

Introduction

This course inventory was developed for University of Massachusetts Amherst's STARS 2.2 submission following the STARS 2.2 Technical Manual.

Methodology

For the two semesters of academic year 2018/2019 we obtained from the registrar the complete listing of class offerings. The database obtained includes a separate record for every primary instructor, graduate teaching assistant and undergraduate classroom assistant for every section, discussion group, lab or colloquium of these courses. There were more than 12,000 records in total per semester. All courses were counted once, regardless of the number of sections or number of times the course was offered during the academic year. We choose not to include internships, practica or independent studies, even though UMass has a large number of students enrolled in that type of sustainability immersive learning opportunity. Those opportunities are difficult to track or compare relative to the sustainability focused and inclusive metrics, so we opted not to include them. After removing those courses, the remaining courses were inventoried to identify sustainability courses ("Sustainability Focused") and courses that contain sustainability ("Sustainability Inclusive") per the definitions provided in the STARS 2.2 Technical Manual (see definitions below).

We maintain a database of known sustainability faculty, updated annually, whose courses have in the past met the criteria of being either sustainability focused or sustainability inclusive, and address one or more UMass sustainability learning outcomes. To develop the sustainability course listing for a given academic year (in the case of this current submission, Fall 2018 and Spring 2019), we go through a three-step process to build our sustainability course list:

1. Identify the courses offered during the 2018/2019 academic year that are already on our "living inventory master list" of sustainability courses (sustainability courses offered at least once during the previous 3 academic years).
2. Extract all classes taught by sustainability faculty members (339 at present, from 49 relevant academic departments) from the remaining courses; not all of those courses automatically meet our criteria, so we then assess course-by-course whether they meet the sustainability focused or sustainability inclusive criteria. Those courses that meet the criteria are added to the course list.
3. Review the remaining courses—which may be taught by new faculty, or by existing faculty members who had not previously taught a sustainability course—and add any additional courses that meet the criteria.

Definitions

Sustainability-Focused Courses: To count as focused, the course title or description must indicate a primary and explicit focus on sustainability. The course title or description does not have to use the term "sustainability" to count as sustainability- focused if the primary and explicit focus of the course is on the interdependence of ecological and social/economic systems or a major sustainability challenge.

Sustainability-Inclusive Courses: To count as inclusive, the course description or rationale provided in the course inventory must indicate that the course incorporates a unit or module on sustainability or a sustainability challenge, includes one or more sustainability-focused activities, or integrates sustainability challenges, issues, and concepts throughout the course.

Undergraduate Courses				
Subject	Catalog	Course Name	Sustainability Focused or Sustainability Inclusive	Course Description
AFROAM	133	African-Amer Hist,Cv War-1954	Inclusive	Major issues and actions from the beginning of the Civil War to the 1954 Supreme Court decision. Focus on political and social history: transition from slavery to emancipation and Reconstruction; the Age of Booker T. Washington; urban migrations, rise of the ghettos; the ideologies and movements from integrationism to black nationalism. (Gen.Ed. HS, DU)
AFROAM	161	Intro Afro-Amer Political Sci	Inclusive	A survey of the politics of black people and their struggle for citizenship rights from 1787 to the present. The history of black political development and the theories to which it has given rise; and the two party struggles since the passage of 1965 Voting Rights Act--such as the rise of the Republican Right, Jesse Jackson's two 1980's presidential campaigns and the 2008 path-breaking election of Barack Obama to the presidency of the USA.
ANTHRO	100	Human Nature	Inclusive	Introduces the full range of human cultural and biological diversity. Human evolution, rise and fall of civilizations, non-Western cultures, and the human condition in different societies today. Emphasis on the relationships among biological, environmental, and cultural factors. (Gen.Ed. SB, DG)
ANTHRO	104	Culture, Society and People	Inclusive	The nature of culture and its role in creating forms of social, economic, and political life in diverse historical and geographical contexts. Readings drawn from contemporary ethnographies of various peoples, analyzing the persistence of cultural diversity in the midst of global social and socioeconomic forces. (Gen.Ed. SB, DG)
ANTHRO	208	Human Ecology	Inclusive	The study of human/environmental interactions. Emphasis on biological and cultural responses by contemporary human groups to pervasive environmental problems. Examples from mountains, grasslands, deserts, and tropical forests. (Gen.Ed. SB, DG)
ANTHRO	270	North American Indians	Inclusive	Survey of the indigenous people of America north of Mexico; their regional variations and adaptations, their relationship to each other, and the changes taking place in their lifeways. (Gen.Ed. SB, DU)
ANTHRO	380	Grassroots Community Organizing	Inclusive	This course examines how marginalized communities organize to combat racial, economic, and political injustices. Student facilitation, grassroots community partnerships, and an alternative spring break experience enable a unique learning community.
ANTHRO	397RA	ST- Relational Organizing	Inclusive	Focuses on developing narrative, relationships building, and conflict engagement skills to strengthen leadership work.
ARCH	211	The City	Inclusive	This lecture investigates the history of global cities, with an emphasis on the twentieth and twenty first centuries. Gen. Ed. HS, DG)
ARCH	230	Design Engagement	Inclusive	This seminar course provides several frameworks to explore critical architectural/spatial dialogues between a broad range of political, cultural and social contexts. (Gen. Ed. AT, DU)
ARCH	400	Design III	Inclusive	Studio. In-depth exploration of increasingly complex planning and architectural programming, social context of design. Continued exploration of design through written, visual, and dimensional opportunities. Extensive out of class work, portfolio development, advanced presentation techniques, and class participation/attendance required.
ARCH	403	Design V Studio	Inclusive	Projects developed to explore the principles and process of architectural design and the development of structure and enclosure. Design projects, sketch problems. Satisfies the Integrative Experience requirement for BFA-Arch majors.
ARCH	497	Sustainable Building Systems	Focused	Students will engage in a process of research and analysis of sustainable, energy efficient, and cost-effective building systems, and ultimately construct the building they have designed.
ART-HIST	345	Architecture Now	Focused	What is sustainable architecture? How can we build sustainably, and what lessons can we learn from the past? This course addresses the history of environmental concerns about the built and unbuilt environment, from vernacular and indigenous buildings to 19th- and 20th-century reactions to the Industrial Revolution and the modern city. Through a study of landscape painting, landscape architecture, and architectural history we will review Western perceptions of nature and industry to better understand evolving expectations of the two and how these expectations affect the way we live. The course covers the environmental movement of the 1960s and 70s and how architects responded to the oil crisis. It concludes with a study of recent work by contemporary architects who are intent on addressing ecological and climate-related challenges.
BCT	150	The Built Environment	Focused	We will explore the issues of sustainability from the perspective of the built environment, our history of construction and expansion, and buildings and how they interact with the natural environment. Students will be exposed to issues of human impacts on natural systems through the built environment and the variety of disciplines that are working to create a more sustainable future. (Gen.Ed. I)

BCT	204	Construction Materials&Methods	Inclusive	Provides an introductory overview of the various materials used in construction. Topics covered: structural, physical and long-term performance, material and product manufacturing, common building systems and construction principles.
BCT	211	Energy Efficient Housing	Focused	Energy conservation in contemporary residential construction. Emphasis on: energy efficient building materials, products and construction technology; alternative energy sources; passive solar design; environmental concerns, regulatory issues and building codes.
BCT	304	Wood Properties	Inclusive	Introduces students to the anatomy and the physical and mechanical properties of wood, a beautiful, renewable, and structurally efficient material. Deterioration and its prevention are discussed. The course provides an overview of wood-based products and exposes students to structural systems in wood. Basic lab techniques for physical measurement and mechanical testing are introduced by conducting and analyzing laboratory experiments.
BCT	311	SustindoorEnvironmentalSystems	Focused	The focus of this course is to understand the fundamental principles behind the sustainable design and regulation of thermal comfort and mechanical, plumbing, and lighting systems in buildings.
BCT	313	Light-Frame Strct Tc	Inclusive	Analysis and review of the entire light-frame construction process, from regulation and design through site preparation, project management, and ultimate delivery of a completed structure.
BCT	330	Mech Bld Mat Constrctn	Inclusive	Introduction to the mechanical behavior of building materials for students of construction technology and architecture. Basic structural concepts, including statics and strength of materials, are addressed in a practical hands-on manner.
BCT	353	Business of Building	Inclusive	Introduces business concepts to students interested in design and fabrication of structures. Managing a project, contracts, marketing, scheduling, personnel, leadership, interpersonal communication, human behavior, finance, budgeting, ethical and legal considerations.
BCT	414	Sustainable Bldg & LEED Certif	Focused	The LEED Professional Credentials indicate professional excellence and a strong depth of knowledge as well as practical understanding of the LEED Rating Systems and how they apply to the high-performance design and construction of the built environment. Preparing to take the LEED Green Associate and AP exams requires more than taking one course; it is a process that involves acquisition of disciplinary knowledge and understanding of complex building and environmental systems.
BCT	420	Designing with 3D CAD & BIM	Inclusive	Presents advanced topics in architectural CAD in a problem-based environment: 3D modeling, parametric building design, building information models (BIMs), material takeoff, energy-efficient planning, rendering and presentation.
BCT	494BI	BCT Senior Seminar	Focused	Senior BCT capstone seminar course for students preparing to enter the construction and building technology field. Centers on management of construction projects by integrating core aspects like: design, building systems and structure, sustainability, bidding/estimating, scheduling, BIM, value engineering, contracts/negotiation, subcontractor relations, cost control, management during construction, close out, and post-construction requirements. Students complete a group-based semester-long comprehensive project in this course that responds to an RFP and leads to a presentation of written and oral outcomes in front of a panel of industry jurors.
BIOLOGY	105	Biology of Social Issues	Inclusive	For non-science majors; not for Biology major credit. Designed to provide non-science majors with the basic scientific knowledge that an informed citizen requires to develop thoughtful positions on sometimes controversial questions related to medical ethics, environmental degradation, cloning, biotechnology, STDs, and education.(Gen.Ed. BS)
BIOLOGY	152	Introduction to Biology II	Inclusive	Topics include plant and animal structure and physiology, evolution, and ecology.
BIOLOGY	280	Evolution: Diversity Life Thru Time	Inclusive	We will investigate the process of biological evolution and the evolutionary history of life on Earth. Topics to be covered include natural selection, speciation (the formation of new species), and other causes of evolutionary change; the methods that evolutionary biologists use to investigate evolutionary processes and history; and an overview of life's history, focusing on major evolutionary innovations and transitions.
BIOLOGY	287	Intro Ecology	Inclusive	The scope of ecology; how organisms cope with environmental challenges; population dynamics; species interactions of competition, predation, and mutualism; community ecology; biodiversity; biogeochemical cycles; selected topics in evolutionary and behavioral ecology. Basic concepts related to practical applications in harvesting, biological control, conservation, pollution, and global change.
BIOLOGY	335	Topics in Plant Biology	Inclusive	We have two goals in this course. The first, and most important, is to introduce Undergraduate Biology students to some of the many fascinating aspects of Plant Biology, especially as these differ from animal biology. For instance, did you know that plants are moving (on a large scale) all the time? It's the truth, but in a very different time scale than we animals use. How do plants do that without the benefit of muscles and skeleton? Have you ever thought about how, in the absence of a pumping heart, plants' circulatory systems work? After all, the water at the top of a tree got there from roots in the ground, but no pump was involved. Plants don't have an immune system, and yet, they 'stand and fight' - literally rooted to the spot - taking on all types of pathogens, as well insects and other predators. What strategies do plants use to overcome these attacks? Have you ever wondered about how biotechnology is used in agriculture? We have all heard news stories about GMO's (genetically modified organisms). What are these and what makes them useful or dangerous? These are the types of topics we will be covering in this course. The second goal for this course is to provide a convenient way for UMass Biology majors to accomplish their plant biology course requirement

BIOLOGY	421	Plant Ecology	Inclusive	This fundamental ecology course emphasizes the quantitative skills needed to understand and conduct field research. The lectures introduce major ecological concepts, local vegetation types, and methods and techniques of gathering and analyzing data. In laboratories, students collect original data at sites in the Connecticut Valley and write an original scientific paper.
BIOLOGY	424	Marine Biology	Inclusive	This course introduces life in the sea from ecological and evolutionary perspectives. Topics will include primary and secondary production, interrelations of marine organisms and their environment (e.g. rocky intertidal, estuaries, interstitial communities, coral reefs, deep-sea communities), adaptations of marine organisms, human impacts on marine life, biodiversity, conservation, and aquaculture. Students will also learn about recent advances in marine research by reading primary literature on topics including reproduction, embryology, paleontology, metazoan body-plan evolution, evolution of development, and phylogeny
BIOLOGY	426	New England Flora	Inclusive	Learn the vascular plants of the region in their natural habitats through field trips and in the laboratory with the use of botanical keys and manuals. Field experience will include some collecting and pressing of specimens. The class also visits the herbarium and greenhouses. Recognition of certain plant families and familiarity with terminology will be gained.
CE-ENGIN	121	Introduction to Civil and Environmental Engineering Measurements	Inclusive	Introduction to various measurements used in civil engineering. Topics include basic surveying principles involving linear and angular measurement, leveling, traversing, green design and technology, and stadia. Also, smaller scale measurements, such as displacement and load. Includes precision instruments such as verniers, calipers, micrometers and load cells.
CE-ENGIN	211	Persp on Evolutn of Structures	Inclusive	Learn how to interpret and understand the built environment through technical, visual, and social analysis and critique of bridges, buildings, and designers. (Gen.Ed. SI)
CE-ENGIN	270	Sys Analys & Econ Civil Engin	Focused	Introduction to decision making techniques used in Civil and Environmental Engineering. Develop and solve mathematical models for optimizing engineering systems. Use basic economic concepts to make decisions between alternative engineering designs. Incorporate environmental sustainability and social issues into engineering decisions. Prerequisite: ENGIN 111 and MATH 132.
CE-ENGIN	310	Transportation	Inclusive	Transportation operations, planning, and design; emphasis on the highway mode. Topics include: vehicle, operator, and roadway characteristics; traffic control; capacity; geometric design objectives and plan formulation; demand forecasting; and economic, social, and environmental evaluation. Co-requisite: CE-ENGIN 260
CE-ENGIN	370	Intro to Envir&Water Res Engin	Focused	With Lab. Introduction to environmental engineering with a focus on physical, chemical, and biological principles. Topics include environmental standards and legislation, material balances, reaction kinetics, environmental chemistry and microbiology, biogeochemical cycles, water quality, water resources, air quality, and solid and hazardous wastes.
CE-ENGIN	411	Traffic Engineering	Inclusive	Fundamental principles of traffic flow and intersection traffic operations including traffic data collection methods, traffic control devices, traffic signal design, and analysis techniques. Emphasizes quantitative and computerized techniques for designing and optimizing intersection signalization. Several traffic engineering software packages used.
CE-ENGIN	423	Engineering Geology	Inclusive	With lab. Interpretation of geology for the purpose of planning, siting, design, and construction of engineered facilities. Includes plate tectonics, mineral and rock identification, engineering geologic mapping, air photo interpretation, residual soils, glaciation, and engineering problems associated with geologic features. Prerequisite: CE-ENGIN 320
CE-ENGIN	462	Water Resources Engin&Sustain	Focused	Methods for sustaining natural hydrologic conditions and controlling flooding in land development. Characteristics of precipitation and watersheds. Peak discharge, hydrograph and flood routing prediction. Design of drainage structures, detention ponds, and innovative water management techniques. Prerequisites: CE-ENGIN 270, CE-ENGIN 357
CE-ENGIN	470	GIS for Engineers	Inclusive	Introduction to fundamental principles and concepts necessary to carry out meaningful and appropriate geographic analysis with geographic information science (GIS). Reinforcement of key issues in GIS such as geographic coordinate systems, map projections, spatial analysis, use of remotely sensed data, integration of social science data, and visualization of spatial data. Laboratory exercises will address problems in hydrology, water treatment, renewable energy, and transportation.
CE-ENGIN	471	Water and Waste Water Systems	Inclusive	Introduction to the design of water and wastewater systems. Topics include water supply, design of transmission and distribution systems, drinking water treatment, wastewater collection and design of sanitary sewers, and wastewater treatment systems.
CE-ENGIN	476	Solid and Hazardous Waste Mgmt	Inclusive	Introduction to municipal solid waste management and hazardous waste management. The relationship between the properties of wastes, the techniques and hardware used for waste handling and processing and the ultimate disposal (containment) of waste and other residual materials will be emphasized. Remediation of contaminated areas is also covered. The design of systems for the management and disposal of solid and hazardous wastes subject to economic factors, safety, reliability and ethical and social implications will be examined. Prerequisite: CE-ENGIN 370.

CHINESE	241	Contemp Chinese Lit	Inclusive	The development of modern China as seen through its literature covering the period 1915-1989. Exploration of the relationship between writing and political change, the role of dissident writers, and the politics of gender in texts from mainland China and Taiwan. All readings are in English translation.
COMM	397SS	ST-Youth, Democracy & Ent indu	Inclusive	The entertainment industries are inordinately focused on young people as they represent tremendous market force. How do the imperatives of this market-driven media culture correspond with principles of democracy? Topics to be considered include commercialism & youth identity, culture jamming, global youth protests, race/class inequities, generation debt, urban youth, strategies for organizing youth resistance.
ECON	103	Introduction to Microeconomics	Focused	Introduction to the economics of markets and market economies. Basic concepts of demand, supply, production, prices, allocation of resources, and distribution of income. Public policy applications. (Gen.Ed. SB)
ECON	104	Introduction to Macroeconomics	Inclusive	Economic theory of the macro-economy. Determinants of unemployment rates, inflation rates, national income, GDP. Tools of public policy available which can be used to promote macroeconomic goals. (Gen.Ed. SB)
ECON	105	Introduction Political Economy	Focused	Introduction to economic analysis for majors and nonmajors. Facts and concepts basic to understanding the U.S. economy today. Topics may include: unemployment, economic development, inequality, technology, social wealth, environment, government economic policy, economic alternatives, race and gender, and discrimination. Contrasting theoretical perspectives. (Gen.Ed. SB, DU)
ECON	204	Intermed Macroeconomic Theory	Inclusive	Analysis of theories of determination of national income, aggregate employment, and the price level. Monetary and fiscal policy. Inflation, unemployment, and economic growth.
ECON	305	Marxian Economics	Inclusive	Introduction to Marxian theory and modern political economy. Logic and methods of Marxian analysis of economic change; comparisons between Marxian and non-Marxian theories.
ECON	306	History of Economic Thought	Inclusive	The purpose of this course is to develop critical thinking in the study of economic theories from pre-Classical to 21st century developments in economic thought. The perspective of the course is multi-disciplinary, in line with the objectives of the integrative educational experience. Students are required to do two writing assignments that integrate prior learning into the analysis of the economic theories covered in the course.
ECON	308	Political Economy of the Envir	Focused	Application of the theories of political economy to environmental problems and issues. Topics include regulatory and market approaches to pollution and natural resource depletion; cost-benefit analysis and its economic and political foundations; and case studies of specific environmental problems such as acid rain, deforestation, and global warming.
ECON	310	Environmental & Resource Econ	Inclusive	This course provides an introduction to environmental economics, ecological economics, and resource economics. We explore their fundamental principles and analytical methods. Address the valuation of environmental goods and services, the causes of environmental degradation, the design of policies to regulate pollution, the theory of renewable and non-renewable resources.
ECON	330	labor in the American Economy	Inclusive	Introduction to labor economics; emphasis on public policy issues such as unemployment, age and sex discrimination, collective bargaining, labor law reform, occupational safety and health.
ECON	341	labor Economics	Inclusive	Theoretical and empirical analysis of labor market issues primarily using tools developed in microeconomics and econometrics. First semester: a general survey of neoclassical, institutionalist, and Marxian theories and empirical work on wage determination. Second semester: an intensive analysis of selected topics.
ECON	348	The Political Economy of Women	Inclusive	A critical review of neoclassical, Marxist, and feminist economic theories pertaining to inequality between men and women in both the family and the firm.
ECON	452	Econometrics	Inclusive	Basic concepts in econometric methods. Estimation of the general linear model with applications to theoretical economic models. Introduction to problems and methods to solve problems common in economic data. Nonlinear models, binary independent variables and binary dependent viable methods. Application of methods to real world data; emphasis is on application through use of econometric software. Students undertake research projects.
ECON	394CI	Econ of Cooperative Entrprs	Focused	Students will be asked to retrospectively analyze their experiences as workers and consumers, evaluating the impact of organizational forms and industry structure. How do cooperative enterprises (including those on campus such as People's Market, Earthfoods) differ from other enterprises? Students will also be asked to explicitly bring material they have learned in other classes to bear on these issues.
ECON	394FI	Finance and Society	Inclusive	Have we entered a new Era of Social Organization: the Era of Financialization? Financialization is the increasing role of financial motives, financial markets, financial actors, and financial institutions in the operations of domestic and international economies. If we have have entered a new era of financialization: what does this mean about the way our economy works?
ENVIRSCI	101	Intro to Environmental Science	Focused	Introduction to the biology of environmental pollution. Examples of air, water, and land degradation will be studied using case histories. Strategies to restore damaged ecosystems and current approaches to achieve sustainable environments will be discussed. (Gen.Ed. BS)

