Undergraduate Sustainability Course Inventory, AY2016/2017.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
1.s-u	ANTHRO	258	**Food and Culture**	u/grad	SUST'Y course	This course surveys how cultural anthropologists have studied the big questions about food and culture. How and why do people restrict what foods are considered ?edible? or morally acceptable? How is food processed and prepared, and what does food tell us about other aspects of culture like gender and ethnic identity? How have power issues of gender, class, and colonialism shaped people?s access to food? How has industrialization changed food, and where are foodways headed in the future?
2.s-u	FOOD-SCI	120	**Food Preservation-Why&How**	u/grad	SUST'Y course	Food preservation methods such as sterilization methods, refrigeration, freezing, drying explained in terms of physical, chemical, and biological principles. Their implementation in industrial processes and impact on society evaluated. (Gen.Ed. PS)
3.s-u	PUBHLTH	390AS	**Food Toxicology**	u/grad	SUST'Y course	This course is designed to teach fundamentals of toxicology with an emphasis on food toxicology. Topics to be discussed include mechanisms of toxicity, absorption, metabolism, distribution and excretion of food toxins, dose-response relationships, major mechanisms of toxicity, sources and major groups of food toxins, toxicity testing methods and risk assessment.
4.s-u	STOCKSCH	356	**Food Justice and Policy**	u/grad	SUST'Y course	This course examines the role of policy in determining WHAT we eat, WHO experiences barriers to access to safe, healthy, local, fairly produced foods, and HOW we create equity and sustainability in our local food system. We will start by looking at the basic components of our food system: production, distribution, and consumption. We will then examine systemic structures of race, class, citizenship and ability as they relate to access to healthy local food.
5.s-u	FOOD-SCI	466	**Hyg Food Handling**	u/grad	SUST'Y course	With lab. Overview of microbiology principles as applied to food safety. Emphasis on the control of microbial food-borne illnesses in institutional and industrial settings. Labs teach basic techniques used for microbial testing of foods.
6.s-u	STOCKSCH	387	**Global Food Systems**	u/grad	SUST'Y course	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.
7.s-u	FOOD-SCI	270	**Biol. of Food in Human Health**	u/grad	SUST'Y course	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.
8.s-u	STOCKSCH	171	**Plagues, Food and People: Eco**	u/grad	SUST'Y course	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).
9.s-u	FOOD-SCI	265	**Survey of Food Science**	u/grad	SUST'Y course	The role of food processing and ingredient technology on food quality and safety, including principles and methods of food processing, food standards and regulation, quality control and assurance, and overviews of engineering, chemical, microbiological, and nutritional concerns.
10.s-u	NATSCI	191CNS25	**FYS - "Is Food Thy Medicine?"**	u/grad	SUST'Y course	"Let Food be Thy Medicine," one of the most widely quoted phrases of Hippocrates, has taken on new meaning in our contemporary society as companies flood the marketplace with nutraceuticals and functional foods to capitalize on their health promoting claims. In this course we will examine the science behind the claims through the lens of food science, epigenetics, chemoprevention and pharmacognosy.
11.s-u	FOOD-SCI	150	**The Science Of Food**	u/grad	SUST'Y course	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)

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12.s-u	COMM	499DI	**Honors Thesis II-Food as Comm**	u/grad	SUST'Y course	Continuation of Comm 499C, this course is devoted to the implementation of students' individual research projects. Each will culminate in an archivable Honors Thesis. Comm 499C and Comm 499DI together satisfy the Integrative Experience requirement for BA-Comm majors. Prerequisite: Comm 499C.
13.s-u	FOOD-SCI	190I	**Introduction/FutureFoodScinst**	u/grad	SUST'Y course	This course will introduce the discipline and profession of food science through an overview of food composition, commodities, food quality and deterioration, food preservation, and product development.
14.s-u	STOCKSCH	397FJ	**ST-SocPermaculture/FoodJustice**	u/grad	SUST'Y course	Social Permaculture for Food Justice prepares students with methodologies from the fields of permaculture design and social justice to enact change in the food system. Students learn tools to help them critique food system inequities, articulate goals for social change, and analyze their own power, privilege, and competencies as makers of change. Finally, students are guided through a permaculture design process in which they create social design models to catalyze the changes they wish to see
15.s-u	ECON	366	**Economic Development**	u/grad	SUST'Y course	Theories of economic growth applied to Third World countries. Classical and Neoclassical economic theories and structural/historical theories. Topics such as the role of foreign investment and multinational corporations, and strategies of industrialization and employment creation, and rural development.
16.s-u	ECON	394CI	**Econ of Cooperative Entrprs**	u/grad	SUST'Y course	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.
