of approaches to solve such conflict through both violent and nonviolent means. The beginning of the course will focus on issues of power and inequality related to class, race (and related divisions of ethnicity, religion, caste, nationality, immigration status) and gender. We will look at structures and system of power ranging from the family, to the community, the workplace and the national and international dimensions. The goal is to link theoretical analysis with the study of practical problem solving.	Related	Course examines levels of conflict on how the social, political, cultural, environmental, and economic dynamics of sustainability are affected.	5, 10, 16
GRAD	PCST	5030	Diplom.Cross Cult.Negotiations	This course introduces the students to the breadth and depth of diplomatic historical practices, and theories. It will also introduce methods of negotiation and conflict resolution utilizing the different models focusing on cross-cultural negotiations. The role of cultural differences in the processes of negotiation and diplomatic practice and the multiple layers of public diplomacy will also be analyzed stressing the role of cultural differences in the processes of negotiation and diplomatic practice. The course will lastly examine democratic transition in conflicted countries and how to advocate for the transition as part and parcel of peace building.	Related	Course explores the breadth and depth of diplomatic historical practices and the roles they play in international policy.	16, 17
GRAD	PCST	5040	Restorative Justice: Repairing Harm Through Dialogue	This course introduces students to the principles, values, and practices of restorative justice to repair harm through dialogue and build positive peace. Students develop a working knowledge of the general theories of restorative justice and gain practical experience with peacemaking techniques. Traditional assumptions about justice and the adversarial legal process will be explored and challenged. Students will critically examine how restorative justice addresses the needs and harms of multiple stakeholders, draws from indigenous approaches, and challenges interpersonal and structural forms of harm, including practical challenges in implementing restorative justice and the relationship between restorative justice, restorative practices, and other conflict resolution methods.	Related	Course integrates the social aspects of sustainability by focusing on the means to create effectively create social justice.	16
GRAD	PCST	5120	Community Conflict Resolution (Formerly PCS 512)	This course gives students an understanding of the main issues and solutions involved in community level conflict resolution; e.g., in neighborhoods, workplaces, and other institutions. It develops students' skills in practicing conflict resolution and/or evaluating programs in the field of dispute resolution. It is important to understand why conflict happens and how to resolve conflict.	Related	Course integrates the social aspects of sustainability by understanding issues related to community level conflict resolution.	16
GRAD	PCST	5450	Politics/Repression & Dissent	A focus on the dark side of politics - political repression, including politically motivated imprisonment, torture, murder, and disappearance- and the struggle of critics to bring about change through non-violent and violent demonstrations, general strikes and armed resistance.	Related	Course focuses on the dark side of politics, repression and dissent across regions.	10, 16
GRAD	PLAS	5150	Lean Plastics Manufacturing (Formerly 26.515)	Methods of analysis and operation of plastics manufacturing facilities. Topics include: performance measurement, inventory control, forecasting, production planning, scheduling, resource management, supply chains, various technologies for improved productivity.	Related	Course focuses on efficient plastic engineering and manufacturing incorporating resource management.	8, 9, 12
GRAD	PLAS	5180	Plastics Product Design (Formerly 26.518)	This course reviews the theoretical principles and the engineering practice associated with the development of new plastic products. The course focuses on design practices for products that will be produced by conventional and advanced injection molding processes. Topics include design methodology, plastic materials selection, design for manufacturing, computer aided engineering, mechanical behavior of plastics, structural design of plastic parts, prototyping techniques, experimental stress analysis, and assembly techniques for plastic parts.	Related	Course relates legal issues associated with engineering practices.	8, 9, 12
GRAD	PLAS	5370	Business Law for Engineers (Formerly 26.537)	Business legal issues engineers encounter in practice, including contractual, products liability, and intellectual property issues. Business torts relating to product design, manufacturing and inadequate warning defects. Unreasonably dangerous products and strict liability.	Related	Course relates legal issues associated with engineering practices.	8, 16
GRAD	PLAS	5400	Commercial Development of Plastics (Formerly 26.540)	The concepts of industrial marketing will be reviewed for research, pricing strategies, and product planning for market segmentation, place (distribution)-promotional activities. Topics will include creating a demand, selling, and servicing base resins and additives.	Related	Course reviews the marketing and development of plastics in a sustainable way.	8, 9, 12