ENVIRSCI	197D	Foundations of Sustainability	Focused	This course is focused on working toward environmental literacy and leadership both within the program and on the campus at large. This is an academic course open to students of all interests and education levels. We especially encourage students who wish to gain or expand their knowledge in sustainability and environmental literacy. This fall semester course builds a foundation knowledge in sustainability and raise awareness about these issues across the campus. Focusing on the role and impact of the individual, students work to promote environmentally responsible behavior in the campus community.
ENVIRSCI	213	Intro to Environmental Policy	Focused	An overview of the environmental policy process covering the roles of major players at community, state, and federal levels, and emphasizing the role of environmental science. Covers the major environmental laws and recent amendments, the role of policy analysis, and international environmental policy.
ENVIRSCI	214	Ecosystms,Biodivrsty&GloblChng	Inclusive	Conservation science is concerned with phenomena that affect the maintenance, loss, and restoration of Earth's animals, plants and ecosystem while balancing the needs of people. Using principles from ecology, population genetics, economics, political science, and other natural and social sciences, this course will examine the global changes causing widespread species extinctions via large-scale shifts in climate, habitat destruction and fragmentation, ocean acidification and overexploitation.
ENVIRSCI	294A	Environmnetal Careers and Planning	Inclusive	This course will explore some of the career opportunities available to graduates of the Environmental Science major. Periodic guest speakers will present seminars about career opportunities in both private consulting and public agency sectors of the environmental arena. Students will investigate the various focus areas available within Environmental Science (e.g., policy and law, global change ecology, habitat restoration, environmental toxicology, natural resource inventory and assessment, hazardous waste remediation, etc.) with a goal of planning their upper-level elective course selections. Students will be introduced to a variety of minors, certificates, and double majoring opportunities that would add value to their undergraduate degrees. Time will be spent building an individualized curriculum plan to meet specific career goals and outcomes for each student.
ENVIRSCI	297F	Environmental Communication Eco Rep	Focused	This course is focused on working towards environmental literacy and leadership both within the program, and on the campus at large. This is an academic course open to students of all interests and education levels; it is especially encouraged to those who wish to gain or expand their knowledge in sustainability and environmental literacy. Eco-Reps build a foundational knowledge surrounding issues of sustainability and explore how best to raise awareness about these issues amongst their peers. Focusing on the role and impact of the individual, Eco-Reps work to promote environmentally responsible behavior in the campus community.
ENVIRSCI	213	Introduction to Environmental Policy & Mgt	Focused	An overview of the environmental policy process covering the roles of major players at community, state, and federal levels, and emphasizing the role of environmental science. Covers the major environmental laws and recent amendments, the role of policy analysis, and international environmental policy.
ENVIRSCI	315	Prin of Envir Toxicology &Chem	Focused	Fundamental areas of environmental science presented in an integrated, interdisciplinary sequence: 1) environmental toxicology, 2) toxins in food and the environment, 3) environmental fate and degradation of toxicants. Prerequisites: ENVIRSCI 214 and organic chemistry.
ENVIRSCI	364	Environmental Soil Science	Focused	An examination of the basic physical, chemical, and biological properties of soil with emphasis on environmental science and natural resource applications. Soil's natural role in biome structure, nutrient cycling, water purification, and carbon storage will be explored. Processes important to soil and groundwater pollution (subsurface movement, attenuation, and remediation) will be discussed. Special attention given to wetland soil processes.
ENVIRSCI	445	Sustainability and Problem-Sol	Focused	In the course you will seek practical solutions to complex environmental problems by crossing traditional disciplinary boundaries and using an inquiry, cooperative learning-based approach. You'll learn how to integrate and apply knowledge from the four core areas of the ENVIRSCI curriculum. The main learning goals for this course are to gain in-depth experience in identifying tools and planning solutions for environmental challenges, and to explore how integrating your diverse educational experiences leads to new levels of understanding. You will learn how to address environmental management problems caused by global change, pollution, and the unsustainable use of renewable and non-renewable resources. The semester culminates in team-based projects in which students investigate connections between current environmental issues, their education in your ENVIRSCI major and your experience as UMass undergraduates, with structured opportunities for reflection on both your discipline and on yourself as a life-long scholar. This course meets the Integrative Experience requirement for the BS-EnvSci majors.
ENVIRSCI	452	Haz Waste Ops & Emerg Respnse	Inclusive	Meets federal requirements of 40-hours training involving methods and concerns for workers handling hazardous materials as specified by OSHA under 29 CFR 1910.120. First aid and CPR sessions provided for uncertified individuals. Site specific Health and Safety Plans prepared prior to and after entry into an industrial facility. Simulated drills performed by students in personal protective equipment responding to unknown incidents to challenge skills developed in lecture. Certifications awarded.
ENVIRSCI	465	Principles Envir Site Assessmt	Focused	Training in the ASTM method for detecting recognized indicators of petroleum and hazardous material contamination at properties of concern to local communities. Phase I and II techniques including record file research, site reconnaissance, and subsurface investigations. Information obtained on project sites assembled into Phase I Environmental Site Assessment Reports for submission to interested municipalities.

FOOD-SCI	102	World Food Habits	Inclusive	Cultural, historical, political, psychological, scientific and social aspects of contemporary food habits in diverse parts of the world; hunters and gatherers, food production for better health, developed and developing countries, basis of food selection, food safety, food processing and preservation, world food resources, foods of the future; impact of modern biotechnology, food fermentation, and environmental issues related to global food and energy sources.
FOOD-SCI	150	The Science Of Food	Focused	Biological and chemical principles underlying the maintenance of food quality during the period after harvest to consumption. Topics include chemical, enzymic, physical, and biological deterioration; implications and prevention; food toxicology. (Gen.Ed. BS)
FOOD-SCI	270	Biol. of Food in Human Health	Focused	This course will evaluate the biological significance of food. It will cover a basic description of physiology, demonstration of pathology, and evaluation of the role of foods and food components in disease prevention.
GEOGRAPH	102	Intro/Human Geography	Focused	A wide-ranging introduction to the ways people shape the world they live in. We will study the themes and concepts of human geography through the current issues and large questions which guide them. Lectures and reading will focus on the geographic aspects of cultural diversity, population issues, states vs. nations, the global economy, development, urbanization and the human transformation of the earth.
GEOGRAPH	110	Global Environment Change	Focused	The natural relationships between the atmosphere, hydrosphere, biosphere, and lithosphere; human impact on the natural environment. Global environmental issues: global warming, sea-level rise, and ozone depletion in the stratosphere. Global changes of the past also studied to give perspective to forecasted changes.
GEOGRAPH	200	Geography of US and Canada	Focused	This course will provide a survey of the geography of the US and Canada, starting with physical geography and historical developments that shaped human geography, and then moving into a region-by-region overview. Special emphasis will be on issues of environmental change and sustainability, and the diversity of peoples and cultures and their relationships with landscapes and each other. This newly developed course will include a variety of experimental readings, lectures and activities. Students will co-design, teach and assess one experimental reading or activity themselves. Class activities will include some remote activities and participation such as videos, podcasts, web interactives, a self-guided field trip, and interacting with classmates via moodle or a blog.
GEOGRAPH	220	World Regional Geography	Inclusive	Survey of world physical and human geography, highlighting regional diversity and variation in globalization processes and outcomes. Introduces geographical theories, concepts, and methods while exploring nine major world regions. (GenEd SB, DG)
GEOGRAPH	314	Writing In Geography	Inclusive	Readings, lecture, group and individual tutorial, exercises, and peer review focusing on critical thinking and geographic writing.
GEOGRAPH	352	Computer Mapping	Inclusive	Environmental mapping projects that draw on various ecological, governance, and social science data through the use of software mapping packages. Students select their own final projects.
GEOGRAPH	354	Climatology	Focused	Fundamentals of the earth/atmosphere energy balance, the hydrologic cycle, atmospheric motion, and the general circulation of the atmosphere. Regional and local climates. How climate affects people's activities and how people influence climate. Climate change, its causes, and its effects.
GEOGRAPH	360	Economic Geography	Inclusive	Economic Geography is the study of how humans struggle to live on our planet. The course examines economic activities in space, place, and location through three lens: globalization, unequal development, and sustainability. Students will learn not just the "why" of economics, but how "where" complicates understanding the economy.
GEOGRAPH	370	Urban Issues	Focused	This course addresses the challenges faced by 21st century cities as the world's population becomes increasingly urbanized. These challenges are grouped in five themes: water, land, air, built environment and community. The course takes an integrative, geographical, case-study based approach in its exploration of the linkages between these issues and the physical, social, cultural, economic and political aspects of today's rapidly changing cities. Case studies emphasize, but are not limited to, the experiences of cities in Asia, Africa, and Latin America, where most of the world's urbanization is taking place today. Course topics vary by year in response to current events but usually include issues such as the privatization of drinking water provision, impacts of natural disasters, brownfields and blighted neighborhoods, air pollution, transportation planning, squatter settlements, and environmental and social justice issues.
GEOGRAPH	440	Political Geography	Inclusive	An analysis of how and why we organize the world into political territories and into geographically based political alliances and systems, and the consequences of this organization for people and environments. The first half of the course focuses on the practice of organizing the world into the bordered political units we know as nation-states. The second half focuses on the politics of development and the globalizing economy.
GEOGRAPH	470	The Chinese City: Geography, Environment, and Development	Focused	China's cities are home to ten percent of the world's population. This lecture, discussion, and research course analyzes these cities' rapidly changing urban forms, environments, economies, and societies.
GEOGRAPH	497C	Climate Crisis	Focused	This course is an introduction to the political ecology of climate change, response, and justice. It provides an opportunity to engage in critical reading and discussion about the great moral, political, economic, and environmental challenge of our time. We will explore climate crisis narratives; mitigation, adaptation, and climate justice issues; policy and social/economic reform debates; and climate activism. Reading will range from IPCC reports to work by Bill McKibben, Naomi Klein, and Indigenous activists.
GEOGRAPH	497N	National Parks and Protected Areas	Focused	This course explores efforts in the U.S. and worldwide to promote biodiversity conservation, sustainability, and social justice through the designation and management of national parks and other protected areas.

				This course examines the ways US lands, waters and resources are organized by policies and law, how this has changed over time, and why. We examine underlying structures of law and policy that are often taken for granted. We uncover the political-economic origins of key policies, and trace their long-term social and environmental effects. A key goal is creative and critical comparison: thinking about different ways land, waters, resources and policy have been or might be organized, how and why this changed or might change, and the consequences for the environment and people. The course provides a strong conceptual introduction to the political economy of the environment and political conflict over the environment.
GEOGRAPH	497R	Rethinking US Environmental Policy	Focused	
				Soils are the medium that grows the vast majority of the food consumed world-wide, yet soil erosion diminishes agricultural production and ultimately threatens food security. In the U.S. major uncertainties still exist regarding the rates of soil erosion and soil formation. This research-intensive course will explore soils and soil erosion in the Midwestern U.S., one of the world's most important agricultural landscapes. Students will conduct a semester-long research project. During a pre-semester field trip, students will collect soils and make a variety of field measurements as well as investigate the human dimensions shaping the agricultural landscape and soil changes. During the semester, the lab component will be devoted to learning and applying a variety of measurements for characterizing the properties of the soils they collect, and to learning methods for determining rates of soil erosion and soil formation. Classroom sessions will be devoted to a wide range of topics related to agricultural soils, including: the glacial history of North America, soil forming factors, soil erosion processes and prediction, and agricultural policy. Enrollment in both the lecture and lab is required. Enrollment is open to undergraduates in all majors within the School of Earth & Sustainability.
GEOGRAPH	497S	Soil Erosion in Agricultural Landscapes	Focused	
				Nature and origin of the earth; volcanism; minerals and rocks; earthquakes; plate tectonics; mountain belts; geologic time scales; wave, river, glacial, and wind action in modification of landscape and atmosphere; the asteroid impact hypotheses; genesis of non-renewable resources, geologic basis for environmental decision making. Field excursions.
GEOLOGY	101	The Earth	Focused	
				The natural processes of the ocean, including earthquakes and volcanoes, the hydrologic cycle and weather, ocean circulation and the global energy balance, the carbon cycle and productivity, biodiversity and marine food webs, coastal dynamics. Also, global warming, sea-level rise, environmental degradation and the ocean system response to human activity and global change. Interactive class sessions, with considerable participation by students in problem solving, discussions, and demonstrations. Exams and grades based on teamwork as well as on individual performance.
GEOLOGY	103	Introduction to Oceanography	Focused	
				The earth is a dynamic planet, constantly creating oceans and mountain ranges, accompanied by earthquakes and volcanic eruptions. This course explores the ideas that led to the scientific revolution of plate tectonics; how plate tectonics provides a comprehensive theory explaining how and why volcanoes and earthquakes occur; the hazards that they produce and their impact on humans; and adaptation and resiliency efforts for vulnerable population centers. Emphasis is placed on current earthquake and volcanic events, as well as on momentous events from the past, such as the San Francisco earthquake of 1906, the 79 A.D. eruption of Vesuvius that destroyed Pompeii, and the more recent eruptions of Mount St. Helens (Washington), Pinatubo (Philippines) and Kilauea (Hawaii).
GEOLOGY	105	Dynamic Earth	Inclusive	
				Subjects covered include geologic time, principles of stratigraphy and correlation, evolution and the fossil record, a review of plate tectonics, eustasy and isotasy, and the geologic evolution of the Earth with emphasis on the geologic and environmental history of North America as well as human impacts. Prerequisite: introductory geology course, preferably GEO-SCI 101, or one semester of biology.
GEOLOGY	201	History Of The Earth	Inclusive	
				In this course, students take advantage of the breadth of their shared experiences in the Geosciences Department from human dimensions to physical sciences, drawing from geography, earth systems science and geology. The platform of the course uses real-world Geoscience problems facing societies and cultures, incorporating the themes of Water, Air, Energy, Climate and Sustainability. Using readings, print and on-line media, students are encouraged to work through the ways in which integration of their diverse educational experiences leads to new levels of understanding. The semester culminates in team-based projects in which students investigate connections between current Geosciences issues, their education in their major and their experience as UMass undergraduates, with structured opportunities for reflection on both their discipline and themselves as life-long scholars. This course satisfies the Integrative Experience requirement.
GEOLOGY	494LI	Living on Earth	Focused	

HISTORY	117	Science & Society/Modern China	Inclusive	Science has meant many things in modern Chinese history. It has been pursued as a force for sovereignty, enlightenment, civilization, modernity, economic development, social transformation, political liberation, state authority, democracy, populism, individual opportunity, international solidarity, global power, and more. This course will explore how science has shaped modern Chinese history and the roles played by scientists in supporting and challenging the state. It will also examine how specific social, cultural, and political contexts have shaped the practice and policy of science in China, and how the specific visions for science that have emerged there have influenced and inspired people within the country and around the world. Throughout the course, we will be attuned to the effects of power relations on the history of science in China, including the Chinese state's geopolitical maneuverings in the contexts of colonialism and the Cold War, revolutionary challenges to ivory-tower elitism, and scientists' struggles to find their voices within and against the state. (Gen. Ed. HS, DG)
HISTORY	181	Hist Western Sci&Technology II	Inclusive	Science in the modern world from the Enlightenment to the Cold War. Key scientific issues of the modern age, the social organization of science, the place of the scientific community in larger social and cultural context, and the expanding relationship between science and modern technology. (Gen.Ed. HS)
HISTORY	220	Capitalism & Altern/Latin Amer	Inclusive	Why have poverty and inequality proven so persistent in modern Latin American history? What strategies have people proposed to deal with these problems, and with what consequences? This course surveys the major periods in Latin American and Caribbean economic development, focusing on the last 150 years: the liberal export era of the late nineteenth and early twentieth centuries, the state-led industrialization efforts last century, and experimentation with radical alternatives to capitalism.
HISTORY	383	Amer Environmtl Hist	Focused	Americans today are experiencing the impact of climate change, as well as urban sprawl, fracking, oil spills, mountains of trash, unsafe drinking water, unhealthy air, and their favorite plants and animals' loss of habitat. How did we get into this mess? How can we get out? Exploring the history of how Americans have interacted with their environment over the past 400 years can help you understand our present environmental predicament.
HISTORY	389	US Women's History Since 1890	Inclusive	Explores the relationship of women to the social, cultural, economic and political developments shaping American society from 1890 to the present. Examines women's paid and unpaid labor, family life and sexuality, feminist movements and women's consciousness; emphasis on how class, race, ethnicity, and sexual choice have affected women's historical experience. Sophomore level and above. (Gen.Ed. HS, DU)
HISTORY	391N	History and Sustainability	Focused	Americans debate whether their ever-rising consumption of natural resources and standard of living can continue indefinitely into the future. This is not a new question; since the mid-1800s, movements for the conservation of nature have challenged the primacy of mass consumer culture, and met fierce opposition from those charging that these movements threaten the American dream of individual economic opportunity. Through exploring the history of these ideas, students will gain a better understanding of the meaning of sustainability in an era of globalization and rapid climate change.
HISTORY	394CI	Ideas That Changed History	Inclusive	This class is about 1. Ideas that have changed the discipline of history. 2. Ideas that have changed the larger flow of history. 3. Ideas that have changed you, the student, and your relationship to history. 4. Ideas that have changed your personal history.Satisfies the Integrative Experience requirement for BA-Hist majors. (No credit after History 391G).
HISTORY	397LA	Environmental History of Latin America	Focused	This course will trace the environmental history of Latin America. Beginning with the Pre-Columbian era, the course will move on to examine the intertwining of environmental, social, and cultural transformations brought about by the conquest of the Americas by Europeans, and finally the environmental and related social repercussions of the emergence of modernity, urbanization, and industrialization in the era of independence. The course will focus not only on environmental change, its causes and social repercussions, but equally on examining cultural attitudes and ideas to environment and the changes that these ideas have undergone at different phases in Latin America's history.
LANDARCH	197D	Intro to Environmental Design	Inclusive	This course is an introduction to fundamental "design thinking" and graphic communication skills in environmental design. This studio based course introduces students to reading and responding to the site through a series of readings, drawing exercises and model explorations. Exercises will progress.
LANDARCH	494LI	Landscape Planning & the Cultural Landscape	Focused	Landscape planning crosses scales from regional to site specific, taking a real world problem to creative sustainable solutions. An introduction to design research methods, inventory and assessment models and techniques for policy planning, regional scale design proposals, and site selection for particular development types. Implementation of a greenway solution. Satisfies the Integrative Experience requirement.
LANDCONT	107	Land Form	Inclusive	Practice in use of simple surveying instruments such as tapes, compasses, and levels for measurement of land surfaces. Methods of grading and graphic representations of landform (contours and profiles) explored
LEGAL	494DI	Environmental & Public Policy Dispute Resolution	Focused	This course examines multiparty disputes involving topics such as land use management, water rights, e-healthcare, and pollution remediation. We explore dispute resolution's role in enhancing democratic participation in decision making of public import. Satisfies the Integrative Experience requirement for BA-Legal majors.