17.s-u	M&I-ENG	353	**Engr Econ Dec Making**	u/grad	SUST'Y course	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.
18.s-u	ECON	341	**Labor Economics**	u/grad	SUST'Y course	Choice-theoretic model of labor-leisure choice. Returns to education and occupational choice. Demand for labor. Minimum wages. Changing income distribution. Effect of household structure and tax system on income structure. Labor market discrimination. Compensating wage differentials. Unions.
19.s-u	RES-ECON	460	**Family Economic Systems**	u/grad	SUST'Y course	This course provides an economic analysis of the behavior and circumstances of families/ households. It will examine issues such as decision-making, household formation and dissolution, allocation of time, human capital, fertility, labor-force participation, income inequality, and aging. Standard microeconomic analysis will be applied to the production and consumption activities of the household.
20.s-u	ECON	305	**Marxian Economics**	u/grad	SUST'Y course	Introduction to Marxian theory and modern political economy. Logic and methods of Marxian analysis of economic change; comparisons between Marxian and non-Marxian theories.
21.s-u	ECON	362	**American Economic History**	u/grad	SUST'Y course	Economic development in the U.S. from colonial era to present. America as a raw materials producer, an agrarian society, and an industrial nation. Possible topics: development of economic systems, demographic trends, industrialization, regional development, growth of large-scale enterprise and organized labor, changing role of government. (Gen.Ed. HS)
22.s-u	RES-ECON	312	**Intro to Econometrics**	u/grad	SUST'Y course	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.

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23.s-u	ECON	306	**History of Economic Thought**	u/grad	SUST'Y course	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.
24.s-u	CE-ENGIN	270	**Sys Analys & Econ Civil Engin**	u/grad	SUST'Y course	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.
25.s-u	ECON	348	**The Political Economy of Women**	u/grad	SUST'Y course	A critical review of neoclassical, Marxist, and feminist economic theories pertaining to inequality between men and women in both the family and the firm.
26.s-u	RES-ECON	102	**Intro Resource Econ**	u/grad	SUST'Y course	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)
27.s-u	PUBHLTH	490C	**Intro to Health Economics**	u/grad	SUST'Y course	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.
28.s-u	RES-ECON	121	**Hunger In Globl Econ**	u/grad	SUST'Y course	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.
29.s-u	RES-ECON	263	**Natural Resource Economics**	u/grad	SUST'Y course	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)
30.s-u	ECON	330	**Labor in the American Economy**	u/grad	SUST'Y course	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.
31.s-u	POLISCI	281	**Comparative Political Economy**	u/grad	SUST'Y course	This course introduces core political economy concepts from both classical and modern thinkers while engaging in contemporary debates about the relationship between states and markets. Students will read Smith, Marx, List, Polanyi, Keynes, Hayek, and others, as well as engage with questions such as: What is political economy? Why and how do capitalist systems differ? Why are some countries wealthier and more prosperous than others?
32.s-u	POLISCI	388	**Corp. Lobbying/Global Econ**	u/grad	SUST'Y course	This course centers on one of the mist 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 will be extr
33.s-u	ECON	105	**Introduction Political Economy**	u/grad	SUST'Y course	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)

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34.s-u	POLISCI	359	**International Political Econ**	u/grad	SUST'Y course	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.
35.s-u	LEGAL	497N	**Environmental Justice**	u/grad	SUST'Y course	This course provides an exploration of the environmental justice (EJ) movement. Central to our study is an examination of environmental degradation, inequality in exposure to pollution in relationship to racism and poverty, and globalization's effect on international environmental injustices. We critically analyze the role of grassroots activism, the law, and alternative dispute resolution methods used to redress environmental injustices.
36.s-u	NRC	100	**Environment and Society**	u/grad	SUST'Y course	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.
37.s-u	NRC	494EI	**Environmental Decision-Making**	u/grad	SUST'Y course	This course introduces students to the study of environmental decision-making. Topics covered include: behavioral approaches to conservation; behavior change; barriers to and facilitators of conservation behavior; effective intervention design; persuasive and strategic environmental communication. Students will develop their own environmental behavior change campaigns and integrate course content with their broader undergraduate education experience.
38.s-u	PHIL	166	**Environmental Ethics**	u/grad	SUST'Y course	In this class, we will engage with the issues of population growth and resource use, biodiversity loss and sustainability, non-human animal welfare, environmental justice, and global climate change. We will examine these issues through grappling with the following distinctively ethical questions: (a) is nature just for humans to use?; (b) how should we understand the value of nature?; (c) what is the moral status of non-human animals, and how should we take their welfare into account?