GRAD	PLAS	5750	Biomaterials I (Formerly 26.575)	A comprehensive study of the history, current and future trends within biomedical devices and their applications. Students will be introduced to research techniques used to analyze the different classes of biomaterials. An overview of typical host reactions such as inflammatory response and their evaluation will be touched upon.	Related	Course integrates the environmental aspects of sustainability related to ground water quality modeling.	3, 8, 9, 12
GRAD	PLAS	6750	Biomaterials II (Formerly 26.675)	The degradation of biomaterials in the biological environment for applications such as sutures, orthopedic implants, dental implants, etc. will be reviewed. Students will analyze issues unique to the field of implants, devices and biomaterials. While reviewing new products and standards, the prospective and possibilities of biomaterials will be studied.	Related	Course relates to the environmental aspect of sustainability by examining the degradation of biomaterials.	3, 8, 9, 12
GRAD	POLY	5110	Biopolymers (Formerly 97.511)	Topics include conformation and configuration of vinyl polymers and polypeptides, energetics of chain folding and examination of the forces dictating ordered structures, helix to coil transitions in biopolymers with emphasis on polypeptide structures, instrumental analysis of biopolymer conformation, synthesis of biopolymers including polypeptides, polysaccharides and polynucleotides, and examination of relationships between synthetic polymers and naturally occurring polymers.	Related	Course integrates polymers and polypeptides to the economic/environmental dynamic of sustainability.	8, 9, 12
GRAD	POMS	6020	Global Supply Chain (Formerly POMS 602)		Related	Course examines global operations and the impact on economies and national communities.	8, 9, 12, 17
GRAD	PSYC	5000	Introduction to Community Social Psychology (Formerly 47.500)	Introduces history and contemporary trends of community and social psychology with focus on how social and environmental forces affect individual and group quality of life. This course surveys the history, theoretical frameworks, core values, methods/approaches and orienting concepts in the field.	Related	Course focuses on social and environmental factors that impact individuals and communities.	3, 11
GRAD	PSYC	5020	Seminar in Community Social Psychology (Formerly 47.502)	Offered from time to time to highlight specialized areas of faculty interest and to acquaint the student with new developments from a broad range of current psychological theory and research and how these developments might affect social and community life.	Related	Course examines the social dynamics of sustainability in community.	3, 11

GRAD	PSYC	5260	Workplace Diversity (Formerly 47.526)	This course will explore the challenges presented by the increasingly diverse workforce within the United States. Students will consider how work groups and organizations can effectively incorporate a diversity of perspectives. Students will consider issues of oppression, discrimination and bias, with particular attention paid to the situation here in the Merrimack Valley. There will also be some focus on personal awareness and the development of skills for addressing diversity concerns.	Related	Course examines the necessity for diversity in the workplace.	5, 8, 10
GRAD	PSYC	5270	Immigrant Psychology and Communities (Formerly 47.527)	This course will focus on the immigrant experience and the various immigrant groups in the United States with emphasis on recent immigrants in Lowell and Massachusetts. Theories of acculturation and adaptation to a new cultural environment will be extensively examined in the course. An experiential approach will be integrated throughout the course via the incorporation of guest speakers, films, autobiographies/novels, and food. Students will have ample opportunities to read, reflect, discuss and write about the immigrant experience. As our country is a country of immigrants, this course should have relevance to anyone working in the community.	Related	Course focuses on the dynamics of immigrants in communities and the accompanied social implications.	10, 11, 17
GRAD	PSYC	5810	Concepts and Principles of Behavior Analysis	This course is designed to provide students with foundational knowledge regarding the basic concepts and principles of behavior analysis. Students will gain an introduction to what behavior analysis is and how it differs from other approaches that study behavior. Students will be asked to define and identify examples of the basic principles, then apply that knowledge to describe and diagram original, real-world examples. Students will look at how the environment promotes the development of both adaptive and maladaptive behaviors, shapes behavior over time, and how the environment can be modified to help change behavior.	Related	This course addresses how environments impact behaviors over time.	3,4,6,8,9,10,11,15,16
GRAD	PSYC	5830	Philosophical Underpinnings of Behavior Analysis	This course will focus on the scientific and philosophical underpinnings of behavior analysis. In this course, students will review basic assumptions about the nature of behavior, including comparison of the philosophical positions of free will and determinism. Emphasis will be placed on verbal behavior and the problems that can arise when practitioners are confronted with mentalistic explanations of behavior. Students also will explore complex conceptual issues, such as knowledge and understanding, purpose and intention, problem-solving, reasoning, creativity, culture, ethics, and rights and values, in ways that illustrate how they are important to everyday life. The historical perspective of how radical behaviorism evolved, and how it compare to other conceptual systems will be reviewed.	Related	This course examines culture, ethics, rights and values and how they affect everyday life.	3,4,5,10,11