M&I-ENG	353	Engr Econ Dec Making	Focused	Concepts and techniques needed in making economic decisions which confront engineers: accounting principles, cost control, budgeting, choosing among alternatives, interest and rate-of-return formulas, depreciation, replacement problems, income tax, lease-buy decisions, decisions under risk, scheduling techniques, corporation structure, financing alternatives, economic decision-making by public and regulated organizations.
MANAGMNT	362	Law of Enterprise Organization	Inclusive	The economic functions and consequences of agency, partnerships, and corporations. Prerequisite: MANAGMNT 260.
MANAGMNT	366	Foundtns/Sustainable Entrprse	Focused	Examines current threats to the sustainability of the global economy, the environmental and social impacts of current business practices, and how both governmental regulations and for profit business initiatives are needed to address these issues.
MANAGMNT	391E	Environmental Law	Inclusive	This course provides an overview of U.S. environmental law, including history, policies, and social context.
MANAGMNT	462	Social Entrepreneurship	Focused	Social entrepreneurship involves using the skills and strategies of business to innovatively and sustainably solve social, environmental, and economic problems. As a result, this course will help students identify and create business opportunities that have positive social impacts.
MANAGMNT	488	StrategicMgmt/SustainableWorld	Focused	There are three primary threads in the course. First, the course serves as an overview of the key concepts and frameworks of strategic management and shows how these can be applied in the discussion of particular cases. The second thread is sustainability. Typically, strategic thinking has limited itself to a concern with economic performance; competitive advantage and above-average profitability have been seen as the 'holy grail.' This course takes a broader view and sees the 'bottom line?' in strategic thinking as including environmental and social impacts. The third thread is actually 'doing?' strategy. The course incorporates an internet-based simulation called Capstone? that puts its players into decision-making situations much like those faced by strategists. Performance in the simulation provides opportunities to use strategy and sustainability concepts and to draw on and use learning from other courses in the curriculum. This course satisfies the Integrative Experience requirement for BBA-Mgt majors with a special interest in sustainability
MANAGMNT	494BI	Business Policy and Strategy	Focused	This course is designed to be highly integrative in that students use knowledge and tools from all functional areas of business to develop a "whole organization" perspective. In addition, they integrate by examining these functions within the context of business and societal environments, such as the competitive, political/legal, socio-cultural, technological, and economic. Furthermore, they integrate and further develop general education knowledge and skills, such as written and oral communications in each course assignment. Finally, the course includes a highly sophisticated online Capstone Simulation "game" whereby students (in teams of four) put their knowledge and skills obtained in all UMass courses and even life experiences into practice by operating a company over an 8-year period and competing with other firms (other teams of students). Students conduct professional business meetings, make professional presentations, and prepare strategic plans for their "simulated" companies.
MICROBIO	311	Foundations in Microbiology	Inclusive	This course will introduce Microbiology majors to the extremely diverse and exciting world of microorganisms. The course begins with describing the basics of microorganisms: structure and function, metabolic pathways, physiology, and genetics. These topics are used as a base to discuss more complex microbial systems we study in environmental microbiology, medical microbiology, and applied biotechnology. We will explore the wonderfully extensive diversity of microbes and discuss this diversity within the context of evolution and what 'species?' means in microbiology. We will explore the interactions between microbes and humans, including the influence of microbiota on the health of humans, plants, animals and the environment. We will also discuss historical and current innovations where microbes have been used to make great advances in research and biotechnology.
MICROBIO	444	Biodeterioration, Bioconversion, and Bioenergy: Carbon Cycling to Sustainability	Focused	Bioconversion of materials is part of the natural cycle for all bio-based materials as well as a key factor in bioenergy production. Biodegradation processes including those employed by fungal, bacterial, insect and marine organisms relative to carbon and nutrient cycling and the production of feedstocks for bioenergy and biomaterials are important to maintaining the ecological balance on earth, and for the development of a sustainable society with renewable and bio-based materials. The course examines aspects of natural degradative systems, and how biomimicry of these systems can be harnessed for sustainable energy and product production. Deterioration and protection of biomaterials including wood, bamboo, and historic materials is also included.
MICROBIO	480	Microbial Physiology&Diversity	Inclusive	Description of the structure and function of key aspects of microorganisms and approaches to their study. Topics include cell structure, bacterial growth, energy generation, biosynthesis of macromolecules, and the integration of these processes in an environmental context. Emphasis is on modern approaches to these topics using biochemistry and genomic tools. Prerequisite: MICROBIO 310

MICROBIO	494FI	Soil Microbes and the Sustainability of Organic Agriculture	Focused	Students will engage in meaningful literature research and dialogue about whether organic standards are meeting the needs of both environmental and community sustainability. We will also consider the benefits of sustainable agriculture, both in the sense of conservation of land and soil as limiting natural resources, as well as the sense of community with the farm and food production as the center of family and local community life. In exploring these wide-ranging issues, students will have the opportunity to reflect on and integrate their Gen Ed learning experience from various courses as well as practice Gen Ed learning objectives at a more advanced level as they seek meaningful solutions to complex and ever evolving societal problems. Students will work in small groups to explore these solutions allowing them to participate in shared learning experiences as they apply prior knowledge from various Gen Ed courses and social experiences to solve challenging real-world problems. Satisfies one of three required modules of the Integrative Experience.
NATSCI	189H	Global Challenges, Scientific Solutions	Focused	This 4-credit course brings together topics from Life Sciences, Physical Sciences, Natural Systems, and Social Systems in the context of real world scientific issues. Students will be expected to grapple with the scientific underpinnings of complex problems, including issues surrounding Clean Water, Climate Change, Energy Demands, and Disease and Biomedicine. Case studies will serve as the format/foundation in which students will learn and use fundamental scientific principles to investigate these challenges and quantify the scientific contributions to solutions. The case studies pursued will have political, social, and economic relevance, allowing for the study of scientific concepts and methods as they impact our society. (Gen. Ed. I)
NRC	100	Environment and Society	Focused	In this course, you will both individually and in teams to explore the inherently interdisciplinary environmental challenges facing society. You will engage in discussions, debates, and problem-based team projects to learn about and address environmental problems. You will investigate the impacts of human activities on forests, water, fish and wildlife populations, urban areas, and climate change.
NRC	185	SustainableLiving:Solutions/21st	Focused	Students will work in teams to research and develop solutions to the sustainable challenges facing our society. They will collaborate to investigate, critically evaluate, effectively communicate, and reflect on the multifaceted challenges associated with addressing sustainable resource use, water, food, energy, transportation, waste management, and climate change.
NRC	212	Forest Tree & Shrub Identifctn	Inclusive	Field based instruction in plant identification - chiefly of trees and shrubs native to New England. Ecological requirements of species important for timber, wildlife and/or biodiversity considerations. Field trips to state and University forests/wildlife management areas to learn to recognize plants where they grow naturally on the landscape.
NRC	225	Forests and People	Inclusive	Forests are complex and fascinating ecosystems. They have been shaped by ecological processes over 1,000s of years and also by centuries of human use, abuse, neglect, and care. They are always changing. Forests are essential to human health and well being yet they are often taken for granted. Forests and People explores the: Unique values that forests have in our culture; key characteristics of forests in the Northeast and how and why they have changed through time.
NRC	232	Prin Of Arboriculture	Inclusive	The use and maintenance of trees in the urban environment from both a private and government perspective.
NRC	252	Fundamentals of Applied Ecology	Inclusive	Introduction to the principles of ecology, including structure and dynamics of populations, communities, and ecosystems. Applications of ecological principles to current problems in natural resource management and conservation.
NRC	260	Fish Conservation & Management	Inclusive	Overview of the biological, sociological, historical, and economic factors that influence the use and conservation of our nation's fisheries resources. Prerequisite: One semester general biology or permission of instructor
NRC	261	Wildlife Conservation	Inclusive	Fundamental ecology and principles of wildlife management. Emphasis on wildlife habitat and population characteristics and responses. Prerequisite: One semester of general biology or permission of instructor.
NRC	270	Forest Ecology & Conservation	Focused	This class will provide students with an understanding of the major processes and influences of forest ecosystems and major conservation issues which threaten them. Focus is on northeast forests.
NRC	290B	Introduction to Quantitative Ecology	Inclusive	This introductory statistics course aims to provide students interested in ecology with a supportive, encouraging and comfortable environment for developing a sound knowledge of core statistical concepts in ecology. Ecology, the study of the relationships between organisms to one another and their environment, is a discipline concerned with quantifying the relationships we observe in nature and in the context of the human-environment connection. The objective of the course is to demystify statistics and help develop the basic level of understanding that all future ecologists should possess. In this course, you will develop a detailed understanding of why and how to apply the great variety of statistical tools available for answering important ecological questions.
NRC	290C	Trees & Sustainability	Focused	rees growing in residential areas provide many benefits like cleaning the air and water, reducing energy use, and blocking unsightly views. They can also be dangerous if not carefully planted and properly maintained, causing power outages and damaging property. We'll review the benefits that trees provide, including different ways to assess their value relative to ecological, social and economic considerations. We will also discuss how best to plant and maintain trees to maximize their benefits and minimize their costs.

NRC	297R	Renewable Energy & Sustainability	Focused	This course will introduce students to major themes of renewable energy systems. Students will analyze alternative energy solutions for a sustainable future. Emphasis will be on the different forms of renewable energy, within the context of the existing energy mix, energy policy, resource potential, and institutional opportunities and barriers. We will explore renewable energy potential and solutions through textbook and supplemental readings, current event briefings, group work and activities. The culmination of the course is a group research project to evaluate strategies and envision creative solutions.
NRC	305	Commercial Arboriculture	Inclusive	In this class, students will learn the fundamentals of owning/operating a tree care business. We will cover basic cost accounting and estimating for pruning, fertilization, and support system installation. We will also review the importance of a company safety policy.
NRC	309	Nat Res Policy&Admin	Inclusive	Introduction to the processes of natural resource policy formulation, administration of public lands, and social values related to managing the nation's renewable natural resources. History of current federal laws, policies, and programs, and discussion of the roles of various resources management agencies.
NRC	310	Community Forestry	Inclusive	Management principles of municipal and utility tree care, land use problems, tree laws and ordinances.
NRC	333	Prin of Arbor II	Inclusive	The course digs into the sustainable design and management of urban forests and trees.
NRC	382	Human Dimnsns Natrl Resrc Mgmt	Focused	Introduction to the human dimension of resource management. Topics include social values, demographics, outdoor recreation, agency history and mandates, economic valuation, resource allocation, stakeholder groups, the commons dilemma, and other topics. Satisfies the Integrative Experience requirement for BS-NRC majors.
NUTRITN	130	Nutrition/Healthy Lifestyle	Focused	Introduction to the science of human nutrition and the relationship of food and nutrients to health, socioeconomics, and disease. Topics covered include digestion, and functions of macro and micro-nutrients as well as current recommendations for nutrient intake. We will also discuss energy balance and weight control. (Gen.Ed. BS)
NUTRITN	230	Basic Nutrition	Inclusive	Basic principles of human nutrition. Energy needs. Chemical structures, physical characteristics, and metabolism of protein, carbohydrate, lipids, minerals, and vitamins. Human requirements at various ages. Food sources. Effects of deficiency or excess on health. Prerequisites: general biology and chemistry; organic chemistry concurrent.
POLISCI	101	American Politics	Inclusive	Introduction to and overview of American government. Emphasis on understanding American political institutions such as the Congress, the presidency, and the courts in light of democratic theory and values. Examination of the electoral process; how government institutions respond to demands for public policies. (Gen.Ed. SB)
POLISCI	214	Urban Gov & Politics	Inclusive	An overview of city politics in the U.S. Focus on understanding urban political economy, including its relation to state and federal governments, the complexity of relations between public and private sectors, the structure of city governments, and decision-making processes. Includes such topical issues as education, housing, and economic development
POLISCI	280	Public Policy	Inclusive	Focus on how public policies are made in the U.S., including the role of citizens, interest groups, and government institutions. Emphasis on the processes by which policies are made in various institutions, including the Presidency, Congress, bureaucracy, and courts. Examples cover numerous public policies, such as campaign finance reform, foreign policy, and the environment. (Gen.Ed. SB)
POLISCI	359	International Political Econ	Inclusive	This course provides a thorough introduction to international political economy (IPE): the study of the dynamic interplay between international economics and politics. The course first reviews different theoretical approaches to analyzing and explaining governance in the contemporary international system and the basis for world order. It then covers a wide variety of contemporary issue areas in international political economy.
POLISCI	383	Energy Policy	Inclusive	This course explores the politics of energy policy by examining a range of cases from around the world, including the United States. What is energy? How does energy impact politics and everyday lives in energy-rich and energy-important countries? What are energy transitions and when do they occur? How do energy markets work? This course provides the conceptual, theoretical, and empirical tools to think critically about such questions. It is a multidisciplinary course, with readings drawn from the fields of history, international politics, political economy, development, environmental studies, and the sciences as they pertain to various energy sources, including oil, gas, nuclear, biofuels, and renewables. In addition to readings, we will watch a range of documentaries that highlight various dimensions of energy politics and policy. Students will also come away from this course with greater knowledge of the history of energy in the United States and the rest of the world, as well as a better understanding of the politics surrounding energy policy in select cases. Satisfies the Integrative Experience requirement for BA-PolSci students.
POLISCI	388	Corp. Lobbying/Global Econ	Inclusive	This course centers on one of the most important yet under-appreciated aspects of contemporary political life: the governance of the global economy by private actors. It covers both theoretical and empirical perspectives on how, when, and why private actors are able to influence international institutions, global standards and regulations, and international negotiation processes. Some basic familiarity with international political economy (IPE), economics, and international relations.

PUBHLTH	129	Health Care For All	Inclusive	U.S. health care system with emphasis on issues relating to unequal access to health services. An analysis of how the system should work. Special attention to controversial issues, including managed care and health insurance. How other countries design health systems. (Gen.Ed. SB, DU)
PUBHLTH	200	Intro to Public Health	Inclusive	This course presents an overview of the field of public health, including major health problems; social, behavioral, and environmental factors affecting health; important actors within the public health system; and approaches used.
PUBHLTH	203	Intro Environmental Health Sci	Focused	Introduction to the physical, chemical, and biological implications relating to human exposures to a variety of environmental contaminants, including air, water, and soil pollution, infectious disease, and occupational environmental health.
PUBHLTH	301	Princ of Comm Health Education	Inclusive	This course provides the student with an understanding of major theories used to understand health problems in communities. Grounded in social and behavioral sciences, students will examine the tools and strategies used by public health educators to educate and empower people about health issues.
PUBHLTH	302	Comm Devlpm & Health Education	Inclusive	This course provides students with the opportunity to explore approaches to community development and organizing. Students will gain skills and techniques to involve people in the analysis of the health problems that affect them. Students will also discuss potential solutions to community health problems. This course will incorporate new technologies as tools to examine local community health issues.
PUBHLTH	319	Cancer and the Environment	Inclusive	This class will provide an overview of how cancer is seen from the perspective of environmental health. We will explore in-depth how cancer is diagnosed, what is meant by "cancer clusters," how environmental chemicals are tested for their carcinogenicity, and how cancer trends have increased over time. The remainder of the semester will focus on environmental agents that have been implicated in human cancers.
PUBHLTH	323	Public Health Communications	Inclusive	The public health community - individuals and organizations - have an important role to play in shaping how populations receive and gain access to accurate health information. The Center for Disease Control and Prevention defines health communication as "the use of communication strategies to inform and influence individual and community decisions that enhance health."
PUBHLTH	332	Holistic Health and Healing	Inclusive	This course is designed to give students a broad overview of holism as it relates to health practices currently identified as "complementary and alternative medicine" (CAM). Students will learn about a variety of CAM therapies, their philosophical and cultural contexts, controversies, and how they do - or do not - interface with biomedicine.
PUBHLTH	389	Health Inequities	Focused	While the health and wellbeing of the nation has improved overall, racial, ethnic, gender and sexuality disparities in morbidity and mortality persist. To successfully address growing disparities, it is important to understand social determinants of health and translate current knowledge into specific strategies to undo health inequalities. This course will explore social justice as a philosophical underpinning of public health and will consider the etiology of disease rooted in social conditions.
PUBHLTH	410	Intro to Health Economics	Inclusive	This course introduces the applications of economics to health and health care. It explores the health care sector and healthy policy issues from an economic perspective. The topics to cover include: allocation of health care resources with respect to demand and supply of health care; the role of health care providers, health insurance and market failures.
PUBHLTH	433	Ecotoxicology & Public Health	Inclusive	This course will provide a broad perspective of environmental contaminants, how they impact wildlife, and what lessons can be learned and applied to protect human health. Students will gain knowledge of basic principles of ecotoxicology and an understanding of critical case studies that have informed policies and practice in public health.
PUBHLTH	397A	ST-Intro to Global Health	Inclusive	This course is an introduction to global health from an interdisciplinary perspective. It will examine issues that affect population health the world over and policy recommendations to prevent emerging and re-emerging diseases.
RES-ECON	102	Intro Resource Econ	Focused	Microeconomic theory for majors and non-majors. Concepts of supply, demand, markets, natural resource management, economic policy. Applications to business and government decision-making emphasized. (Gen.Ed. SB)
RES-ECON	121	Hunger In Globl Econ	Focused	Explores the causes of hunger (chronic undernutrition) from an economic perspective. Focus on how population growth and economic development are increasing demand for food and on the prospects for food production to supply those needs at affordable prices, while sustaining the environment.
RES-ECON	162	Consumer In Society	Inclusive	An introduction to Consumer Economics and the role that consumers play including their decision-making and market and non-market consumption activities. Focus on contemporary consumer economic issues in addition to topics such as consumer rights and responsibilities, the impact of advertising, use of consumer credit, product safety, consumer fraud, and legal protections available to consumers. (Gen.Ed. SB)