39.s-u	PUBHLTH	290KH	**EnvirEpigenetics:CntrlYourDest**	u/grad	SUST'Y course	The Human Genome Project identified 25,000 genes that carry instructions to make proteins, responsible for the structure, function and regulation of our body?s organs and tissue. This course will explore the second genome, the epigenome, which guides the operation of our genes. If we think of our genes are hardware, the epigenome can be viewed as the software capable of providing functional controls guiding how, where and when our genes are expressed.
40.s-u	RES-ECON	262	**Environmental Econ**	u/grad	SUST'Y course	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)
41.s-u	MANAGMNT	391E	**S-Environmental Law**	u/grad	SUST'Y course	Description not available at this time
42.s-u	ECON	397EV	**ST-Environmental Economics**	u/grad	SUST'Y course	Not available at this time.
43.s-u	ENVIRSCI	297F	**ST-EnvCommunicationEcoRepII**	u/grad	SUST'Y course	The UMass Amherst Eco-Rep Program 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 issue.
44.s-u	POLISCI	394II	**Int'l Envrn Pol&Plc**	u/grad	SUST'Y course	The course acquaints students with the history and current discussions surrounding key issues related with trans boundary environmental threats as well as reviewing policy alternatives and the policies associated with the management of these problems. It focuses on the social, political, and economic factors causing environmental threats and by which efforts have been taken to manage or ameliorate such threats.

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45.s-u	PUBHLTH	203	**Intro Environmental Health Sci**	u/grad	SUST'Y course	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.
46.s-u	GEOGRAPH	110	**Global Environment Change**	u/grad	SUST'Y course	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.
47.s-u	GEOGRAPH	110ISH	**Global Envirnmnt Chg (HnrsInd)**	u/grad	SUST'Y course	
48.s-u	ENVIRSCI	315	**Prin of Envir Toxicology &Chem**	u/grad	SUST'Y course	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.
49.s-u	CE-ENGIN	370	**Intro to Envir&Water Res Engin**	u/grad	SUST'Y course	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.
50.s-u	ENVIRSCI	101	**Intro to Environmental Science**	u/grad	SUST'Y course	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)
51.s-u	ENVIRSCI	213	**Intro to Environmental Policy**	u/grad	SUST'Y course	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.
52.s-u	PUBHLTH	490VS	**Seminars/Environmental Health**	u/grad	SUST'Y course	This course examines current advances in environmental health science via lectures from UMass faculty with research programs related to environmental health, UMass PhD students in the EHS program, as well as visiting scholars. Seminar topics will change from week to week and will include topics such as pollution, exposure assessments, mechanistic toxicology, environmental health policy, environmental epidemiology, and others.
53.s-u	BCT	150	**The Built Environment**	u/grad	SUST'Y course	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)
54.s-u	ENVIRSCI	465	**Principles Envir Site Assessmt**	u/grad	SUST'Y course	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.
55.s-u	RES-ECON	472	**Adv Tpc Res&Envrn Ec**	u/grad	SUST'Y course	Topics may include: the design of environmental and natural resource policies, particularly incentive-based policies; the analysis and control of environmental risks; cost-benefit analyses of specific environmental policies; critiques of cost-benefit analysis, international environmental cooperation; environmental and natural resource policy in the developing world; sustainability, and the conservation of biodiversity.
56.s-u	SUSTCOMM	394A	**S-Writing in Envirdes&LandArch**	u/grad	SUST'Y course	This 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. This course fulfills the UMass Junior Year writing requirement.

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57.s-u	ENGIN	111	**Intro Civil & Environ Engin**	u/grad	SUST'Y course	ENGIN 111 provides an overview of the environmental, geotechnical, structural and transportation areas within the discipline of Civil and Environmental Engineering while developing core skills required throughout the curriculum. Civil and environmental engineering projects and problems are presented; students use written, oral, and computing skills to derive and present solutions.
58.s-u	ENVIRSCI	342	**Pesticides, the Envir&Pub Pol**	u/grad	SUST'Y course	Current issues associated with pesticide use; includes discussion of role of pesticides in agriculture, public health, and other related areas; fate of pesticides in the environment; and public perception of pesticides. Case studies examine benefits and risks of pesticide use; environmental cancer; and role of media and public interest groups in pesticide decisions. Alternatives to current heavy reliance on chemical technology in pest control.
59.s-u	SUSTCOMM	394RI	**Rsrch Issues in Envir Plan Des**	u/grad	SUST'Y course	Survey of research issues in environmental design and planning. Designed to assist students in developing research in their area of interest. Includes selecting a topic for research, synthesizing the pertinent literature, developing research questions, designing a research study, and communicating the research findings verbally, visually, and in writing.