GRAD	PSYC	5850	Professional and Ethical Issues in Behavior Analysis	This course will explore the legal and ethical issues facing professionals working with individuals diagnosed with disabilities, particularly those on the autism spectrum. The goal is to provide behavior analysts and other professionals the opportunity to develop skills in dealing with the complex legal and ethical issues that arise when working in human service fields.	Related	This course dives into the topic of addressing disabilities in the workplace and developing skills to handle situations in the workplace.	4,8,11
GRAD	PUBH	5010	Social and Behavioral Determinants of Health (Formerly PUBH 501)	This course provides a foundation for the analysis of social and behavioral influences on public health. Planning, implementation, and evaluation of initiatives designed to improve public health are discussed. The course reviews prominent concepts in the social and behavioral sciences and provides examples of their impact on public health. Psychosocial theories of health promotion and how they inform public health practice are analyzed. Public health competencies in social and behavioral sciences provide a foundation for the course content.	Related	Course relates to the social and behavior dynamics that impact public health.	3
GRAD	PUBH	5021	Public Health Policy (Formerly PUBH 502)	The course focuses on expanding students' knowledge and skills for developing and evaluating contemporary public health policy in the United States and international settings. Students will gain information about the current US national health care system as it relates to emergent public health topics and priorities in the US and globally. This course will focus on competencies for designing, implementing, evaluating and advocating for evidence-based policy, program and practices.	Related	This course outlines factors for developing public health policies.	3
GRAD	PUBH	5030	Toxicology and Health (Formerly 19.503)	Examines the effects of the major and chemical physical hazards in the modern work environment. Presents principles of toxicology as well as the toxicology of heavy metals, organic solvents, pesticides, harmful dusts, asphyxiants. Mechanisms of the effects on human physiologic systems are described along with the physiologic effects of ionizing radiation, heat stress, noise and repetitive trauma.	Related	Course addresses on the impact of toxins to public health.	3, 8, 12
GRAD	PUBH	5130	Assessment and Planning in Public Health	This course presents methods, concepts and techniques required for the identification of resources and needs, and planning of public programs and advocacy efforts to meet those a community, state, national, and global levels. Students will engage in community assessment and planning activities based on ethical and professional principles. This course will enhance skills needed for a health education specialist.	Related	Course will give students experience with public health planning and resources for community, state, national and global levels.	3,11
GRAD	PUBH	5150	Applied Health Economics (Formerly 32.515)	Students study basic economic concepts and how they are applied to healthcare and gain a broad familiarity with the health economics and related health services research literature, as well as experience using economics to analyze health policy issues.	Related	Course reviews the importance of health in policy.	3, 8, 16
GRAD	PUBH	5270	Planning and Marketing in Healthcare (Formerly 32.527)	Students learn the fundamentals of planning and marketing and how they are applied to the health care system. Students use common tools and techniques to conduct environmental scanning, and feasibility analysis to determine if marketing goals for a new product or service meet the mission, vision and strategic plan of the healthcare organization. SMART Goals are introduced along with other campaign foundations in the development of a marketing summary and strategy for the healthcare organization.	Related	This course explores the concept of environmental scanning to bring awareness to marketing strategies in the healthcare environment.	3
GRAD	PUBH	5310	Health Informatics (Formerly 32.531)	The course provides healthcare professionals with a conceptual and practical understanding of information and communication systems, and how they are used. It also addresses the systems analysis, development and implementation challenges in optimizing today's complex healthcare systems designs to improve both use and clinical outcomes. Students learn the theory, techniques and systems used for transforming clinical data into information useful for decision-making. The current and future role of the health care informatics professional is discussed.	Related	Course explores practical understandings needed for healthcare professionals.	3, 9
GRAD	PUBH	5510	Work Environment Policy and Practice (Formerly 19.551)	This course provides an overview of occupational safety and health (OSH) policy and practice. It focuses on the legal and administrative vehicles, especially the Occupational Safety and Health Administration (OSHA) and OSH Act of 1970. It demonstrates the public health and business case for safety via case studies. The course provides an analytical framework for examining social, economic, and political factors in the recognition and control of occupational hazards and a management program for identifying and preventing hazards at the worksite. The course covers national and international workplace management systems as well as business and organizational management policies to ensure safety and how these are translated to effective practice at the level of a specific worksite.	Related	This course addresses workplace safety and reviews specific OSHA standards to ensure businesses and workplaces follow standards and guidelines that prevent, reduce and mitigate hazards in the workplace.	3,8,9,10,11