RES-ECON	262	Environmental Econ	Focused	Economic analysis of environmental problems focusing on air, water, and land pollution. Emphasis is on analyzing the individual incentives that lead to pollution, the valuation of environmental quality amenities, and the design and evaluation of regulations that seek to improve environmental quality. Includes the economic analysis of global climate change. (Gen.Ed. SB)
RES-ECON	263	Natural Resource Economics	Focused	Economic analysis of natural resource use and conservation. Includes analyses of the use of fuel, forest, marine and biodiversity resources. Focuses on evaluating natural resource use in terms of efficiency and sustainability, and designing regulations for correcting inefficient and unsustainable resource markets. (Gen.Ed. SB)
RES-ECON	452	Industrial Organization	Inclusive	In this course we explore microeconomic theories of how industries operate in real-world marketplaces where the conditions often deviate substantially from the perfectly competitive model in your earlier microeconomics courses. Industrial organization refers to the degree and type of competition (or cooperation) among firms in an industry. Different industrial conditions tend to lead to different structures and conduct of industries, and hence, different outcomes for shareholders, managers, and workers.
SPP	110	Intro/Community Engagement	Inclusive	To imagine changing even a small part of the world is a daunting, yet exhilarating proposition. Through class exercises, readings, exploration of social policy, guest speakers and a project that takes you to parts of the campus you might otherwise not explore, you will acquire knowledge and skills necessary for becoming a person who can make a difference. By the end of the semester you will have learned to connect ideas with action, have made a positive contribution to your community, and understand, through experience, the personal and social value of community engagement. This is a foundation course for the Civic Engagement and Service Learning certificate. (Gen. Ed. SB, DU)
SPP/MDEAST	190A	WaterOil&Blood:MidEast/GlblPol	Inclusive	This course introduces students to the contemporary dynamics of the Middle East and North Africa. By using as metaphors three basic substances that are important to the region and the world, the course spans basic issues of Middle Eastern cultures, recent history, and politics in an innovative and interdisciplinary fashion. More specifically, the course includes the attention to Islam, Western colonialism, Israel, Iran, contemporary growth, regional conflicts, and the role of the US.
STOCKSCH	100	Botany for Gardeners	Focused	A holistic view of plants including ecology, plant form and function, inheritance and evolution, and the relationship between plants and human life. Taught using world food, agricultural and gardening examples. (Gen.Ed. BS)
STOCKSCH	101	Insects & Related Forms	Inclusive	The goal of this course is to introduce students to the world of insects in order to gain a better appreciation for the role insects play in the scheme of life. The course explores the historical and current interactions between humans and insects to appreciate the importance of insects in human well being, including beneficial insects and iconic species. It also seeks to understand the role of insects in nature, and to explore the science of entomology. Major focus will be on insect identification, reproduction, life cycles, ecology, evolution, biodiversity, economic impact, and conservation.
STOCKSCH	104	Plant Nutrients	Inclusive	Functions of mineral nutrients in plants, effects of mineral deficiencies, and sources of these nutrients to prevent or alleviate deficiencies in crop production.
STOCKSCH	105	Soils	Inclusive	Interrelationship of soils and higher plants. Physical, chemical, and biological properties of soils. Practical approach to current problems through basic soil principles. Prerequisite: some knowledge of chemistry. (Gen.Ed. BS)
STOCKSCH	108	Intro Botany	Inclusive	This introductory botany course covers the unique features of plants, how they function, how they are categorized, and how they fit into the ecosystem. Topics include classification of plants, analysis of cell structure and various plant tissues and organs, and study of sexual and asexual reproduction as well as structure and function of plant systems. In addition, students will develop a basic understanding of the processes of photosynthesis and cellular respiration.
STOCKSCH	109	Insects of Ornamentals	Inclusive	The recognition, biology, and control of major insect and mite pests attacking shade trees and woody ornamentals in the northeastern U.S. Emphasis on techniques and knowledge useful to the professional in tree care. Formerly ENTOMOL 105.
STOCKSCH	111	Introductory Plant Pathology	Inclusive	Applied introduction to plant pathology in horticultural crops. Identification, description, and management of diseases in modern horticultural production. Chemical, biological, cultural, and genetic controls and their integration
STOCKSCH	113	Intro Plant Pathology Lab	Inclusive	A field laboratory on the diagnosis and management of the health problems of woody plants. Students learn to recognize the major plant diseases of trees and shrubs using plant materials on campus. Disease management options presented on an individual basis in a clinical context.
STOCKSCH	118	Intro/SustainableFood&Farming	Focused	Highly interactive and participatory introduction to the Sustainable Food and Farming major, focused on academic preparation, internships and careers. Especially for first year students and transfers into the major.
STOCKSCH	120	Organic Farming and Gardening	Inclusive	Introduction to principles of soil fertility and crop management by organic procedures which are contrasted and evaluated against conventional chemical methods of farming. A science course. (Gen. Ed. BS)

STOCKSCH	170	Pesticide Certification	Inclusive	Independent preparation for the state pesticide certification examination and licensure. The State Pesticide Exam Study Manual is used and available for purchase either online or at the UMass Extension Bookstore. Students must apply to take the exam; applications must be submitted by the deadline date (one week prior to the exam). Examinations are given at various times throughout the state.
STOCKSCH	171	Plagues, Food and People: Eco	Focused	The ecology of major diseases related to food, from ergotism and the Salem Witch Trials to the Irish Potato famine to celiac disease and diabetes. How people, microbes and farming change our health and the environment. (Gen. Ed. BS, DG).
STOCKSCH	182	Principles of Pesticide Mgt	Inclusive	Topics include state and federal pesticide laws and regulations, pesticides and the environment, handling and storage of pesticides, classes and formulations of pesticides, safety and application equipment, understanding the pesticide label, toxicity, proper calculation and mixing of pesticides, and history of pesticide use. Includes preparation for the Massachusetts Pesticide Core Examination. Formerly listed as ENTOMOL 182
STOCKSCH	186	Intro to Permaculture	Focused	A foundation in permaculture history, ethics, principles, design process, and practical applications, rooted in the observation of natural systems. By observing key ecological relationships, we can mimic and apply these beneficial relationships in the design of systems that serve humans while helping to restore the natural world. This course trains students as critical thinkers, observers, and analysts of the world(s) around them, and then goes on to provide students with the tools needed to design for inspired and positive change.
STOCKSCH	198P	Permaculture Gardening at UMass	Focused	In this hands-on class students will learn about permaculture basics while maintaining our on-campus permaculture demonstration gardens.
STOCKSCH	200	Plant Propagation	Inclusive	With lab. The basic principles and techniques for propagating plants by both sexual and asexual means, including seeds, cuttings, bulbs, and tissue culture. The hormonal and physiological factors affecting rooting, seed dormancy, grafting, budding, and layering. Prerequisite: BIOLOGY 103 or equivalent.
STOCKSCH	230	Intro Turfgrass Mgt	Inclusive	With lab. Basic principles of selecting and managing turfgrass for home lawns, parks, golf courses, and other turf areas. Topics include: climatic adaption, grass identification, establishment practices, pest control, fertility, environmental stresses, etc
STOCKSCH	234	Irrigation & Drainage	Inclusive	With lab. Principles of hydraulics and system design for turf and landscapes with an emphasis on golf courses. Irrigation systems, equipment performance, installation practices, operation procedures and troubleshooting. Drainage of sports turf also included
STOCKSCH	235	Pruning Fruit Crops	Inclusive	Theory and practice of pruning deciduous fruit plants/trees. Practical, hands-on experience is the focus of the class.
STOCKSCH	240	Applied Calc in Turf Managemnt	Inclusive	Calculations involving area and volume measurements, fertilizer and pesticide requirements, cost analysis, seed calculations, irrigation calculations, and calculations relating to spreader and sprayer calibrations.
STOCKSCH	255	Herbaceous Plants	Inclusive	Study and identification of herbaceous plants; their uses as ornamental plants for home, park, and business.
STOCKSCH	258	Urban Argriculture	Focused	Students will learn about innovative production methods and critical social, economic, and environmental dimensions of modern day urban agriculture. Scholarly articles and videos, a custom library research guide, and significant research support from the instructor provide a strong foundation for students to investigate important topics and evaluate the performance of real life urban farm systems. The course will consist of lectures, readings, videos, and research assignments in which students critically assess major strengths, weaknesses and issues of 21st century urban farm systems.
STOCKSCH	265	Sustainable Agriculture	Focused	Exploration of ethical, practical and scientific aspects of agricultural sustainability including economic, social and environmental impacts of food and farming. Uses systems thinking tools to compare industrial and ecological agriculture
STOCKSCH	268	Small Farm Husbandry: Meat	Inclusive	This course is a farmer's perspective on the sustainable management of cows, sheep and goats on a small farm. It provides students with a clear understanding of how to think through the planning and management of cows, sheep and goats for meat production. All aspects from breeding to marketing will be addressed. Students will gain a rudimentary plan on how to incorporate ruminants into their small farm plan.
STOCKSCH	269	Small Farm Husbandry-Pigs&Poul	Inclusive	This course is a farmer's perspective on the management, production and marketing of poultry and pigs on a small farm. This course will address the advantages of having pigs and poultry and will review basic care, processing options, regulations and marketing. The course will be structured around lectures, farm visits, guest lectures and acquiring hands on skills. At the end of this course, students will be able to incorporate pigs and poultry as an integral part of their small farm plan.
STOCKSCH	275	Turfgrass Physiology & Ecology	Inclusive	First half of the semester: an introduction to basic concepts in agricultural chemistry as related to the growth and culture of turf grasses. Second half: the overall growth and development of grasses including such areas as soil fertility and mineral nutrition. Prerequisite: PLNTSOIL 230.
STOCKSCH	286	Permaculture Design & PRACTICE	Inclusive	This course includes in-class lectures, field trips, design studio and a hands-on field component, to offer students a deepened and applied practice in permaculture design process and techniques. The course culminates with students developing a permaculture design and community engagement process.
STOCKSCH	298	Practicum	Inclusive	Pre-professional work experience related to some area of the equine, food crops, and green industries.
STOCKSCH	300	Deciduous Orchards Sci	Inclusive	Principles and practices involved in the establishment and management of deciduous orchards. Basic botany course suggested.

STOCKSCH	310	Principles of Weed Management	Inclusive	With lab. History of weed control; importance of weeds and their relationship to people and the environment; ecology of weeds, competition, persistence and survival mechanisms; reproduction, seed germination, and dormancy; methods of weed control - cultural, biological, chemical, and integrated pest management strategies; classification of herbicides and their selectivity; soil factors affecting herbicide performance, persistence and degradation; application equipment and calibration of sprayer
STOCKSCH	320	Organic Vegetable Productn	Inclusive	Students will learn organic insect, disease, and weed control, greenhouse production and construction, irrigation practices, planting and fertility, harvesting and marketing techniques, as well as how to manage money, people and natural resources.
STOCKSCH	326	Insect Biology	Inclusive	With optional lab and field trips. How insects solve their problems of maintenance, survival, reproduction, etc., and how entomologists apply this knowledge in managing them. Other topics include insect evolution, plant and insect interactions, biodiversity and conservation of insects, behavior, and insect pest management. Emphasis on various insect models (e.g., <i>Drosophila</i>) as they relate to major research in biology. Formerly ENTOMOL 326.
STOCKSCH	350	Sustainable Soil & Crop Mgmt	Focused	Maintenance and enhancement of long-term productivity and sustainability of soil in food and feed production. Students will gain an integrated knowledge of soil and crop influences on cropping systems. The lab includes several farm visits, farmers and students presentations.
STOCKSCH	355	Community Food Systems	Focused	This course examines the movement of food from seed to table. Participants explore local and global food systems, and specific food related issues that impact health of communities. Among the topics included are: examining the economic and political decisions that frame our food chain, direct marketing, commercial agriculture, processing, food justice, hunger, health, food security, peak oil, school food systems and school gardens, Community Supported Agriculture, farmers' markets, small scale farming and homesteading. At the center of this course is the examination of the opportunities and challenges required in making community food projects that create real lasting systems change. Community Food Systems requires participants to be motivated to develop meaningful projects in the community.
STOCKSCH	360	Landscape Plant Production	Inclusive	With lab. Cultural practices of field and container production; how these practices and environmental factors influence nursery crop growth and development. Topics include: site selection, planting and spacing, mineral nutrition, harvesting, irrigation practices, pest management, and overwintering. Basic economic management of nursery crops production and marketing reviewed. Prerequisites: PLNTSOIL 105; ENVIRDES 335 highly recommended.
STOCKSCH	370	Tropical Agriculture	Inclusive	Tropical regions of the world, their environment and classification; influence of climate, population, and socio-economic conditions on agriculture; major crops and cropping systems of sub-humid tropics; introduction to dry land agriculture; importance of rainfall and irrigation on productivity; green revolution; desertification; present and future research needs of region, and state of agricultural technology.
STOCKSCH	376	Student Farm Management I	Focused	In this course students will formulate a complete production plan for a 20 acre organic vegetable farm through the comprehension of introduced topics and activity. Topics covered in detail include small farm business development, production planning for established markets, compliance with farm certifications for organic production and food safety regulations, soil health and fertility and, methods for plant production and crop maintenance.
STOCKSCH	379	Agricultural Systems Thinking	Focused	Systems thinking is a way of understanding complex real-world situations such as those often encountered in sustainable food and farming careers. Systems tools are needed to complement more traditional discipline-focused scientific approaches when a problem under study: 1) is complex; 2) involves multiple relationships; and/or 3) involves human decision-making. Students will learn systems tools for unraveling complexity.
STOCKSCH	384	Intro to Plant Physiology	Inclusive	This course will introduce students to fundamental concepts of physiological processes governing plant growth and development, from cell to whole plant responses. The course blends concepts from traditional plant physiology and recent research advances to help provide insight on plant growth and function under various environmental conditions.
STOCKSCH	387	Global Food Systems	Focused	This course covers social aspects of the agri-food systems as well as the political economy of food, agriculture and sustainability. Students are also encouraged to examine the cultural, ecological and economic implications of the ways food is perceived, produced and consumed. Topics range from rural development to the controversy of GMOs, from land conservation to the politics of globalization, from local food systems to global food justice.
STOCKSCH	390N	Ecosystem Processes and Nutrient Cycling	Inclusive	Ecosystems are defined by the interactions among the plants, animals, microorganisms and abiotic, environmental features that affect them. This course will cover the flows of energy, carbon, and nutrients within ecosystems, tracing the key processes that define ecosystem function and stability. Through the course, we will develop the connections between organisms, abiotic factors, ecosystem processes, and socio-economic factors. In particular, we will focus on carbon and nutrient cycling in soils, sediments, wetland and rivers. We will also learn quantitative tools to assess and predict the impact of global environmental change on nutrient cycles in these ecosystems at local, regional and global scales.
STOCKSCH	476	Student Farm Management II	Focused	In this class students will learn the practical application of harvesting and marketing techniques used for the sale of organic vegetable crops. Students will complete a financial analysis of the current growing season and make recommendations for the next production cycle.

STOCKSCH	485	Sust Food & Farming Capstone	Focused	This course offers seniors an opportunity to study a current sustainable food and/or farming problem, review the literature related to the problem, develop management tactics and strategies to address the problem, and communicate their conclusions with others in a professional setting.
SUSTCOMM	125	Global Cities and Global Issues	Focused	Cities are dynamic organisms whose inhabitants require food, water, shelter, safety, commerce, leadership, and equity. For most people, the city can be a wonderful place to live in. For persons without privilege, the necessary goods and services that are required for a quality life may be lacking. In this course, students will note that every village, town, city, or mega-city has some type of challenge. By examining cities within a global context, students should recognize that any challenge can also be viewed as an opportunity for implementing positive change. As such, we examine global cities in order to ask a central question: what does it mean to be an active and engaged citizen living in any city, town, or village?
SUSTCOMM	140	Awareness of the Visual Envir.	Inclusive	Examines physical elements that compose a variety of visual environments including gardens and paintings; the cultural values underlying different types of American landscapes, from wilderness to cities; and the ways in which other cultures perceive, use, and create their own visual environments. (Gen.Ed. AT)
SUSTCOMM	205	Dynamics of Human Habitation	Inclusive	How the built environment is shaped by humans. The forces that go into developing human settlements, how these environments change, how different groups experience the environment, and how environmental designers work within this context. (Gen.Ed. I, DU)
SUSTCOMM	232	HistorySustainablecommunityDev	Focused	This course focuses on the historical and multicultural roots of the sustainability framework within a global context, critically examining interrelationship of ecology, economy, social equity, and community engagement as they have influenced divergent changes in quality of life across time and space, natural as well as human. (Gen. Ed. HS, DG)
SUSTCOMM	297G	Climate Change and Resilient Cities	Focused	In this course we will explore the challenges of a changing climate and investigate frameworks and tools to understand and address climate issues that impact people and their communities. Some cities have begun to incorporate climate change into their planning, taking action to confront their climate threats, reduce their vulnerability to climate-related impacts, and build resilience to extreme events. This online class will engage students, placing them at the center of the teaching process to ensure more effective learning. This dynamic class will use recent articles, movies, vibrant discussions and case studies to reveal planning and building resilience for people and in their communities.
SUSTCOMM	314	Writing in Community Development & Landscape Architecture	Inclusive	his course is intended to develop advanced writing and critical thinking skills for upper level students majoring in Landscape Architecture and Sustainable Community Development. Toward that goal, the course is structured around typical modes of writing that support this kind of work.
SUSTCOMM	333	Intro/CommunityEconDevelopment	Focused	Community economic development practice, especially in the urban context, within the sustainability framework?economy, equity and a pluralistic society, and the natural and built environment. Particular attention is given to understanding pluralistic and diverse communities' goals and methods for economic empowerment. (Gen. Ed. SB)
SUSTCOMM	335	Plants In Landscape	Inclusive	With lab. Introduction to 200 basic ornamental plants used in landscape architectural, horticultural, arboricultural, and other design uses; their identification, uses, and cultural requirements. Two weekly field trips around campus. Workbook with sketches required.
SUSTCOMM	397P	Planning Tools and Techniques	Focused	This class is for anyone working for or with local or regional governments. It is a hands-on examination of the tools and techniques communities use to get good things done: zoning and regulations, protection of natural areas and downtown parklets, tweaking transportation systems to serve all modes of travel, finding the money, managing planning functions, regulations, and everything in between. The class provides enough breadth and depth for planning and design professionals to use management, regulatory, investment, and policy interventions to improve the sustainability and quality of life in communities.
UWW	310	Exp Refl: Technological World	Inclusive	In this course non-traditional students will learn how to apply a selection of principles and frameworks of technology to their professional and life experience. This course focuses on the utilization of academic reference material to narrative accounts of a students experience with the goal of informing experience through interdisciplinary research. This class can serve as a prerequisite for UWW 370, Writing about Experience. Satisfies the Integrative Experience requirement for BA-UWWOC and B
WGSS	301	Theorizng Gender, Race & Power	Inclusive	Ways of analyzing and reflecting on current issues and controversies in feminist thought within an international context sensitive to class, race, and sexual power concerns. Topics may include work and international economic development, violence against women, racism, class and poverty, heterosexism, the social construction of gender, race and sexuality.