60.s-u	GEOGRAPH	497R	**ST- Rethinking US Env Policy**	u/grad	SUST'Y course	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.
61.s-u	STOCKSCH	342	**Pesticides, Pub Pol & Envrnmnt**	u/grad	SUST'Y course	Current issues associated with pesticide use; includes discussion of role of pesticides in agriculture, public health, and other related areas; fate of pesticides in the environment; and public perception of pesticides. Case studies examine benefits and risks of pesticide use; environmental cancer; and role of media and public interest groups in pesticide decisions. Alternatives to current heavy reliance on chemical technology in pest control.
62.s-u	ECON	308	**Political Economy of the Envir**	u/grad	SUST'Y course	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.
63.s-u	ECON	308H	**Political Economy of the Envir**	u/grad	SUST'Y course	Course Description not available at this time.
64.s-u	ANTHRO	205	**Inequality and Oppression**	u/grad	SUST'Y course	The roots of racism and sexism and the issues they raise. The cultural, biological, and social contexts of race and gender and examination of biological variation, genetic determinism, human adaptation, and the bases of human behavior. (Gen Ed SB, DU)
65.s-u	PUBHLTH	389	**Health Inequities**	u/grad	SUST'Y course	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.
66.s-u	SOCIOL	262	**Globlization & Inequality**	u/grad	SUST'Y course	This course introduces students to sociological theory, concepts, methods, and results of critical inquiry into the issue of globalization -- the complex and multi-level interconnections of historical, political, economic, and cultural dynamics taking place internationally and how globalization is tied into numerous social issues and inequalities in the U.S. and around the world.
67.s-u	SOCIOL	224	**Social Class and Inequality**	u/grad	SUST'Y course	The nature of social classes in society from the viewpoint of differences in economic power, political power, and social status. Why stratification exists, its internal dynamics, and its effects on individuals, subgroups, and the society as a whole. Problems of poverty and the uses of power. (Gen.Ed. SB, DU)

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68.s-u	BCT	311	**SustIndoorEnvironmentalSystems**	u/grad	SUST'Y course	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.
69.s-u	NRC	185	**SustainbleLivng:Solutions/21st**	u/grad	SUST'Y course	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.
70.s-u	NRC	490S	**SustSys:EvaluatingLocalSolutns**	u/grad	SUST'Y course	Project-based course in which students will work on a semester-long applied research project that analyzes various current systems in western Massachusetts (energy, transportation, agriculture), and identify practical solutions that move towards sustainability. Students identify unique research areas, develop methods and collect data, and analyze and present findings in a report.
71.s-u	STOCKSCH	350	**Sustainable Soil & Crop Mgmnt**	u/grad	SUST'Y course	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.
72.s-u	STOCKSCH	265	**Sustainable Agriculture**	u/grad	SUST'Y course	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.
73.s-u	STOCKSCH	350ISH	**Sustainable Soil & Crop Mgmnt**	u/grad	SUST'Y course	
74.s-u	STOCKSCH	485	**Sust Food & Farming Capstone**	u/grad	SUST'Y course	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.
75.s-u	STOCKSCH	386	**Sustble Site Design & Planning**	u/grad	SUST'Y course	This course is an exploration into the fundamentals of sustainable landscape design with particular attention to integrating both existing and new buildings into the landscape with a view to reducing maintenance needs. Students investigate sustainable design strategies that address the ecological, water, energy and food system links between buildings and their supporting sites, as exemplified by the LEED (Leadership in Energy and Environmental Design) rating system and Sustainable Sites Initiatiive.
76.s-u	ANTHRO	397SD	**ST-SustainbltySustainingDvlpmt**	u/grad	SUST'Y course	How is sustainable development imagined, discursively constructed, and implemented in different locations? Who and what benefits from sustainable development and who and what suffers? What is the relationship between economy and ecology? And how might we begin to imagine, organize around, and enact truly sustainable and socially just worlds? The course is divided up into three overlapping sections. We will critically explore capitalist development as a theoretical structure.
77.s-u	ARCH	497A	**ST-Sustainable Buildng Systems**	u/grad	SUST'Y course	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.
78.s-u	ARCH	497B	**ST-Sustainable Design**	u/grad	SUST'Y course	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.
79.s-u	HT-MGT	497L	**ST-SustToursm:GlblTrends&Issue**	u/grad	SUST'Y course	This course addresses global trends and current issues related to the development of sustainable tourism. It explores the emerging green paradigm as well as the policies and politics that make sustainable practices possible and locates tourism development within the broader context of sustainable development and the triple bottom line (i.e. economic, socio-cultural, and environmental impacts).