GRAD	PUBH	5770	Biostatistics for Health Data (Formerly 19.577)	This is a practical course in biostatistical methods for health research. Emphasis is placed on developing an understanding of the use and interpretation of standard biostatistical methods. Topics include probability and sampling distributions, regression and ANOVA, methods for analyzing rates and proportions, power and sample size calculations. Students will gain experience in using a statistical software package to apply and expand their data analysis skills.	Related	Course outlines the importance of health data for society and how that connects to global health.	3, 9

GRAD	PUBH	6140	Evaluation of Work Environment Hazards (Formerly 19.614)	This course provides the work environment professional with a systematic method of evaluating chemical, ergonomics and work organizational hazards in the field. Formal walk around inspections are conducted and formal reports are prepared. Sampling strategies and statistical considerations in the quantification of occupational exposures are covered. The health risks and control of physical hazards (noise and vibration) in the work environment are a major focus of this course.	Related	Course examines the connection between work and hazards.	3, 8, 12
GRAD	PUBH	6150	Solutions for Work Environment Hazards (Formerly 19.615)	Techniques for controlling exposure to airborne contaminants. Basic controls include substitution, ventilation, isolation, administrative controls, and personal protective equipment. Special focus is placed on Toxic Use Reduction (TUR) and Pollution Prevention strategies.	Related	Course explores solutions related to a hazardous work environment specifically associated with airborne contaminants and incorporates the health aspects of sustainability.	3, 8, 12
GRAD	PUBH	6250	Health Policy (Formerly 32.625)	This course provides students with a basic framework for health policy analysis and examines major aspects of U.S. health policy. Detailed consideration and discussion focus on the relationship of national policy to the planning, implementation and funding of healthcare services. The course covers topics such as the healthcare policy environment in the U.S, government-funded healthcare through Medicaid and Medicare, and the Massachusetts healthcare reform.	Related	Course examines the health policy of the United States and how it effects the public.	3, 16
GRAD	PUBH	6820	Applied Epidemiology Methods (Formerly 19.682)	This course emphasizes the design and conduct of epidemiology studies. Major topics covered include: casual inference in epidemiology, point and interval estimation for cohort and case control studies, exposure assessment for epidemiology, control of confounding, the identification and interpretation of effect modification, as well as cross-sectional designs and meta-analysis.	Related	This course outlines major topics surrounding epidemiology and explores various case studies to enhance learning around the topic.	3,11
GRAD	PUBH	6870	Quantitative Models Environmental Health (Formerly 19.687)	In this seminar readings, discussion, group work and computer exercises are used to gain an understanding of how certain kinds of quantitative models work. Emphasis is placed on the underlying assumptions of these models, and on gaining an intuitive understanding of the most common modeling procedures. The types of models covered will be those most important to current research and policy in environmental health, including ordinary least squares, the method of maximum likelihood, Monte Carlo simulation, and systems of ordinary difference equations. There will be a diverse set of readings, frequent computer exercises to be worked either individually or in groups, and a final project. Faculty with Excel or an analogous spreadsheet program will be assumed. .	Related	Course examines the importance of environmental health models on society.	3, 9
GRAD	SOCI	5150	Social Policy and Inequalities	Social Policy and Inequalities is a semester-long course that analyzes the social policies in the United States and Massachusetts that address persistent and structural inequalities in education, health and healthcare access, immigration, workforce, and human services. We will pay particular attention to social policies that contribute to or seek to alleviate inequalities based on race, gender, income and wealth, sexuality and disabilities. The course will identify key features of policy development, implementation and evaluation and interrogate the underlying patterns of inequalities at each stage. The course will analyze case studies of policies such as those related to poverty and income inequality; affirmative action; education; workforce development and employment.	Related	Course focuses on how inequalities impact social and economic sustainability.	1, 2, 3, 4, 5, 8, 10, 16
GRAD	WORC	804N	Survey/Measure in Health Research	Inter-campus Course -- Please Refer to UMASS Worcester Course Catalog for Details. (UME-N 804).	Related	Course integrates health and social aspects of sustainability via focus on practical research development.	3, 5