Sustainability Focused 83
Sustainability Inclusive 135
TOTAL 218

Graduate Courses

Subject	Catalog	Course Name	Sustainability Focused or Sustainability Inclusive	Course Description
AFROAM	652	Lit. of Harlem Renaissance	Inclusive	An intensive study of the literature and orature associated with the Harlem Renaissance, from the philosophical underpinnings supplied by Du Bois, Johnson, Locke, Garvey, and Randolph to the varied poetic visions of Hughes, Spencer, Brown, Cullen, and McKay to the fictional explorations of Toomer, Hurston, Fisher, Larsen, Fauset, and Thurman to the inspiration supplied by blues, jazz, and folklore of the African American tradition. Journals connected with the movement and the contributions of interested patrons such as Van Vechten, Cunard, and the Spingarns, and the relations of the Harlem Renaissance to other contemporary American literary currents (realism, naturalism, and modernism.)
AFROAM	691F	S-Black Pol Strg & Amer Pol S	Inclusive	This graduate seminar will introduce students to carceral studies, an interdisciplinary body of scholarship that takes the late twentieth century expansion of the U.S. prison system as its primary object of analysis. We will draw on a variety of sources - influential older articles and books, a growing literature on the prison system's historical development, and recent examinations of mass incarceration's "collateral consequences".
ANTHRO	546	Critical Knowledge Practices	Inclusive	This course is designed for people who are actively attempting to teach, conduct research, or do social change work in a way that engages and cultivates the knowledge of marginalized communities. Organized efforts of marginalized people to produce collective knowledge and to make their knowledge matter have bubbled up in and been transported to many places and spaces across the globe, from rural Chiapas to rural Denmark, Appalachia to the Bronx, Brazil to Tanzania, the World Bank to the World Social Forum. This course provides a structure for weekly learning and dialogue about the contexts and implications of such diverse critical knowledge practices, and invites students to consider how the course materials might inform their own practices.
ANTHRO	603	Community-Based Rsrch&Prac	Inclusive	This course will introduce students to theoretical frameworks, controversies, methods, and other topics of community-based research and practice in the anthropological tradition. Students will understand the history of applied anthropology, critiques of anthropology coming from the global south, and critical epistemological approaches of contemporary engaged researchers and practitioners. Through studies of theoretical debates as well as case studies of engaged research and scholarly practice, students will leave this class with a foundation for thinking about their own work with diverse community-engaged projects. In addition to historical and theoretical foundations, this course will provide an introductory framework for thinking about ethics, evaluation, communication of research, and professional development in the field. Finally, this course will introduce methods and tools of community-engaged and applied research and action.
ANTHRO	652	Indigenous Archaeologies	Inclusive	Hybrid seminar/service learning course examining theories, methods, and ethics related to Indigenous archaeology. Explores knowledge mobilizations methods to understand how research moves out of the academy in ways that are useful and meet community-defined needs. Prerequisite: Introduction to Archaeology of equivalent.
ANTHRO	597AG	ST- NAGPRA & Cultural Property	Inclusive	Course that explores the Native American Graves Protection and Repatriation Act and also considers other cultural property rights.
ANTHRO	597CM	ST- Community Based Methods	Inclusive	This course is organized around a series of methods workshops. These workshops are designed to develop and teach practical methods and skills that are useful for community engaged research and practice. Workshops are likely to include digital shorts, focus groups, grant writing, animated shorts, and more.
ARCH	520	Building Physics II	Focused	Studio and lecture. Energy conservation in contemporary residential construction. Emphasis on: energy efficient building materials, products and construction technology; alternative energy sources; passive solar design; environmental concerns, regulatory issues and building codes.
ARCH	530	Design Engagement	Inclusive	This seminar course provides several frameworks to explore critical architectural/spatial dialogues between a broad range of political, cultural and social contexts.
ARCH	591S	Sustainable&HighPerformceFacade	Focused	This course is intended to develop students' skills in designing sustainable, high-performance building facades and to broaden their knowledge about sustainable facade materials, design methods, systems, simulation and modeling tools, and facade performance. The course is structured to allow students to learn about the design methods and approaches, analyze properties of facades, and also incorporate specific design strategies to develop viable solutions for innovative facades. Students will learn about the advances in technology, sustainable and high-performance facades, building simulations and energy modeling, materials and their environmental impact, design and technical documentation.
ARCH	597AR	ST- Architecture and Race	Inclusive	The seminar will examine the theme of architecture and race within the context of the Americas and the Caribbean from the colonial era to the contemporary moment. The close examination of pertinent literature, history, and theory will help us to flesh out the ways that architecture narrates race, and vice versa.
ARCH	597D	ST-History&Theory:Preservation	Inclusive	Examines the history and theory of historic preservation, focusing on the United States, but with reference to traditions and practices in other countries. The class is designed to examine the largely untold history of the historic preservation movement in this country, and explore what laws, public policies and cultural attitudes shape how we preserve or do not preserve the built environment.
ARCH	597SB	ST-Sustainable Buildng Systems	Focused	Students will engage in a process of research and analysis of sustainable, energy efficient, and cost-effective building systems, and ultimately construct the building they have designed.
ARCH	597SD	ST-Sustainable Design	Focused	This course provides an introduction to the principles of sustainable design, exploring emerging definitions, methods, debates and challenges of how designers address the built environment.

ART-HIST	645	Architecture Now	Inclusive	Seminar. For architects, interior designers, and environmentalists. Discussion, reading and prepared reports on immediate problems of architects, clients and the public with regard to characteristics of architecture today. How we have arrived; where we may go. ART-HIST 642 and 643 advantageous.
ARTS-EXT	509	Greening/Nonprofit Arts Org	Focused	The arts have always been on the forefront of change, and never has change been more required than today. Whether your organization needs to cut its facility costs, be first in line for donation dollars, or serve as a 'green' model for your community, this class is for you. Determine which changes are easy to institute, provide the greatest cost saving, reduce your carbon footprint, and build credibility with your audiences. This class concludes with a final Green plan be tailored to the unique needs of your institution. All course work is applied to a case study organization, which may be your own organization or one where you volunteer. Students interested in sustainability are encouraged to enroll.
BCT	511	Clean Energy Corps	Inclusive	Students in the UMass Clean Energy Corps will work in teams with energy engineers and other staff of the UMass Clean Energy Extension to provide energy analysis and highlevel energy audits to Massachusetts cities and towns. We will collect and analyze municipal energy data, conduct walk through and instrumented energy audits on site for some facilities, and provide guidance to help municipalities cut their energy consumption by at least 20%.
BCT	520	Energy and Buildings	Inclusive	An introduction to building energy use focusing on the minimization of energy costs and dependence on non-renewable fossil fuel sources through the implementation both time honored passive design strategies and effective building envelope construction practices. The course also introduces students to the fundamentals of building system loads and building annual energy consumption calculations providing the necessary metricized evaluation of a building's energy and associated climate impacts.
BCT	521	Environmental Control Systems	Focused	This course builds on building technology fundamentals and focuses on the design, control, and optimization of environmental (heating, cooling, and plumbing) systems in buildings. Students will learn how to analyze, design, and optimize active heating and cooling technology, including plumbing systems, in both residential and commercial buildings. In the lab, students will gain expertise in building energy modeling (BEM) using eQuest.
BCT	540	Design of Wood Structures	Inclusive	Provides students with a fundamental understanding of design principles for design of individual wood components including beams, columns, trusses, wood/steel connections, and sheathing.
BCT	550	Construction Project Mgmt	Inclusive	Introduces concepts of project management for design and construction, including initiation, planning, implementation, monitoring, control, closeout, documentation, scope, budget and scheduling, teamwork and communication, contracts and negotiation, and risk management.
BCT	590S	Sust Bldg Sys & Construct Tech	Focused	Course covers principles and techniques of sustainable building systems, and green construction technology.
BCT	597BE	ST-Intro/Building Energy Model	Inclusive	Students are introduced to sustainable concepts and technical designs for the whole building energy simulation. Students will learn to use the energy modeling software eQUEST, underlying principles of energy modeling, and modeling methodology. Students will use parametric analysis to assess energy conservation measure (ECMs) to see how design alternatives can reduce energy use. The conceptual aspects of the course will explain the significance of these elements and how they interact with a model, independent of what software is used. In addition, the course will cover the LEED methods, energy code compliance and utility incentive programs.
BCT	597N	ST-LegalAspects/Arch,Engin,Con	Inclusive	Legal issues arising from design and construction services, with a practical focus on risk management and liability awareness. Topical areas include basic legal doctrines, contract documents, contract administration, liens & bonds, claims, professional liability, human resources, legal evidence & recordkeeping, and dispute resolution. The course will also touch on the special legal challenges presented by technological, scientific, and cultural developments including sustainability, BIM/VDC, mass timber, automation, and climate change.
BIOLOGY	514	Population Genetics	Inclusive	This course focuses on the processes affecting the distribution of genetic variation in populations of organisms, through space and time. The processes studied are the ones that operate during evolutionary change. Topics covered will include the Hardy-Weinberg principle, gene flow, genetic drift, recombination and linkage disequilibrium, natural selection, the effect of mating systems on diversity, and the neutral theory of evolution. Examples illustrating key concepts will be drawn from various kingdoms of life. The course will consist of lectures and in class discussions. With Biology 494LI, this course satisfies the Integrative Experience requirement for BS-Biol majors. Prerequisites: Biology 280 or 283, plus Math 127 or 128 or Statistics 111 or 240 or ResEcon 211 or 212.
CE-ENGIN	509	Transportation System Analysis	Inclusive	Introduction to transportation systems analysis and modeling as applied to the urban transportation planning process, multiple transportation modes, and the larger metropolitan environment. Prerequisite: CE-ENGIN 310.
CE-ENGIN	516	Transportation Design	Inclusive	Highway location and geometric design principles for streets and highways with emphasis on roadway safety. Includes state-of-the-art design policies and current research findings. AutoCAD and transportation design computer software used for class assignments and the class project. Students enrolled in CE-ENGIN 516 will work in design teams on transportation design projects with an emphasis on creative design and problem solving through transportation systems management techniques.
CE-ENGIN	518	Intelligent Transportation Sys	Inclusive	A review of intelligent transportation systems, technologies and user services with an emphasis on the operation of advanced public transportation systems (APTS) and technologies including wire and wireless communication, sensors, automated vehicle location, information processing and other technological applications; user services include traffic signal priority control, en-route and pre-trip traveler information, electronic payment, and management and operations as they pertain to public transit and paratransit services in large metropolitan areas as well as in small urban and rural communities. Prerequisite: CE-ENGIN 310.
CE-ENGIN	577	Surface Water Quality Modeling	Inclusive	Evaluation and control of water quality in streams, lakes, and estuaries. Mathematical analyses of patterns of water movement and their relation to water quality. Total Maximum Daily Load (TMDL) allocation design.

CE-ENGIN	597J	ST-Comp Methods/EnvironmtEngin	Focused	This course provides an introduction to computational techniques that are applicable to environmental problems. The students are expected to attain hands-on experience with numerical and statistical programming tools and learn how to perform a series of analysis and visualization tasks. Moreover, cloud-based and massively parallel technologies will be introduced as well as fundamental computational concepts and abstractions.
CE-ENGIN	597N	ST-Env Nanoscience & Nanotech	Focused	This course explores the potential environmental and health impacts of nanoscience and nanotechnology. It covers topics such as: the fate and transport of nanomaterials in the environment, state-of-the-art techniques for the characterization of nanomaterials, and new methods for developing nanomaterials with less environmental risk.
CE-ENGIN	597S	ST-Transportation Sustainably	Focused	This course will cover concepts of sustainable transportation management strategies and policies. Among other topics, it will cover: life-cycle assessment for transportation infrastructure, vehicle emission estimation models, alternative fuel vehicles, non-motorized modes, and transit preferential treatments.
CE-ENGIN	597U	ST-WaterPlanning/ClimateChange	Focused	Interdisciplinary course on sustainable water planning in the context of climate change.
CE-ENGIN	597W	ST- Water Res Engin & Sustain	Focused	Methods for sustaining natural hydrologic conditions and controlling flooding in land development. Characteristics of precipitation and watersheds. Peak discharge, hydrograph and flood routing prediction. Design of drainage structures, detention ponds, and innovative water management techniques.
CE-ENGIN	662	Water Resource Systems Analysis	Inclusive	Application of systems analysis techniques, including mathematical programming, uncertainty analysis and economic analysis, the analysis of water resource problems. Topics include water storage, supply, conveyance, treatment, control and quality management.
CE-ENGIN	692A	Environmental Engineering Seminar	Inclusive	Presentations by the graduate student of selected current literature and research. Visiting lecturers.
CE-ENGIN	695A	Transportation	Inclusive	Visiting lecturers. Research presentations by graduate students and faculty. Discussion of current transportation topics.
CHEM-ENG	555	Concpt Energy Conversion	Inclusive	Current and future energy conversion problems, the latter involving the use of heavy oils, coal, oil shale, etc., as energy sources. Fundamentals of catalysis and relation of the application of these fundamental concepts to developing modern catalytic processes. Prerequisite: Senior standing or graduate standing in Chemical Engineering or Chemistry, or consent of instructor.
COMM	794CC	S-Consumer Culture	Inclusive	The notion that contemporary times are characterized in part by a "consumer culture" permeates many vernacular as well as scholarly analyses. In this course we will examine what people mean by the term "consumer culture" and what particular kinds of social arrangements and ideologies this term attempts to capture for analysis or critique. We will aim for empirical and theoretical comparison across historical, cross-cultural, and disciplinary perspectives. Topics that will be considered include: consumerism and/as citizenship, media and promotional culture, globalization of consumerism, consumption and identity, ritual and consumption, and the commercialization of ostensibly non-market spheres. Students will undertake original research as one of the requirements for the course.
COMM	797N	ST-Theor/Interdisciplinarity	Inclusive	This seminar aims to explore the generative possibilities and challenges of disciplinary border-crossing. How can the humanities and arts illuminate and complicate the social, natural, and physical sciences (and vice versa)? Why and how have such divisions been constructed and enforced? Integrating collaborative methods and dialogism, the course format will discussion of diverse readings and case studies; exploratory and experimental individual and group projects; and seminar visits by faculty across specializations, fields, disciplines, departments, and colleges. Final course projects are fully customizable to student interests and needs. Our course readings, discussions, and activities -- while grounded in academic theory, research, and pedagogy -- will also necessarily extend to other forms of creative application, praxis, engagement, and transformational scholarly activity (e.g., artistic production, curation, criticism, activism). Informed by cultural studies, poststructuralism, aesthetics, intellectual history, postcolonial theory, intersectionality, perception psychology, debates in academic journalism, and more, the course readings will enable us to examine the conceptualization and frameworks of interdisciplinarity (and related terms and tropes such as multidisciplinary, transdisciplinarity, postdisciplinarity, undisciplined knowledge, etc.) through investigations of the following: 1) the historical foundations and contestations of academic institutions, disciplines, and canonicity; 2) insider/outsider dialectics and liminality; 3) questions of epistemology, meta-cognition, taxonomy, and knowledge formation; and 4) initiatives and reading strategies that facilitate mutual intelligibility.
COMP-LIT	691RS	S-Race,Gender&Sexuality/Transl	Inclusive	This course takes a critical look at issues of race, gender, and sexuality both in translated texts and in the translation profession. Readings will include: translation studies scholarship addressing race, gender, and sexuality; example translations dealing with these issues; and scholarship from critical race and ethnic studies and gender and sexuality studies. The objectives of the course include developing a reflective, ethical practice for translating discourse around race, gender, and sexuality as well as developing strategies to address the marginalization of certain identities in the profession (queering translation, combatting pay inequity for women translators, increasing the number of domestic translators of color, etc.). Students will prepare a critical essay that can be developed into an article or dissertation chapter; or a translation with a critical reflection that can be submitted for publication.
COMPSCI	532	Systems for Data Science	Inclusive	In this course, students will learn the fundamentals behind large-scale systems in the context of data science. We will cover the issues involved in scaling up (to many processors) and out (to many nodes) parallelism in order to perform fast analyses on large datasets. These include locality and data representation, concurrency, distributed databases and systems, performance analysis and understanding. We will explore the details of existing and emerging data science platforms, including MapReduce-Hadoop, Spark, and more.
ECO	601	Research Concepts	Inclusive	Introduction to the research process in the natural resources sciences. Focus on research philosophy, concepts, and design, progressing from development of hypotheses, questions, and proposals, to grants and budgeting, and delivery of such research products as reports, publications, and presentations.

ECO	602	Analysis of Environmental Data	Focused	This course provides students with an understanding of basic statistical concepts critical to the proper use and understanding of statistics in ecology and conservation science and prepares students for subsequent ECO courses in ecological modeling. The lecture covers foundational concepts in statistical modeling (emphasis is on conceptual underpinnings of statistics not methodology, with a focus on defining statistical models).
ECO	605	UrbanForsts:Struct,Funct,Value	Inclusive	This course introduces concepts related to the management of urbanized landscapes, focusing on what comprises the urban forest, its function as a natural system and the value of urban forests as an environmental and social catalyst. Examination of what makes up the urban forest, how these components function and the importance of sustainable urban natural landscapes will be undertaken
ECO	622	Conservation Biology	Focused	Conservation biology emerged roughly 40 years ago as a mission oriented discipline, engaged in scholarly scientific inquiry, addressing the problems of biodiversity loss and environmental degradation. It is an inherently synthetic and interdisciplinary field, founded largely on basic principles from ecology and environmental management, but strongly dependent on the integration of social and natural science approaches. In this class, we will examine the state of conservation science today: how the field is changing, new insights from current literature, and competing visions for the future. We will aim to keep the discussions grounded in real world problems through case studies and problem solving. It will provide the participants with exposure to key tools in the conservation practitioners' toolkit. Participants are also encouraged to bring examples their own research and work life into the discussions.
ECO	636	Applied Ecological Statistics	Inclusive	Intermediate statistics illustrated using examples from ecology. Topics include ANOVA, linear regression (simple and multiple), correlation, logistic regression, contingency tables and nonparametric methods. Techniques discussed in lectures and applied in laboratories.
ECO	645	Urban Eco,Evolution & Behavior	Inclusive	This course introduces conceptual and technical aspects of whole building energy simulation. Students will learn to use the energy modeling software eQUEST, underlying principles of energy modeling, and the ASHRAE 90.1 Appendix G modeling methodology. The technical aspects of this course will include using the "Wizard" and "Detailed" sides of eQUEST, to create building geometry, assemblies, internal loads, schedules, and HVAC systems. In addition, students will use parametric analysis to assess energy conservation measure (ECMs) to see how design alternatives can reduce energy use. The conceptual aspects of the course will explain the significance of these elements and how they interact with a model, independent of what software is used. In addition, the course will cover the ASHRAE 90.1 Appendix G modeling methodology, which is used for the LEED "Optimize Energy Performance" Credit, energy code compliance and utility incentive programs.
ECO	675	Eco Econ & Sustainability	Focused	A seminar course examines advance topics in ecological economics and sustainability; and (ii) to specialize in selected topics through in-depth review and publishable reporting.
ECO	768	Wetlands Ecology &Conservation	Inclusive	This is a graduate course that meets with NRC 563 for lectures, with an additional 75-minute weekly discussion section. Students are given two journal articles to read and discuss each week. NRC 563 is a straightforward, 3-credit lecture course that covers wetlands ecology, policy, conservation and management. An ecosystems approach to the dynamics and ecology of wetlands includes both biotic (vegetation, wildlife) and abiotic (landforms, soils, hydrology, geochemical cycling) elements, as well as interactions among them. Also covered are the legal, political and economic aspects of wetlands, wetland classification and evaluation, and wetland management and conservation. Case studies focus on the ecology and conservation challenges for prairie pothole wetlands, the Everglades, bottomland hardwood forests of the Mississippi Alluvial Valley, and New England salt marshes. This course has no lab section (enrollment in this course can reach as many as 50), so there will be 1-2 optional field trips to provide opportunities for students to get out into the field.
ECO	690P	Public Engagement & Communicat	Inclusive	This course will provide students with a deeper understanding of various ways in which scientists can effectively engage and communicate with the public. Topics covered include models of public engagement, science-society interaction, and practical communication skills building.
ECO	691A	S-Current Res in Environ Conserv	Focused	Provides graduate students with a broad sampling of new and cutting-edge research related to environmental conservation to help foster critical thinking and provide a more expansive view of natural resources research. Seminars will be given by departmental faculty and faculty from other departments, both on campus and from other institutions. Relevant both to students who plan a research career and those on a more applied path.
ECO	691E	S-Eco Responses/Climate Change	Focused	This seminar will discuss recent and emerging topics of how climate change is impacting fish, wildlife and related natural resources. Students will become familiar with the latest literature and scientific approaches on ecological responses to climate change as well as management, conservation and adaptation strategies being implemented to decrease risk and vulnerability to climate and interactive stressors. Potential topics include climate niche, distribution and occupancy modeling
ECO	692C	S-SustainableBuildngSystemSem	Focused	The course serves as a dynamic sampling of the multiple disciplines necessary to create or modify the Built Environment. Discussions based on lectures presented by various educators, researchers, and practitioners; experts in their fields will provide students with a broadened perspective, which will help foster critical thinking and provide a more expansive view of the Built Environment.
ECO	692S	Readings in Sustainable Building Systems	Focused	Students in this course will read and discuss current publications that span the entire field of sustainable building systems. Regularly scheduled discussions will be led by each member of our graduate faculty. This course provides an overview of the breadth and an introduction to the depth of research in our field and serves as a primer for all our graduate students.
ECO	693E	S-Environmental Careers Sem	Focused	This seminar offers students an opportunity to explore environmental careers that are appropriate for students in environmental conservation, sustainability science, and related fields. We will meet weekly to work on the requested elements for the professional world after graduation, such as resumes, networking, mentoring, interview skills, and more. We will also examine top sectors and growing fields to help students in professional degree programs position themselves for their intended career.