80.s-u	MANAGMNT	497S	**ST-Sustainable Product Innovtn**	u/grad	SUST'Y course	

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81.s-u	STOCKSCH	397VP	**ST- SustainableGrapeProduction**	u/grad	SUST'Y course	This class will explore grape origins, domestication, and fundamental principles of grape growing, both domestically and globally. It will include practices specific to the winter such, as pruning.
82.s-u	STOCKSCH	118	**Intro/SustainableFood&Farming**	u/grad	SUST'Y course	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.
83.s-u	MANAGMNT	366	**Foundtns/Sustainable Entrprse**	u/grad	SUST'Y course	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.
84.s-u	MARKETNG	491SM	**S-Marketng/SustainableBusiness**	u/grad	SUST'Y course	Course description not available at this time.
85.s-u	STOCKSCH	382	**Writing for Sustainability**	u/grad	SUST'Y course	Satisfies the Junior Year Writing requirement for SUSFD majors. Practice and improve writing while clarifying career goals and improving professional communication skills.
86.s-u	MANAGMNT	488	**StrategicMgmt/SustainableWorld**	u/grad	SUST'Y course	This course serves as an overview of the key concepts and frameworks of strategic management and shows how these can be applied in particular cases. A 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 will place the `bottom line' in a broader context.
87.s-u	ENVIRSCI	197D	**ST-Foundations of Sustainablty**	u/grad	SUST'Y course	Description not available at this time
88.s-u	STOCKSCH	190D	**Raising Dairy Goats Sustainbly**	u/grad	SUST'Y course	This course explores the differences between conventional, organic, and sustainable methods of raising goats and managing a dairy, whether for home or commercial use. It will cover planning and managing the dairy, as well as natural methods of raising goats. It will integrate current research on goat health issues with management practices. Breeding and birthing issues will be discussed in detail, as well as raising kids. Basics of cheese and soap making will be included.
89.s-u	CE-ENGIN	462	**Water Resources Engin&Sustain**	u/grad	SUST'Y course	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
90.s-u	NRC	297R	**ST-Renewable Energy & Sustain**	u/grad	SUST'Y course	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.
91.s-u	WGSS	220	**Gender, Global Envir, Sustain**	u/grad	SUST'Y course	Gender, the environment and sustainability are key terms in debates about economic globalization and social justice. While not new, they are reemerging in the as part of the post-2015 sustainable development agenda. This course will introduce students to the perceived and existing links between women, gender, and the global environment as they appear in 21st century discussions about sustainable development.
92.s-u	STOCKSCH	197W	**ST-FoodWaste&Recov/MoreSustFd**	u/grad	SUST'Y course	A weekly discussion exploring the root causes of excessive food waste as well as sustainable solutions including; avoiding of the generation of excess, feeding people in need, livestock feed, industrial uses, and composting.
1.incl-u	AFROAM	222	**Black Church In America**	u/grad	--- *includes sustainability*	Survey of West African religions. The development of the Black Christian Church in its visible and "invisible" institutional forms during the colonial period, and the merging of these two branches, free and slave, following the Civil War. Also the emergence of Holiness and Pentecostal sects, the impact of urban migrations on black spiritual expression, the Black Church and civil rights, gender issues, and the recent challenge of Islam.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
2.incl-u	AFROAM	297A	**ST-Black Springfield:Revisited**	u/grad	--- *includes sustainability*	African American urban studies is a vibrant area of intellectual inquiry. This course will acquaint you with a variety of disciplinary tools for studying African American life in the city of Springfield, Massachusetts, our urban neighbor just 25 miles away. We will start with a broad survey of the city's history that began when William Pynchon and a company of Puritan men from Roxbury, founded Springfield in 1636 at the confluence of three rivers. Pynchon established a trading and fur-collectin
3.incl-u	AFROAM	161	**Intro Afro-Amer Political Sci**	u/grad	--- *includes sustainability*	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.
4.incl-u	AFROAM	236	**Hist of the Civil Rights Mvmt**	u/grad	--- *includes sustainability*	Examination of the Civil Rights Movement from the Brown v. Topeka decision to the rise of Black power. All the major organizations of the period, e.g., SCLC, SNCC, CORE, NAACP, and the Urban League. The impact on white students and the anti-war movement. (Gen.Ed. HS, DU)
5.incl-u	AFROAM	133	**African-Amer Hist,Cv War-1954**	u/grad	--- *includes sustainability*	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 ghettoes; the ideologies and movements from integrationism to black nationalism. (Gen.Ed. HS, DU)
6.incl-u	ANIMLSCI	260	**Farm Animal Care & Welfare**	u/grad	--- *includes sustainability*	This class examines the academic discipline of animal welfare, considering how science, ethics, legislation and economic factors impact the lives of animals. (Gen. Ed. SI)
7.incl-u	ANIMLSCI	454	**Dairy Herd Mgt**	u/grad	--- *includes sustainability*	Managerial problems and practices associated with successful dairying in the Northeast and the U.S. Includes dairy cattle nutrition, selection, breeding, lactation, and waste management.