ECO	697DL	ST-Sust Building & LEED Certif	Focused	The LEED Professional Credentials indicate professional excellence and a strong depth of knowledge as well as practical understanding of the LEED Rating Systems and how they apply to the high-performance design and construction of the built environment. Preparing to take the LEED Green Associate and AP exams requires more than taking one course; it is a process that involves acquisition of disciplinary knowledge and understanding of complex building and environmental systems.
ECO	697FS	Foundations of Sustainable Food Systems	Focused	In this course, students will gain an interdisciplinary knowledge of local, national and global food systems through experiential learning and dialogue-based inquiry. Students will learn about the social, ecological and economic impacts of the industrial food system while exploring alternative models for agriculture and equitable food distribution. Students will evaluate the internal and external drivers in every aspect of the food system, including, but not limited to: production, processing, distribution and waste management. This course will prepare students to contribute to the overall sustainability of the communities in which they live and work while strengthening their skill set to work as professionals in the growing field of sustainable food systems.
ECO	697PS	S-Perspectives on Sustainability	Focused	Perspectives on Sustainability is the foundational course introducing the field of sustainability science. The course focuses on interdisciplinary aspects of the field, drawing on multiple disciplines to address current societal challenges. The course provides a foundation in historical and modern thinkers in the field; an introduction to sectors that are commonly pursued by sustainability professional (food systems, water, energy, urban environment, transportation, waste systems); and training in skills that are necessary to be successful as a practitioner in the sustainability field. We will develop skills through several hands-on projects that build on one another throughout the semester, using real world examples in various sectors as the basis for our learning.
ECO	697SV	Design, Implementation and Analysis of Surveys of People	Inclusive	At the end of this course, students should have all of the basic skills to successfully design, implement, and analyze a survey. Although the content of the course will have a natural resources focus, the principles will be applicable to all surveys of people. After an overview of the survey process, the class will discuss the different types of surveys and their relative strengths and weaknesses. Next, the class will study the Dillman method for designing surveys. The practical elements of implementing a survey, including the Internal Review Board process, will be discussed. Data processing, storage, and validation will be covered. Finally, both basic and advanced analytical techniques, using the R statistical package, will be investigated.
ECO	697WD	ST- Offshore Wind Energy : Environmental Impacts, Siting, Permitting and Stakeholder Engagement	Inclusive	Before construction begins on an offshore wind farm, there is a rigorous process of assessing ecological and environmental impacts, obtaining environmental and legal permits, and engaging with stakeholders. This process is expensive, and vital to the successful installation of an offshore wind farm; and indeed, critical to the success of this industry in the United States. A thorough understanding of these procedures is essential, to avoid unnecessary impacts to people and wildlife, and to minimize costly delays. This course is designed to guide the student through this process, from the time the potential offshore wind development site has been identified, until construction is complete and the wind farm is operational. This course is appropriate for students interested in environmental science, ecological protection, government permitting, and interactions with the public. Students will leave the course with skills that can be immediately applied to the workforce.
ECO	698S	Sustainability Science Professional Experience	Focused	Students gain real-world training through a series of professional development opportunities relevant to the sustainability field and the green workforce.
ECO	797P	ST-Population&CommunityEcology	Inclusive	This advanced graduate course examines the interactions between organisms, the dynamics of populations and the environment. It deals with animal, plant and pathogenic organisms, and the structuring and function of communities and aims to develop both a quantitative and qualitative understanding of interactions between organisms and their consequences. Students will learn how and why populations grow in order to make better predictions about future changes in population sizes and growth rates. This is essential for answering questions in areas such as biodiversity conservation and human population growth (e.g., how fast will the human population grow, and what does that mean for climate change, resource use, and biodiversity).
ECON	568	Practice/DvlpmntPly&IntlCo	Inclusive	This course exposes students to the practice of development policy and international cooperation and how they affect policy design and implementation in developing countries. It will discuss the role of both academic thinking and operational experience in guiding development policy and cooperation over time; examine key instruments of development assistance and cooperation, their effectiveness and limitations; and discuss agenda setting processes in global strategies and the role played by key s
ECON	700	Microeconomics Coordination and Conflict	Focused	Introduces microeconomic concepts relevant to the coordination of social interactions with particular attention to conflict, cooperation, collective action, competition, and coordination failures.
ECON	766	Econ Dev-Policy Issues	Inclusive	Policy decisions involved in efforts of underdeveloped countries to induce development.
ECON	797P	Political Economics and Public Health	Focused	This course offers a survey of the Political Economy of Public Health. This is an emergent research stream that seeks to understand the distal political and economic causes of population health, and represents a return to the origins of public health, captured by Rudolph Virchow's famous dictum: "Medicine is a social science, and politics is nothing more than medicine on a grand scale." It extends the social determinants of disease tradition, making it more dynamic and moving further upstream. Students will be taught various topics in heterodox economics and comparative political economy that are necessary to understand the patterning of health outcomes at a societal level. This course will focus primarily on the advanced market economies. The first part of the course will cover capitalist development and population health. Topics will include: (1) Capitalist development and life expectancy; (2) Ideology, individualism, and public health; (3) Class, race, and health inequalities; (4) The welfare state and health; (5) Financial crisis, austerity and health; (6) Deindustrialization and health; and (7) Mass incarceration and health. The second part will study corporate power, and examine corporations as disease vectors. We will consider corporations that produce and market tobacco, alcohol, sugary drinks and foods, automobiles, guns, and prescription drugs, including opioids. The last part of the class will cover healthcare and medicine, examining health insurance and drug innovation and pricing.

ECON	797T	ST-Pol Econ of Agrarian Reform	Inclusive	This course will mainly cover the political economy of rural change as societies transform from pre-industrial forms to more industrial. In addition it will consider the state of agricultural class relations worldwide in the context of globalization. During the course of the semester we will compare the classical transition as described by Karl Marx in Capital to more contemporaneous changes occurring in the world. We shall also consider how these changes differ in countries that elected a socialist path of development as compared to a capitalist one. In examining this transition we shall be particularly interested in examining issues of class differentiation, the various "modes of production" debates that took place worldwide, the relationship between productivity and size of holding, changes in the distribution of assets, the creation of wage labour, gender roles, institutional changes and the various ways that accumulation takes place. We shall also consider the role of the state in mid-wiving the transition and in trying to manage the tensions created by this process. The course will end by examining whether the classical agrarian question exists in a globalized world.
EDUC	610	Investigating Science Classrms	Inclusive	The course fosters meaningful discussions about the nature and practice of elementary and middle school science education and enables teachers to identify elements of inquiry, conduct investigations, and implement scientific inquiry in their classrooms. Graduate level course for practicing elementary and middle school teachers.
EDUC	623	Project Planning & Proposal Dv	Inclusive	For those who are or plan to be program personnel or consultants in nonformal education and human service programs. Planning and proposal development and how to improve its contribution to program success.
EHS	565	Environmental Health Practices	Inclusive	Concepts of control methods used by environmental health and engineering practitioners. Topics include water, wastewater, solid wastes, food sanitation, vector control, housing, and accident control measures.
EHS	562	Air Quality and Assessment	Focused	Air pollution is presented as a major public health problem. Topics include air pollutant sources and atmospheric transformations, meteorology, health and economic effects, climate change, sampling and analysis, indoor/outdoor exposures, control technology and air quality criteria (including air quality standards, policy and regulations).
EHS	666	Env. & Occupational Toxicology	Focused	The toxicological activity of toxic substances found in the general environment and in industrial settings. Topics include biochemical mechanisms for absorption, excretion, tissue distribution, metabolic transformations, and conjugations; comparative metabolism of animal species; special applications to the toxicology of heavy metals, pesticides, and other industrial chemicals.
EHS	671	Risk Assessment and Mngmnt	Inclusive	This course provides an introduction to the field of multi-media (e.g., air, water, soil, food) environmental health risk assessment and how society incorporates risk assessment findings into regulations and policy.
ENVIRSCI	575	Environmental Soil Chemistry	Focused	The course describes fundamental chemical concepts/processes in soils such as precipitation/dissolution, ion exchange, redox reactions, partitioning and adsorption, ion speciation, and the nature of soil minerals and organic matter. The students will learn about land-use patterns and impact that drive changes and soil processes. These concepts and computer models are used to examine some current environmental, agricultural, societal, economic, and engineering problems. The course also addresses how the chemical processes affect fate, transport, and availability of conventional and contaminants of emerging concerns (e.g., antibiotics and nanomaterials) and nutrients in soils and other related terrestrial environments.
ENVIRSCI	564H	Environmntl Soil Science, Hons	Inclusive	Contact instructor for details.
FOOD-SCI	561	Food Processing	Focused	This course will introduce students to the fundamentals of product development as well as current topics and concerns in the food industry. Student teams will develop a food product from concept to production. This project will incorporate the student's knowledge in chemistry, engineering, microbiology as well as social sciences. A market analysis will involve investigation of current food movements and health concerns. Students will also learn basic engineering concepts in order to produce their product in a pilot scale-plant.
FOOD-SCI	590A	Food Science Policy	Inclusive	To understand the basis of food policy and the role science has in its development. This course covers food law policy and regulations and how science might be better used in formulating current and future policies.
GEO-SCI	510	Natural Hazards	Inclusive	Natural hazards as interaction of extreme geophysical events and the spatial organization of human activities. Topics include earthquakes, floods, drought, landslides, volcanic eruptions, hurricanes, and tornadoes. Policy and economic implications of hazards, risk assessment, hazard mapping. Some prior experience of scientific subjects recommended.
GEO-SCI	517	Sedimentary Geochemistry	Inclusive	With lab, field trip. Applications of geochemistry to the study of modern sedimentary environments and sedimentary rocks. Geochemistry of carbonates and evaporites. Use of stable isotopes in paleoenvironmental analysis. Oxidation-reduction processes and their significance for iron formations. Geochemical transformations during burial of sedimentary sequences and the formation of petroleum. Prerequisite: GEO-SCI 445 or equivalent; college chemistry recommended.
GEO-SCI	539	Adv Geologic Mapping	Inclusive	Complete series of operations required for publication of a geological map: field location and drawing of contacts, collection and interpretation of field notes, data reduction, drafting, and methods of reproduction. Two afternoons per week in the field.
GEO-SCI	557	Coastal Processes	Inclusive	Processes that govern the movement of sediment, the shaping of coastal landforms, and the geologic evolution of coastlines. Course topics include basic principles for water waves, tidal and estuarine processes, and the geomorphic development of beach and barrier systems. Prerequisite: GEO-SCI 445 or permission from instructor; introductory calculus course recommended.
GEO-SCI	558	Paleoclimatology	Inclusive	Methods used in reconstructing climate before the period of instrumental records and their application in understanding late Quaternary climatic fluctuations. Topics include dating methods, ice core studies, palynology, ocean core studies, terrestrial geological and biological studies, dendroclimatology, and historical climatology. Prerequisites: Geo-Sci 354, 458.

GEO-SCI	573	Environmental Geophysics	Inclusive	Application of seismic, gravity, magnetic, and electrical methods used in geophysical exploration. Field techniques, data compilation, and basic interpretations used to support shallow subsurface studies and environmental or hydrologic programs. Integrate the human dimensions that impact the systems. Lectures, laboratory and field problems.
GEO-SCI	587	Hydrogeology	Inclusive	With lab. Basic principles of theoretical and practical hydrogeology. Topics include the hydrologic cycle, principles of groundwater flow, groundwater hydraulics, occurrence of groundwater in geologic materials, aquifer analysis, field methods, introduction to groundwater modeling, and chemistry of groundwater. Prerequisite: one year of geology; introductory calculus course recommended.
GEO-SCI	687	Adv Hydrogeology	Inclusive	Advanced groundwater hydrology and contaminant hydrogeology. Includes the application of field techniques, analysis of field data, and use of analytical and numerical models in the investigation of groundwater problems. Introduction to Visual MODFLOW and other groundwater models, including development of conceptual models from geologic data, laying out grids handling boundaries, sources and sinks, transience, calibration and sensitivity. Prerequisite: Geo-Sci 587.
GEO-SCI	787	Hydrogeology Seminar	Inclusive	Review and discussion of current research in hydrogeology, environmental soil and water sampling, groundwater chemistry, analytical and numerical modeling, isotope hydrology, fluid flow in fractured rock, surface and borehole geophysics, geostatistics, environmental monitoring and remediation, and related topics.
GEO-SCI	591CM	S-Intro/Climate&EnvironModeling	Focused	Graduate level introduction to climate change, the impacts of climate change, and human dimensions. Environmental modeling will be used to help understand and integrate the data.
GEO-SCI	595P	S-Diversity/Inclusion/Pedagogy	Inclusive	This seminar will review domain literature concerning best practices in diversity, inclusion, and pedagogy, while connecting these topics to workplace and classroom experiences. Starting with core literature and examples from geosciences, geology, geography and elsewhere, students will engage in critical discussion of how race, gender, class and other identities have been marginalized in these fields. Through conversations, reflections, and participatory actions, this course will explore current issues and consider how to create an equitable landscape moving forward.
GEO-SCI	691EC	Ecohydrology	Inclusive	Ecohydrology will provide a complete survey of the integrated systems of hydrogeology, ecosystems and habitats. It is my belief that much interesting science occurs at the interfaces and intersections between processes, environments, and disciplines. This course will provide a fundamental understanding of the processes and principles that link ecology and hydrology, then apply that knowledge to exploration of the plants, vertebrates and invertebrates that depend on water quantities and quality in specific ecosystems and to quantification of how these are affected by changes in hydrologic cycles and anthropomorphic alterations to their environments. This is not a straight lecture class! Active learning and student participation will be an essential component.
GEO-SCI	691GW	S-SurfaceWater-GroundwaterInter	Inclusive	The field of Hydrology has long separated the study of surface water (streams, lakes, etc.) from groundwater, despite the clear connection of these systems. Over the last two decades, surface water and groundwater have increasingly been viewed as a single resource, producing a myriad of new and exciting scientific work on the subject. The quantity and quality of surface water can affect the volume and chemistry of groundwater, and vice versa. Interactions between these are crucial to understanding the ecosystems that depend on them, the processes governing hydrologic systems, and effective resource assessment and management practices. In this course you will learn in-class and field-based techniques for the quantification of surface water - groundwater interactions, explore the scientific literature investigating the interfaces between disciplines encapsulated by hydrologic and geologic systems and ecosystems. The class will examine a current issue related to surface water - groundwater interactions, and collectively, will provide concrete recommendations for addressing the issue in a final report.
GEO-SCI	793E	S-Isotopes/EnvironmentalScienc	Inclusive	Stable and radiogenic isotope series are powerful tools across the spectrum of the environmental sciences. This seminar will address the fundamental and cutting edge literature discussing the analysis and application of isotopes in studies such as: (paleo)climatology, (paleo)ecology, (paleo)oceanography, (paleo)limnology, microbiology, and hydrogeology.
GEOGRAPH	604	Geographic Theory and Analysis	Inclusive	Advanced survey of the development of theoretical and analytical approaches in geography emphasizing philosophy of science and current approaches and methodologies. Practical discussions and exercises in framing research projects, and proposal, grant, and thesis writing. Students lead discussions in their areas of specialization. Primarily for entering graduate students in Geography.
GEOGRAPH	626	Remote Sensing & Image Intrprt	Inclusive	Focus on a range of concepts and techniques key to understanding how remote sensing data are acquired, displayed, restored, enhanced, and analyzed. Hands-on experience using the image processing software ITT ENVI.
GEOGRAPH	668	GIS and Spatial Analysis	Inclusive	Introduce the concepts and principles of GIS. Both theoretical and applied realms of GIS are emphasized in this course. Some important spatial analysis topics in GIS are also included.
GEOGRAPH	670	Urban Environmental History	Inclusive	Seminar on the analysis of contemporary urban development issues from a geographical perspective and survey of recently published work in the field. Topics include changing urban systems and structures, transportation, housing, and social and economic factors. Students carry out individual or group research projects.
GEOGRAPH	592B	S-GIS Seminar	Inclusive	Seminar on spatial analysis techniques and how they apply to the environmental, sustainability, and planning fields. Case studies of relevant regional and national examples that highlight the integration of science, socio-economic factors, and governance issues.
GEOGRAPH	592M	S-Computer Mapping	Inclusive	Mapping projects through the use of software mapping packages. Students select their own final projects
GEOGRAPH	593G	ST- Introduction to GIS	Inclusive	The goals of this course are to teach you basic GIS concepts such as spatial data sources and structures, projections and coordinate systems, geospatial analysis, cartographic modeling, and the integration of remote sensing and GIS. By the end of the course, students will be proficient in ESRI ArcGIS software.