8.incl-u	ANIMLSCI	103	**Intro Animal Mgmt**	u/grad	--- *includes sustainability*	In depth presentation of animal agriculture and its economic implications. Concepts of nutrition, reproduction, husbandry and marketing will be presented for beef and dairy cattle, sheep, swine, poultry and horses. Lab emphasizes application of selected management practices for these animal species. Prereq: ANIMLSCI 101 with a grade of C or better.
9.incl-u	ANIMLSCI	252	**Belted Galloway Mangmnt II**	u/grad	--- *includes sustainability*	This course provides exposure to the beef cattle production cycle in the winter-spring with hands-on experience. An emphasis is placed on understanding cattle behavior and practicing ?sound stockmanship.?
10.incl-u	ANIMLSCI	421	**Wildlife Reproduction**	u/grad	--- *includes sustainability*	This course explores comparative reproductive biology in wildlife and domesticated animals. Topics will include: conservation techniques to solve problems of environmental change and international development; human-wildlife conflict; reproductive cycles in wild animals; reproductive technologies; pharmacological and physical restraint; capture methods and transport. Management of wildlife in national parks, game reserves and zoos.
11.incl-u	ANIMLSCI	251	**Dorset Sheep Management II**	u/grad	--- *includes sustainability*	Students enrolled in this course will participate in all aspects of managing a sheep flock, including nutritional management, health management, pregnancy, neonatal care and marketing.
12.incl-u	ANIMLSCI	254	**Poultry Management II**	u/grad	--- *includes sustainability*	This course will educate students on poultry anatomy and physiology. Discuss various common poultry diseases and well as their prevention, symptoms and treatments. Student will form groups and research topics in the current poultry industry and have debates concerning these issues at the end of the semester.
13.incl-u	ANTHRO	104	**Culture, Society and People**	u/grad	--- *includes sustainability*	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)
14.incl-u	ANTHRO	397S	**ST-Community Service Learning**	u/grad	--- *includes sustainability*	Description not available at this time

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15.incl-u	ANTHRO	397L	**ST-Leadership & Activism**	u/grad	--- *includes sustainability*	Not available at this time
16.incl-u	ANTHRO	397RA	**ST- Relational Organizing**	u/grad	--- *includes sustainability*	Focuses on developing narrative, relationships building, and conflict engagement skills to strengthen leadership work.
17.incl-u	ANTHRO	297MA	**ST-Mapping,Analysis,Visual/GIS**	u/grad	--- *includes sustainability*	Want to learn something about the history of the lands on which we work and live? How to map and track the way land is given and taken away? This is a hands-on, project-based course focused on exploring the impact of America's Land Grant Institutions on Native America. Students will map the public land holdings granted to each state by the Morrill Land Grant Act (1862), then overlay those with tribal land cessions from the same period.
18.incl-u	ANTHRO	380	**Grassroots Community Organizng**	u/grad	--- *includes sustainability*	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.
19.incl-u	ANTHRO	270	**North American Indians**	u/grad	--- *includes sustainability*	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)
20.incl-u	ARCH	211	**The City**	u/grad	--- *includes sustainability*	This lecture investigates the history of global cities, with an emphasis on the twentieth and twenty first centuries. Gen. Ed. HS, DG)
21.incl-u	BCT	211	**Energy Efficient Housing**	u/grad	--- *includes sustainability*	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.
22.incl-u	BCT	313	**Light-Frame Strct Tc**	u/grad	--- *includes sustainability*	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.
23.incl-u	BCT	304	**Wood Properties**	u/grad	--- *includes sustainability*	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.
24.incl-u	BCT	204	**Construction Materials&Methods**	u/grad	--- *includes sustainability*	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.
25.incl-u	BCT	494BI	**BCT Senior Seminar**	u/grad	--- *includes sustainability*	Senior BCT students will explore their own perspectives on professional careers in Building and Construction Technology. They will collaborate in three-person teams to fully develop a business plan for a product/service of their choosing. They will assess their current skill sets and compare those to what is required for success in the business endeavor. They will learn the business planning process.
26.incl-u	BCT	420	**Designing with 3D CAD & BIM**	u/grad	--- *includes sustainability*	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.
27.incl-u	BIOLOGY	421	**Plant Ecology**	u/grad	--- *includes sustainability*	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.
28.incl-u	BIOLOGY	426	**New England Flora**	u/grad	--- *includes sustainability*	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.

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29.incl-u	BIOLOGY	287	**Intro Ecology**	u/grad	--- *includes sustainability*	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.
30.incl-u	BIOLOGY	105	**Biology of Social Issues**	u/grad	--- *includes sustainability*	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)
31.incl-u	CE-ENGIN	310	**Transportation**	u/grad	--- *includes sustainability*	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
32.incl-u	CE-ENGIN	476	**Solid and Hazardous Waste Mgmt**	u/grad	--- *includes sustainability*	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.
33.incl-u	CE-ENGIN	469	**WaterSupply&Wastewater Collctn**	u/grad	--- *includes sustainability*	Design of water supply and wastewater collection systems. Topics include water transmission mains, water distribution systems, pumping, storm sewers and sanitary sewer systems. Design projects, oral and written engineering reports. Ethics and professionalism.
34.incl-u	CE-ENGIN	471	**Water and Wastewater Systems**	u/grad	--- *includes sustainability*	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. Prerequisite: CE-ENGIN 357 and CE-ENGIN 370.
35.incl-u	CE-ENGIN	411	**Traffic Engineering**	u/grad	--- *includes sustainability*	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.
36.incl-u	CE-ENGIN	410	**Public Transportation Systems**	u/grad	--- *includes sustainability*	A historical overview of public transportation and a summary of existing and future transit and paratransit systems and technologies; application of intelligent transportation system (ITS) technologies (including advanced communication, sensor, and information processing technologies) in the implementation of transit and paratransit operations; public transit systems costs, demand, pricing, and performance evaluation; project planning including routing, scheduling, preliminary design and ownership.
37.incl-u	CE-ENGIN	470	**GIS for Engineers**	u/grad	--- *includes sustainability*	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, and visualization of spatial data. Laboratory exercises will address problems in hydrology, water treatment, renewable energy, and transportation.
38.incl-u	CHEM-ENG	290A	**Intro to Energy Engineering**	u/grad	--- *includes sustainability*	This course introduces students to the energy needs and possible energy changes that will occur as we transform from a petroleum-based energy source to renewable energies. It will give students the tools and perspective to evaluate alternative technologies in energy utilization with emphasis on renewable/sustainable technologies.

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39.incl-u	CHINESE	394PI	**Chinese Popular Culture**	u/grad	--- *includes sustainability*	This comprehensive survey of popular culture in modern China has two main purposes: first, providing a structured context for students to reflect on their learning in Chinese language, literature, and culture; second, enabling the students to explore and integrate the connections between their lived experience of Chinese culture and training through General Education in literature, film, history, sociology, political science, anthropology and communications.
40.incl-u	CHINESE	241	**Contemp Chinese Lit**	u/grad	--- *includes sustainability*	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.
41.incl-u	COMM	397SS	**ST-Youth, Democracy & Ent Indu**	u/grad	--- *includes sustainability*	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.
42.incl-u	COMM	288	**Gender, Sex & Representation**	u/grad	--- *includes sustainability*	This course will examine the relationship between commercialized systems of representation and the way that gender and sexuality are thought of and organized in the culture. In particular, we will look at how commercial imagery impacts upon gender identity and the process of gender socialization. Central to this discussion will be the related issues of sexuality and sexual representation (and the key role played by advertising).
43.incl-u	COMM	319	**Health Communication**	u/grad	--- *includes sustainability*	This course applies a communication perspective to the study of health, disease and illness. The course will introduce, investigate and explore the nature of communication processes that influence and/are influenced by health and health care contexts. Communication theories and practices will be applied to a variety of health issues including the physician-patient relationship, designing health media campaigns, and health literacy.
44.incl-u	COMPSCI	305	**Social Issues in Computing**	u/grad	--- *includes sustainability*	Satisfies the Junior Year Writing requirement. The impact of computers on modern society.
45.incl-u	ECON	104	**Introduction to Macroeconomics**	u/grad	--- *includes sustainability*	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)
46.incl-u	ECON	331	**Org Of American Industry**	u/grad	--- *includes sustainability*	A topical study of key industrial and technological developments in U.S. economic history. Focuses on the periods of transition leading to the ascendance of U.S. manufacturing power and the subsequent decline in U.S. manufacturing leadership in the growing globalized economy. Prerequisites: Econ 103 or RESECON 102 or ECON 104.