GEOGRAPH	693C	Advanced Understanding of the Climate Crisis	Focused	This course is an advanced introduction to the political ecology of climate change, response, and justice. It provides an opportunity to engage in critical reading and discussion about the great moral, political, economic, and environmental challenge of our time. We will explore climate crisis narratives; mitigation, adaptation, and climate justice issues; policy and social/economic reform debates; and climate activism. Reading will range from IPCC reports to work by Bill McKibben, Naomi Klein, and Indigenous activists. There will be a final graduate student project.
GEOGRAPH	693W	S- WebGIS	Inclusive	Students in WebGIS will explore web-based applications in geographic information science. This course will focus on hands-on practice using and building web-based mapping and analysis platforms, including Google Maps, ArcGIS Online, Leaflet, and Open Street Map. Along with conceptual discussion of how the internet, web servers, and cloud-based GIS services function, students will create and host web services relevant to their coursework, research, or professional goals.
GEOGRAPH	694P	S-Political Geography	Inclusive	An analysis of how and why we organize the world into political territories and into geographically based political alliances and systems, and the consequences of this organization for people and environments. The first half of the course focuses on the practice of organizing the world into the bordered political units we know as nation-states. The second half focuses on the politics of development and the globalizing economy.
GEOGRAPH	697G	ST-Ggrphy,Policy & Environment	Focused	This is a mixed undergrad/grad class that examines the ways our lives, places and environments are organized by policies and law, and the underlying economic, cultural and political reasons we have shaped policies and laws in the ways we have. We examine the structures and background history of law and policy often taken for granted, from the role of private property in American development to national forest "sustained yield" policies to the politics of waste and recycling, and we trace forward their tangible impacts on human communities and the environmental landscape. The main focus of the course is the United States. A key goal is to uncover different ways geography, policy and environment have been organized differently or might have been, how and why they changed or might still change, and the consequences for the environment and for people. In the process, we will open up a wider range of options for human-environment relations than normally imagined and think through some of their possibilities
HISTORY	691AD	S-MaterialCulture/AfricanDiasp	Inclusive	Too often Western historical narratives consider Africans and African Diasporans as "People Without History." Such a notion also refers to people who possess few or no formally written histories. Employing historical archaeology, this class examines the material traces individuals and communities in the past left behind as important, alternative historical resources for interrogating the European colonial library, and re-writing the histories of slavery and the slave trade. Excavating the "hidden histories" of Africans and African diasporans, free and enslaved, our aim is to insert the voices of those formerly marginalized, silenced and erased.
HISTORY	691N	S-History and Sustainability	Focused	This course examines the idea of sustainability in the context of the environmental history of North America. It pays particular attention to the ways in which relationships between nature and culture have changed over time in response to the forces of global capitalism, and in recent years, to the challenges of a changing climate.
HISTORY	692C	S- U.S. Immigration History	Inclusive	This course will focus on readings that examine the movement of people to, and throughout, the United States, focusing on the period from the 1850s to the present. Special attention will be paid to the movement of immigrants from Europe, Asia, and South America throughout the twentieth century, as well as the experiences of refugees and asylum seekers. The course will also consider developments in immigration law and policy. Students should expect to write several short papers over the course of the semester, as well as a longer historiographical essay.
HISTORY	693W	S-Workers & Work/the Americas	Inclusive	This seminar introduces students to the study of labor and the working class, broadly defined, from the early 1800s to the present. We will begin by exploring the varied definitions of labor and the working class associated with Marxism, anarchism, and other theoretical traditions. From there we will survey the development of the field of labor history, focusing on the so-called new labor histories of the 1960s and onward, characterized by "bottom-up" approaches and an emphasis on the interplay of political economy, social relations, and cultural identities. Since the 1980s the field has taken new turns, for instance by emphasizing the roles of race, gender, sexuality, religion, and art in working-class life and labor movements. Specific topics will include slavery and slave resistance, the rise of mass production and the modern corporation, trade unionism and other worker strategies, the segmentation of the workforce along ethnic, gender, and other lines, the connection between labor relations and environmental degradation/sustainability, increased capital mobility over the past century, and worker migration both within and between nations. By examining a wide range of case studies from the modern United States, Latin America, and the Caribbean, we will seek to understand both the diversity of specific experiences and the global forces that shape workers' lives across the hemisphere. Though our primary geographic focus will be the Americas, we will also draw upon select case studies from Western Europe, Africa, and Asia. Requirements include a medium-length essay analyzing primary documents and/or oral histories plus a longer historiographical review paper due at the end of the semester
HPP	524	Intro/Health Politics & Policy	Inclusive	Examines the determinants of health politics and policy in the U.S., including decisions and non-decisions made by institutional and political actors at all levels of government and by private sector actors
HPP	525	Ethical Iss In Pubhl	Inclusive	C. Everett Koop, former Surgeon General of the United States famously once said "Anything we can do to stop smoking is good." The course explores the meaning of this "anything" in public health practice. A guiding question will be "what are the ethical limits in protecting the public's health?" While we won't be solving all the ethical issues that confronts practitioners, we will raise questions about ethical public health practice. This course explores these questions through the methods and principles of contemporary bioethics and the differences between public health ethics and medical ethics will be stressed. Some issues include the use of the State's police power; the meaning of ethical research; the limits of health promotion, including an ethical analysis of manipulation and coercion in the name of the public's health. We will also address the ethics of public health emergencies; ethical questions in public health genetics; and public health concerns with social justice. A foundation of ethical theory will aid our explorations of ethical public health practice. Critical reading, philosophical analysis and group discussion is emphasized.

HPP	583	Global Health in Dev World	Inclusive	Introduction to major health issues in developing world, factors which affect health status, models for tackling these problems, and the role of industrialized countries in improving global health. Students explore major causes of morbidity and mortality and explore strategies to improve health.
HPP	632	Social Justice & Public Health	Inclusive	Social justice is an integral part of public health but what exactly is social justice and how can the public health professional bring this concept into daily practice? This course is about the intersection of public health and social justice. We will concentrate on the meaning of social justice and how it is applicable to the public health professional. Includes a focus on the philosophical underpinnings of social justice
HPP	642	Public Health Leadership	Inclusive	The course and field work focuses on leadership theory, development, and competencies of contemporary public health leaders. Integral to the leadership role is the application of health policy leadership.
HPP	690P	Health Policy/United States	Inclusive	The purpose of this course is to introduce students to the policy environment that influences and shapes public health and the provision of health care services, to enhance understanding of the historical and political context of health policy, to develop strategies for analysis of health policy issues, and to communicate effectively in the policy environment.
LABOR	742	Labor&Employment Law	Inclusive	Introduction to federal law governing labor unions, the right to organize, and collective bargaining. Topics include historical examination of labor law in the nineteenth and early twentieth centuries, the operation of the National Labor Relations Board, and the National Labor Relations Act.
LANDARCH	547	Landscape Pattern & Process	Focused	Landscape patterns resulting from interactions of biotic, abiotic, and cultural resources and processes over time. Understanding these dynamics as a prerequisite to appropriate planning and design interventions.
LANDARCH	582	Landscape and Green Urbanism	Focused	<i>Interdisciplinary seminar for upper level undergraduate and graduate students. Focus on the role of the built environment in urbanization and sustainability.</i>
LANDARCH	587	People and the Environment	Inclusive	Interdisciplinary seminar on the applications of environmental psychology research to planning and design. Topics include landscape preference, territoriality and defensible space, way finding, and restorative settings/therapeutic gardens.
LANDARCH	605	Recreation Plan&Des	Inclusive	Students develop an understanding the legal context and as well as the topographic and environmental contexts when designing site plans for open space use and developing recreational plans. Fundamental site design and planning criteria, development of project organization, and presentation skills are developed. Students work on their design process and the integration of computer techniques.
LANDARCH	651	Professional Practice	Inclusive	Models of professional office structure, including management, organization, and economics for private, public, and academic practice. Covers ethics, compensation, contracts, specifications, and business plan preparation
LANDARCH	661	CultralLandscpes:DocValuesPolc	Inclusive	An important course for landscape architects, planners, and other professionals interested in the cultural landscape, this course will introduce students to the identification, understanding, documentation and policy implications of cultural landscapes. While it will touch on the issues of both designed and vernacular landscapes, the focus of the course will be vernacular landscape.
LANDARCH	591I	S-SustaingGrnInfrastrPlng&Des	Focused	Green infrastructure planning requires a systems approach to improving ecological function while providing vital ecosystem services for human populations. This course introduces green infrastructure planning at multiple scales. A particular area of focus will be the use of green infrastructure for improving hydrology as part of a comprehensive green space planning for human use. Case studies will projects from a planning, policy, and socioeconomic perspective.
LANDARCH	592A	S-Plants in Ldscepe	Inclusive	This graduate level course examines the role, value, and function of plants in the landscape. It also explore how the design, cultural practices, ecology, and aesthetics complement sustainable practices in the built environment.
LANDARCH	592M	S-MaterialExperiments/Landarch	Inclusive	This course will introduce students to innovative materials and technologies in landscape architecture. The study of landscape materiality will take place in two major forms: through a survey of contemporary material technologies, and through direct experimentation with the materials. The range of materials and technologies will be broad, ranging in subjects from upcycling, to smart materials, those with the potential to transform energy found in the environment into usable forms like electricity.
LANDARCH	597Q	ST-Urban Design Workshop	Inclusive	This course addresses landscape design in the urban environment from the lense of sustainability.
M&I-ENG	551`	Thermal Environmental Engineering	Inclusive	Senior design course on energy use in buildings. Psychometrics, comfort conditions, heating and cooling loads for buildings. Heating, ventilation, and air conditioning equipment design and selection. Energy recovery and conservation methods.
M&I-ENG	570	Solar & Direct Energy Conservation	Focused	Review of engineering principles of solar energy conversion including collection techniques, thermal and direct conversion, system performance prediction, and selected topics.
M&I-ENG	573	Engineering Windpower Systems	Inclusive	Engineering aspects of windpower systems including aerodynamic analysis, mechanical design, support structure design, wind field analysis, system concepts and analysis, and economics.
M&I-ENG	754	Economic Decision Making	Inclusive	Integrated treatment of elements of engineering economy, economics, accounting, and finance and operations research to provide a unified background for economic decision making. Prerequisite: background in economics, engineering, elementary probability theory, and undergraduate economics.
M&I-ENG	597CE	ST- Ocean Renewable Energy	Inclusive	This course reviews renewable energy options for the marine environment and considers the technical, ecological, economic, and governance challenges.
M&I-ENG	795A	S-Wind Energy Fellows Seminar	Inclusive	In this course, we will read and discuss papers on a range of topics applicable to offshore wind energy.
MARKETNG	591C	Marketing for Sustainable Business	Focused	Marketing strategies for sustaining green businesses.
MARKETNG	691N	S- Nonprofit Marketing	Inclusive	This course will cover concepts of effective marketing for non-profits to yield sustainable outcomes.
MICROBIO	562	Environmental Biotechnology	Focused	Traditional and molecular methods strategically applied to problems related to microbial biotechnology and environmental microbiology. Ranges from the diversity of microbial life to biodegradation. Seven general areas emphasized: 1) Statistical sampling and site characterization, 2) biomass determination, 3) enrichment techniques, 4) microbial activity measurements, 5) single cell detection in situ, 6) sequence and phylogenetic analysis followed by probe design, and 7) other modern techniques of environmental microbiology.

MICROBIO	797E	Microbiology Ecology Journal Club	Inclusive	This course reviews articles on environmental microbiology. Students will discuss papers and emerging findings in the field.
NATSCI	597B	Environmental Science Research	Inclusive	This course reviews papers on research related to environmental science.
NATSCI	697A	ST-Contemp Science & Engin	Inclusive	Topics will include Social network modeling, Building Solar Cells, Polymers All Around Us, Supporting Diverse Learners, Natural History of the Connecticut River Valley.
NRC	526	Silviculture	Inclusive	Silvicultural practices used to manage forests for timber production, wildlife habitat, and watershed protection. Special focus on southern New England, but techniques apply to forests throughout the world. Lab: developing silvicultural plans for project areas. Prerequisites: one course in ecology, and one course in plant identification.
NRC	528	Forest&Wetland Hydro	Inclusive	Hydrologic structure and function of forest, wetland, and agricultural ecosystems. Changes in water flow and quality associated with land and resource use. Management approaches to prevent or reverse adverse environmental impacts
NRC	540	Forest Resource Management	Focused	Use of forests to meet multiple objectives. Summary of forest history, policies, programs and review of traditional and contemporary forest management principles and practices. Case examples, site visits and reports, interaction with practitioners and landowners, term project and presentation.
NRC	541	Urban Forest Management	Inclusive	Use of community and urban forests to meet multiple objectives. Summary of forest history, policies, and programs. Review of traditional and contemporary forest management principles and practices. Case examples, site visits, and reports. Interactions with practitioners and landowners. Emphasis on community and urban forest issues.
NRC	547	Global Change Ecology	Inclusive	As a species, humans have a remarkable footprint on global ecosystems. We change land cover, alter water and nutrient cycling, introduce non-native species, harvest natural resources, and change the global climate. This class will explore the impacts of these changes on a variety of ecosystems, as well as consider how natural resource management can improve ecological resistance and resilience to change.
NRC	563	Wetlands,Wildlife Ecology&Mgmt	Inclusive	The course examines the ecology and sustainable management of wildlife, wetlands and other water resources.
NRC	564	Wildlife Habitat Mgt	Inclusive	The dynamics and management of forested, open woodland, and savanna habitats in North America and elsewhere. Topics include wildlife ecology, habitat classification, resource utilization, economic and societal impacts, and management techniques.
NRC	565	Dyn&Mgt Of Wldlf Pop	Inclusive	Basic techniques and concepts of the management and population dynamics of wildlife populations; emphasis on estimating animal population parameters, development of population growth models, and principles of population management. Includes field and laboratory techniques for understanding human impacts and estimating population parameters for wildlife.
NRC	566	Restoration Ecology	Inclusive	Restoration ecology is the returning of damaged ecosystems or particular properties of a desired state of ecological health. For purposes of this course, this field can be divided into four topics: 1) remediation of damaged sites where no return to original conditions is possible (e.g. strip-mined sites), 2) restoration of missing natural processes (fire, flood cycles, etc.), 3) return of missing native species or protection of declining native species.
NRC	568	Wetland Soils	Inclusive	A detailed examination of the physical, chemical, and biological properties of soils occurring in wetland environments. Applications of this information critical to wetland restoration efforts seeking to replicate the biochemical environment of natural wetland substrates. Additional emphasis on the identification of hydric soil characteristics necessary for wetland delineation.
NRC	570	Ecology of Fish	Inclusive	Advanced course that examines the interactions of fish with their environment. Topics include: feeding adaptations, community trophics, mating systems, reproductive biology, life history strategies, growth dynamics, predator-prey systems, community diversity, and population dynamics. Pre-Requisites: Two semesters biology, one semester ecology or permission of instructor.
NRC	577	Ecosystem Modeling & Simulation	Inclusive	Systems modeling and analysis used to understand the complexities of natural systems. System representations, modeling, experimentation, optimization, and policy modeling. Computer modeling using Stella and GIS.
NRC	578	Watershed Sci & Mgmt	Inclusive	Course covers watershed-scale and ecosystem-based approaches to natural resources conservation and environmental decisions. Students will learn various approaches and fundamental concepts for integrating biological, physical, hydrological, and socioeconomics with a trans-disciplinary perspective
NRC	579	Cree Culture, NatRes&Sustnblty	Focused	Interdisciplinary course combines readings, documentary films, and group discussions, a winter camping trip with a Cree family in northern Quebec, and an essay to explore intersections of: our culture, Cree culture, natural resources, and issues of sustainability, stewardship of the environment, and social justice.
NRC	590C	Clean Energy&Climate Pol/Mass	Focused	Over the past 20 years, Massachusetts has evolved as a leader in clean energy policy, which has led to market development, job and economic growth, and reductions in greenhouse gas and other emissions. This course will provide direct insights into the brief history of these policy developments, including policy objectives, legislative and regulatory roles, tradeoffs of costs and benefits, the use of analytical methods to establish program design, and stakeholder perspectives and engagement. The course will explore the market and economic development and challenges that have resulted from the policy, and explore the economic tradeoffs and distributional impacts that may result. Lastly, the course will consider the current energy and climate issues in Massachusetts and the latest policy development and proposals that will impact our energy future.
NRC	590TP	Responding to Climate Change	Focused	As a result of increased atmospheric concentrations of greenhouse gasses, including CO ₂ , the earth's climate is changing. This course aims to provide a broad understanding of both mitigation and adaptation, with a focus on the response of human systems in both the developed and the developing world. The course begins with an overview of climate science and projections and the potential hazards socio-ecological systems may face. Next it will discuss expected emissions pathways and how those can be altered through changes in patterns of fossil fuel use and CO ₂ sequestration (mitigation). Finally, it will turn to a discussion of how to prepare for and respond to any changes that will occur (adaptation). Throughout we will trace how knowledge of climate change can translate into action; consider factors that facilitate or stymie action; and discuss the potential for maladaptation. We will also discuss the international climate community; the role of state and non-state actors; and debates about climate justice and how to reach the most vulnerable.

NRC	592B	S-Readings In GIS	Inclusive	In this course, students will read and discuss three journal articles about applications of GIS in Natural Resources. In addition, students will write an annotated bibliography about a GIS topic of their choice.
NRC	597B	ST- Unmanned Aerial Systems	Inclusive	This is a project-based interdisciplinary course which will provide instruction and guidance to students as they gain practical experience using UASs in a variety of applications. Classroom instruction will cover: mission planning, data analysis, data visualization and UAS public policy in national and international contexts. Additionally, students will have lab instruction in which they process and analyze imagery and data acquired by UASs using combinations of different photogrammetry and GIS software packages. The course content is not exhaustive, but rather this is an introductory course that develops fundamental skills that students will need to execute their own projects using UASs. Example projects might include: Damage assessment and Infrastructure Inspection, Agricultural Health Assessment, Real-time mapping and Development of GIS layers, Invasive species mapping.
NRC	597EC	ST-AnalytcMethds/Energy&ClimPol	Inclusive	The course will introduce students to analytical methods applicable to the evaluation of energy and climate problems and policy solutions. The methods include ethical analysis, spreadsheet analysis, life-cycle analysis, optimization and systems analysis.
NRC	597LE	ST-LandscapeEco&Conservation	Inclusive	This course provides students with an introduction to the discipline of landscape ecology, in both theory and practice, with specific applied examples related to the New England landscape. Landscape ecology focuses on the interplay between scale, spatial pattern, and ecological processes; specifically, how to characterize spatial pattern, where it comes from, why it matters, and how it changes through time and/or scale. Theory and application will weave together throughout the course and students will use their knowledge of landscape ecology theory to better understand practices in land conservation, resource management, and urban planning. Students will also build skills in ecological spatio-temporal data analysis and modeling to analyze patterns and processes through space and time, and gain an understanding of the power and limitations of these techniques.
NRC	597LP	ST-Land Protection Tools&Techn	Focused	Most of the undeveloped land in the eastern U.S. that we rely on for public benefits and ecosystem services is owned by private individuals and families. Every day these private landowners are making decisions about who will own the land in the future and how will it be used. These decisions are the most significant driver of landscape change we face and will determine the public benefits that the land provides in the future (or doesn't provide!). This course will include discussions of permanent land protection tools to maintain the land in its natural state in perpetuity, temporary land protection tools such as current use programs, landowner decisions about the future of their land, maintaining the conservation values after the land has been protected, and local, state, and federal policies that encourage land protection.
NRC	597Q	ST- Envir Leadership/Practice	Focused	This course is designed for students to practice leadership skills needed while working in the natural resources conservation or environmental science profession. The purpose of this course is to integrate the social science, natural science, and communication skills obtained through coursework with social dynamics, conflict resolution, active listening, leading and implementing change and other leadership skills while working with diverse project teams on large complex environmental management projects/issues. In addition to gaining a foundation in theory, you will hear and engage in honest dialogue with nonprofit, local, state and federal leaders in conservation about their learning moments and what you can learn as an emerging environmental leader.
NUTRITN	572	Community Nutrition	Inclusive	Skills and techniques needed to effectively carry out community nutrition programs and nutrition education, including knowledge of agencies and programs, community assessment, legislation, nutrition education, and working with people.
NUTRITN	577	Nutrition Problems in US	Focused	This class is designed to help you reflect and integrate what you have learned from your nutrition coursework as well as that from your Gen Ed courses and other experiences that have contributed to your development on the way to your final year at UMass. The goal of this course is for students to develop insight into the epidemiologic, physiologic, biochemical, socioeconomic, and nutritional complexities of major diet-related diseases in the United States.
NUTRITN	578	Nutr Prob Devlp Wrld	Focused	Malnutrition as it exists in developing countries and its socioeconomic background. Proteinenergy malnutrition, famine, vitamin and mineral deficiency diseases, synergism between nutrition and infection, and the role of international agencies in fighting malnutrition. Prerequisite: NUTRITN 352 or consent of instructor.
NUTRITN	640	Public Health Nutrition	Inclusive	A practice-based approach to public health nutrition processes through readings, lectures and active participation; assessing community needs, priorities and goals; implementing nutrition interventions; designing nutrition plans; building coalitions; and preparing grant applications.
PHIL	560	Topics in Ethics	Inclusive	Critical study of recent work in moral philosophy. May include utilitarian, Kantian, or other normative theories, as well as naturalistic, nonnaturalistic, or emotivist theories in metaethics.
POLISCI	780	Public Policy	Inclusive	Graduate seminar the examines relevant public policy issues related to American Politics, Comparative Politics, Environmental Policy, International Relations, Political Theory, Public Policy and Organizations, and Public Law.
POLISCI	791V	S-Political Behavior	Inclusive	This course serves as a survey of the major theoretical approaches and empirical research in the field of American political behavior. The course is designed to: 1) provide an overview of the burgeoning literature on political behavior in the discipline of political science and the myriad of frameworks and methods used to study political behavior and 2) to prepare graduate students to teach courses on political behavior, political psychology, and/or public opinion.
POLISCI	792AP	S-KnowldgPowrFragilty:PlatAris	Inclusive	This course will examine several Platonic dialogues to address the elenchus, its epistemological consequences and ethical dangers, as well as the notion of knowledge in the crafting of political arguments. Apology, Laches, Charmides, Meno, and Republic are some of the Platonic dialogues to be discussed. We will also address some books in Aristotle's Politics.

POLUSCI	797E	Special Topics- Powering Development: Water, Energy and Environment	Focused	This course examines the human harnessing of water and use of energy to power development over the past century around the world. We will pay particular attention to how infrastructure projects and development plans are often enmeshed in colonial power relations through a reading of interdisciplinary literature in politics, history, geography, and sociology as well as reports from international and non-governmental organizations. Topics range from the construction of massive hydropower dams, to the water-intensive process of fracking for natural gas and oil in an era of extreme energy, to the global land grabs for farmland and by extension water. Critically interrogating these processes in capitalist and (post)socialist contexts, this course is meant to help students generate new linkages and creative research directions within their own disciplines through the mobilization of a variety of theoretical apparatuses that will help us grapple with the pressing sociopolitical challenges of the 21st century including growing inequality and accelerating climate change. The syllabus is available upon request from the instructor.
PSYCH	891RC	S-Roots of Conflict	Inclusive	This course examines how the cognitive and emotional processes of individuals are influenced by (and influence) the social and political processes in groups during intergroup conflicts. The topics will emphasize socio-economic-environmental challenges.
REGIONPL	545	Introduction to Land Use	Focused	Land-Use is a process in which various constituencies (planners, elected officials, corporations, advocates, and the public) manage a community's land and the land's subsequent development. This course examines trends in land-use (e.g., Growth Management, Smart Growth, New Urbanism, Sustainability, Shrinking Cities, etc) in order to understand that development is a constant occurrence. However, the choice of the applied land-use and the desired outcome are contextually dependent on location and development trends.
REGIONPL	574	City Planning	Focused	Introduction to city and regional planning and the urban planning profession. The role the planner plays in addressing the wide range of problems and opportunities, city or regional, that now, or may in the future, confront America's modern urban environment in the context of climate change from a sustainable development perspective.
REGIONPL	577	Urban Policies	Focused	Disciplinary approaches used for critiquing and developing appropriate policies, including urban planning, anthropology, geography, sustainability, political science, media studies, sociology, and economics. Includes service learning component.
REGIONPL	580	Sustainable Cities	Focused	This course introduces students to the 3-E concept of sustainability: environment, economy, equity, and applies it to the built environment and policies at the municipal and regional level.
REGIONPL	585	Planning for Climate Change	Focused	This seminar reads some of the most current literature on the future of the urban form given climate change, and allows time and shared space to reflect on what these coming changes mean for (primarily local) government as well as governance. The class focus will be on implications of these coming conditions for built form both now and in the future, with a goal of developing a working understanding of what municipal, regional, and state planners and policymakers need to know.
REGIONPL	620	Quant Meth In Planng	Inclusive	Application of quantitative methods used by regional and urban planners. Problem definition and data sources, data collection and analysis using descriptive and inferential statistics, and spreadsheet and database planning software. Data presentation techniques. Prerequisite: Statis 501 or equivalent
REGIONPL	625	Intro to GIS Systems/Planning	Inclusive	This is an introductory, graduate-level course in the use of Geographic Information Systems (GIS) in urban and regional planning.
REGIONPL	630	Theory&Practice of PubParticip	Inclusive	This course will introduce students to public participation at the practice level in planning. Lectures and class discussions will review current theory underpinning participation practice, and will critically evaluate the wide range of participation methods currently in use in planning practice. Includes exercises in participation implementation in conjunction with one of the other studio classes
REGIONPL	643	Econ Dev Iss in Plan	Focused	General introduction to methods and techniques for analyzing and solving problems related to planning, resource allocation, and policy analysis.
REGIONPL	651	Plnng Hist & Theory	Inclusive	Planning as a decision-making process, the attributes of the political and administrative environment within which planning takes place, and the implications of this environment for the planning process and the planner
REGIONPL	652	Tools & Tech In Planning	Inclusive	Practical information, specific tools, regulatory processes, and analytic methods useful in the practice of public sector planning at the local level.
REGIONPL	656	Judicial Plan Law	Inclusive	The law of land-use control as expressed in major judicial decisions in the U.S. Creation, expansion and powers of municipal corporations; use of legal planning tools such as zoning, abatement of nuisance, eminent domain, etc.
REGIONPL	673	SpatialAnalysis&RegionalDevlpn	Inclusive	This course is a hands-on study in regional and local economic, demographic and spatial analysis methods commonly used by planners and economic development policy analysts.
RES-ECON	720	Envirnmtl & Natural Res Econ	Focused	The first course in the graduate environmental and natural resource economics sequence. The course covers dynamic optimization with environmental and natural resource applications, the basics of the theory of environmental regulation, and a survey of methods and results from current empirical research in environmental and natural resource economics. Prerequisites include graduate training in microeconomics and econometrics.
RES-ECON	721	Adv Envrnmtl & Nat Res Econ	Focused	The second course in the graduate environmental and natural resource economics sequence. Covers advanced topics in the theory of environmental regulation, including dynamic regulation, regulation under asymmetric information, and second-best environmental regulation. Current empirical topics include the analyses of voluntary and information-based approaches to environmental management and emerging approaches to energy conservation.
RES-ECON	791Y	S- Seminar in Res Econ	Inclusive	This is a full year seminar course for our first year graduate students. It includes discussion of resources available on campus for research, grant finding, and career preparation. Additionally we discuss the research process and writing as well as what you need to be doing at each stage of your program in order to be successful.
SCH-MGMT	508	Alternative Investments	Inclusive	The course will include an overview of alternative assets, alternative investments strategies, options theory, real-life examples, hands-on modeling, the use of financial data, and in-depth business applications projects with real clients.
SCH-MGMT	758	Supply Chain Mgt	Inclusive	Basic concepts of supply chain management such as synchronized information, product and financial flow, channel design and configuration, supplier relationships, internal and external logistics, and inventory deployment and replenishment. Supply chain modeling for the optimization and monitoring of a supply chain, or a segment thereof, using network (mathematical programming) models.

SOCIOL	797SD	ST-SocDem,Socialism,USwelfare	Inclusive	This course examines society, democracy, and the concept of socialism. These social constructs will be used to consider the US welfare system.
SPP	602	Public Management	Inclusive	Overview of organization theory including theories of administration, motivation, budgeting, decision making, inter-organizational relationships, and ethics. Uses case studies to provide a broad range of policy areas and organizations.
SPP	603	Public Policy Analysis	Focused	Integrates material from core courses and applies it to actual and hypothetical policy issues in many areas. Examines policy analysis methods using case studies from a wide range of substantive policy areas. Looks at social, economic, organizational, political, and other influences on policy decisions
SPP	605	Econ & Public Policy	Focused	Introduction to microeconomics theory and policy analysis. Examines economic rationales for and against government policy and the economic consequences of public policy.
SPP	611	Comparative Public Policy	Inclusive	This course introduces the politics of policy-making in explicit cross-national focus. It satisfies a core requirement for CPPA MPP/MPPA students. Focus is on how values, institutions, and choices shape outcome.
SPP	651	Soc Ineqults,Technol&PubPolicy	Inclusive	This seminar examines how communication policy has addressed social equity issues in light of domestic and global structural and technological transformations of the last two decades. We will focus on how notions of access, diversity, expression, control and development have evolved within the structure of the U.S. and global communication policy regimes, discussing their implications for social exclusion. Some of the debates addressed by this seminar include: policy implications of different conceptualizations of ICT gaps (from digital divide to digital inequalities and digital citizenship), persistent access gaps and current formulations of broadband policy, and social media, public participation and copyright issues. Throughout the course, we will reflect on issues of power, democratization and inclusion by keeping a critical eye on the ends and means by which advocate groups, community organizations, and citizens participate in the policy process, and in the development of interventions designed to address digital gaps. While the focus of the class is on U.S. policy, international cases from Latin America and Africa will be examined for their import to current discussions on the consolidation of more democratic and inclusive communication systems.
SPP	597T	ST-InfoTech/Public & Nonprofit	Inclusive	This course is designed for professional degree students in SPP's masters programs or other relevant campus programs (e.g., Environmental Conservation) and focuses on the role of information technology (IT) in public and nonprofit settings. The course provides hands-on skill-building in: (1) analyzing information flow in organizational processes (sometimes called "Systems Analysis"); and (2) data management techniques such as advanced functions in spreadsheets (Excel) and design and development of relational database management systems (MS Access). Participants will also get a brief introduction to Geographic Information Systems and will learn about approaches toward managing social media. In addition to these hands-on skills, approximately one-third of the class will be devoted to discussions on key IT themes in today's workplace, including: cybersecurity, issues around software procurement (e.g., open standards, open source, cloud-based software as a service), disinformation in social media, and the future of machine learning and artificial intelligence as it relates to public administration.
SPP	697B	ST-Introduction to GIS	Inclusive	The goals of this course are to teach you basic GIS concepts such as spatial data sources and structures, projections and coordinate systems, geospatial analysis, cartographic modeling, and the integration of remote sensing and GIS. By the end of the course, students will be proficient in ESRI ArcGIS software.
SPP	697EV	ST-Environmental Policy	Focused	Advance course on the processes of environmental policy formulation, administration of environmental policies, and social values related to managing air and water resources. History of current federal laws, policies, and programs, and discussion of the roles of various resources management agencies.
SPP	697NL	ST-Nonprofit Law & Management	Inclusive	This course is designed for those who may be involved in nonprofit organizations at some point in their lives as directors, employees, volunteers, customers, funders, or founders. Students will create, fund, run, and dissolve a virtual 501(c)(3) public charity over the course of the semester, as we learn the opportunities and challenges that nonprofits can face. We will discuss the theoretical bases for the nonprofit sector and for tax exemption, formation and dissolution of nonprofit corporations at the state level, obtaining tax exempt status from the IRS, the charitable contribution deduction, fiduciary duties of the board of directors, the rules surrounding lobbying and political activity of nonprofits, charitable solicitation laws, unrelated business income tax, private inurement, and excess benefit taxes.
SPP	697PC	ST-Using the Past/EffectivePol	Inclusive	A lot of policy work is contingent on who gets to leverage, correct, or tell the story of the past. This course will push students to think about the historical context of policy work. We will learn a variety of ways of studying past policies using historical methods and discuss in detail the politics of how we remember (and forget) policies. This course will focus on both policies with obvious historical context (like confederate memorials or reparations), and examples where the past is less obvious (like privacy and social media).
SPP/ECON	697SE	ST-Social & Envir Enterprises	Focused	This course is for students who dream of starting, running, or working for a social or environmental enterprise---an organization that places "people" and "planet" ahead of or on an equal footing with ?profit.? In this class, students will take initial steps towards creating a fictional social mission enterprise, with practicing social entrepreneurs acting as mentors. Students will also complete a project that will help solve an issue facing the social enterprise with which their mentor is affiliated. While designing the fictional enterprise, we will discuss systems thinking, design thinking, Lean Startup methodologies, impact measurement, and budget development skills. We will also discuss the legal structures within which social mission enterprises can exist: traditional for-profit, nonprofit, hybrid, and employee-owned organizations.
STOCKSCH	505	General Plant Pathology	Inclusive	With lab. Causes, nature, and control of plant diseases. Diagnosis of plant diseases. Mechanisms, biochemistry, and genetics of plant disease induction, development, and control.
STOCKSCH	510	Mgt & Ecol of Plant Diseases	Inclusive	The ecology of plant, microbe, and human interactions in plant diseases, from wilderness to industrial farms. Epidemics, traditional farming, environmental impacts and sustainability issues. Ways in which agriculture, particularly plant production and plant disease management, change ecosystems. Independent project.
STOCKSCH	525	Mycology	Inclusive	Biology, ecology, classification and identification of fungi and fungal-like organisms. Includes consideration of fungi as causes of diseases in animals, humans, and plants, and their uses in biotechnology applications.

STOCKSCH	580	Soil Fertility	Inclusive	The role of mineral elements in the growth of plants; plant response to fertilizers and other soil amendments; soil reaction, mineral deficiencies and toxicities; environmental impact of soil fertility management practices; economic and policy drivers of various management practices. Prerequisites: STOCKSCH 102 and STOCKSCH 105 (or equivalents), CHEM 110 or 111.
STOCKSCH	587	Phyto/Bioremediation	Inclusive	This course will cover the various aspects of phytoremediation - the use of plants (both natural hyper-accumulators and transgenic) and their associated microbes with the purpose of environmental clean-up of contaminated soil, sediments and water. Various strategies for phytoremediation of a wide range of toxic pollutants, both organic and elemental, with a special emphasis on toxic metals will be discussed.
STOCKSCH	650	GlobalChallenges/Agricultre&Env	Inclusive	The growing human population faces a crisis in food production matched by one in environmental degradation. Demands for food, forage, and biofuel crops and for a healthy and sustainable environment will increase, but climate change, loss of productive soils, decreasing availability of arable land and clean water, emerging and resurgent pests and diseases, and environmental pollution threaten our ability to maintain present levels of crop production and environmental quality. This course will address topics related to the challenges imposed by climate change and environmental contamination on plant growth and production, ecosystem integrity, soil health and ecology, and the sustainability of landscapes. Modern biotechnology, improving soil health through carbon and nutrient management, and developing climate resilient crop systems offer solutions to these problems. This course will be taught by a faculty team from the Stockbridge School of Agriculture, using four themes: 1. Pathogen and pest issues and management in issues in agriculture. 2. Abiotic stresses and climate resilient crops. 3. Soil Health and resource management. 4. Soil contamination and remediation. Students will be assigned papers in the current scientific literature and expected to engage in weekly discussions and write analyses.
STOCKSCH	661	Intermed Biometry	Inclusive	Supplies background necessary to design and analyze field and laboratory experiments. Focus on statistical analysis for biological scientists. Primary emphasis on analysis of variance, regression, and experimental design. Computer-assisted analysis experience provided. Prerequisites: a course in basic statistical analysis.
STOCKSCH	692A	S-Topics in Plant-Path Intract	Inclusive	A key issue threatening plant production in agriculture and the landscape is plant disease, particularly growing threats from new infectious pathogens. In this journal club we will focus on research papers that describe plant-microbe interactions, with specific reference to plant diseases and their management. Modern genomic methods have greatly increased understanding of how pathogens attack plants, how plants defend themselves, etc.
STOCKSCH	692B	S-Soils & Climate Change	Focused	According to the Intergovernmental Panel on Climate Change, global temperatures are expected to increase 1.1 to 6.4 degrees Celsius during the 21st century, and precipitation patterns will be altered by climate change. Soils are intricately linked to the atmospheric climate system through the carbon, nitrogen, and hydrologic cycles. Altered climate will, therefore, have an effect on soil processes and properties, and at the same time, the soils themselves will have an effect on climate. Study of the effects of climate change on soils is still nascent, but has revealed that climate change and climate-related policies will impact soil organic matter dynamics, and soil processes and properties related to fertility, water retention, nutrient export, and contaminant dynamics. According to the Intergovernmental Panel on Climate Change, global temperatures are expected to increase 1.1 to 6.4 degrees Celsius during the 21st century, and precipitation patterns will be altered by climate change. Soils are intricately linked to the atmospheric climate system through the carbon, nitrogen, and hydrologic cycles. Altered climate will, therefore, have an effect on soil processes and properties, and at the same time, the soils themselves will have an effect on climate. Study of the effects of climate change on soils is still nascent, but has revealed that climate change and climate policies will impact soil organic matter dynamics, and soil processes and properties related to fertility, water retention, nutrient export, and contaminant dynamics. This course serves to critically review the literature at the intersection of these issues and on the direction and magnitude of climate change impacts on soils. Students make one presentation. Topics may include, but are not limited to soil (micro)biology, chemistry, pedology, plant-soil interactions (rhizosphere science), hydrology, biogeochemistry, climate change, ecology, and societal impacts.
SUSTCOMM	533	Urban Greening Theory&Practice	Inclusive	Since the rise of urban civilization, vegetated public space has been a strategy to enhance the experience of living in cities. The purpose of this course is to explore the theoretical and practical expressions of this urban greening aspiration, defined here as the introduction or conservation of outdoor flora in cities. Toward this goal, the course is organized in two parts: First, we will analyze the various discourses that have, and are currently, animating urban greening practice. Second, we will explore how urban greening is expressing itself in cities around the world today. This combined inquiry into theory and practice will enhance students' ability to develop urban greening strategies that respond to the needs of 21st century cities.
SUSTCOMM	574	Sustainable City Planning	Focused	Introduction to sustainable city and regional planning. The role the green urban planner plays in addressing the wide range of problems and opportunities, city or regional, that now, or may in the future, confront America's modern urban environment.
WGSS	692J	S- Feminism & Envir Justice	Focused	While feminism and environmental justice are both political projects of social change, their objects or objectives are not the same. As we sink into the 21st century, amid looming fears of ecological catastrophes and socio-economic crises, is a conversation between these two projects likely to be productive for both struggles, or are their goals at odds with each other? This class will examine the perceived, existing, and potential links (or disjuncts) between feminism and environmental justice. Our interdisciplinary inquiry will be guided by questions such as: What is understood by the terms "feminism" and "environmental justice"? How have "nature" and the "environment" figured in feminist writings and feminist ideas of justice? Conversely, how do "women" and "gender" figure in ideas and struggles for environmental justice? Are these ideas explicitly or implicitly "feminist"?

WGSS	693R	S- Race, Caste and Capital	Inclusive	The seminar will examine the co-constitutive historical formations of race and caste in relation to the expansion of capitalism and European high colonialism in the 18th and 19th centuries. Rather than seeing this as a period for the 'origins' of race or caste, the course will examine the ways in which race and caste were discursively mediated in the period of high colonialism to shape the kind of racialized hierarchies that we are familiar with today. The course puts the urgent concerns of African American Studies, South Asian Studies and heterodox economics, with an emphasis on questions of political economy, together in a semester-long inquiry into how racialized hierarchies have been essential to producing and maintaining class stratification and geopolitical power. We will primarily draw from the American Black Radical tradition and the South Asian Dalit Radical tradition for our readings in this course. These readings will focus on how European colonial and imperial regimes of power necessitated and furthered racialized hierarchies through regimes of chattel slavery, indentured servitude and bonded labour. We will also aim to understand how these regimes elicited some of the most radical and revolutionary struggles for liberation in the world. While our readings will be wide ranging in scope, our discussions will focus on the fairly specific question of what relation we can postulate, based on historical evidence and historiographical critiques, between contemporary instantiations of race and caste in different parts of the world? We will necessarily pay close attention to axes of gender and sexuality throughout the seminar, drawing on examples and critical work from authors working in the Caribbean, South Asia, North America, South Africa, East Africa, and the UK
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Sustainability Focused	64
Sustainability Inclusive	147
TOTAL	211