47.incl-u	ECON	204	**Intermed Macroeconomic Theory**	u/grad	--- *includes sustainability*	Analysis of theories of determination of national income, aggregate employment, and the price level. Monetary and fiscal policy. Inflation, unemployment, and economic growth.
48.incl-u	ECON	394FI	**Finance and Society**	u/grad	--- *includes sustainability*	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?
49.incl-u	ECON	103	**Introduction to Microeconomics**	u/grad	--- *includes sustainability*	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)
50.incl-u	ECON	394IO	**Industrial Organization**	u/grad	--- *includes sustainability*	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.

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51.incl-u	ECON	397MI	**ST-City,Industr,Labor/ColIndia**	u/grad	--- *includes sustainability*	Focusing on Calcutta (present day Kolkata) and Bombay (present day Mumbai), the two most important port cities and industrial centers of British India, this course examines how trade and industrialization shaped urban society and politics in colonial India. We will explore themes that include the following: colonial trade, the gendered history of colonial labor migration, beginning of factory industries, the emergence of a class of industrial entrepreneurs and wage earners, the built environment
52.incl-u	EDUC	210	**Social Diversity in Education**	u/grad	--- *includes sustainability*	Focus on issues of social identity, social and cultural diversity, and societal manifestations of oppression. Draws on interdisciplinary perspectives of social identity development, social learning theory, and sociological analyses of power and privilege within broad social contexts. (Gen.Ed. I, DU)
53.incl-u	EDUC	229	**International Education**	u/grad	--- *includes sustainability*	This course is designed to introduce students to the role of culture in education. After exploring the theoretical basis of culture, and its relationship to education, students will be exposed to a range of cultural perspectives from Africa, Asia and Latin America. (Gen.Ed. SB, DG)
54.incl-u	EDUC	258	**Educ Soc Justice&Div Peer Thtr**	u/grad	--- *includes sustainability*	Students in this class develop dramatic scenarios to engage their peers with issues of diversity and social justice. This class explores social justice issues on personal, institutional and societal levels, as experienced in schools, families, neighborhoods and on this campus. (Gen.Ed. U)
55.incl-u	ENGIN	113	**Intro Mech & Indust Engin**	u/grad	--- *includes sustainability*	Students select one of the four introductory engineering courses (ENGIN 110, 111, 112, or 113). Within a small class, student teams explore real engineering designs. This introduction to engineering design and/or manufacturing emphasizes development of communication skills (written, oral, and graphical). Project required.
56.incl-u	ENGLISH	365	**20C Lit Of Ireland**	u/grad	--- *includes sustainability*	Nineteenth-century background: the Irish Renaissance; such major figures as Yeats, Synge, Joyce and O'Casey; recent and contemporary writing. (Gen.Ed. AL)
57.incl-u	ENVIRSCI	452	**Haz Waste Ops & Emerg Respnse**	u/grad	--- *includes sustainability*	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 perfomed by students in personal protective equipment responding to unknown incidents to challenge skills developed in lecture. Certifications awarded.
58.incl-u	ENVIRSCI	214	**Ecosystms,Biodivrsty&GloblChng**	u/grad	--- *includes sustainability*	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.
59.incl-u	ENVIRSCI	194A	**Intro Seminar II**	u/grad	--- *includes sustainability*	This course is designed to introduce first-year students, new Environmental Science majors and transfer students to a variety of faculty and environmental science research at UMASS Amherst, with the goal of helping students identify their particular interest and focal area within the discipline. Students will be able to use this information to locate independent study research opportunities, to select upper-level course work, and to further narrow their interests with the broad scope of topics.
60.incl-u	ENVIRSCI	294A	**S-Career&CurriculumPlanning**	u/grad	--- *includes sustainability*	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, etc.
61.incl-u	FOOD-SCI	391B	**S-Product Development**	u/grad	--- *includes sustainability*	Description not available at this time

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62.incl-u	GEOGRAPH	102	**Intro/Human Geography**	u/grad	--- *includes sustainability*	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.
63.incl-u	GEOGRAPH	314	**Writing In Geography**	u/grad	--- *includes sustainability*	Readings, lecture, group and individual tutorial, exercises, and peer review focusing on critical thinking and geographic writing.
64.incl-u	GEOGRAPH	354HH	**Climatology (honors colloq)**	u/grad	--- *includes sustainability*	Not available at this time
65.incl-u	GEOGRAPH	354	**Climatology**	u/grad	--- *includes sustainability*	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.
66.incl-u	GEOGRAPH	352	**Computer Mapping**	u/grad	--- *includes sustainability*	Mapping projects through the use of software mapping packages. Students select their own final projects.
67.incl-u	GEOGRAPH	440	**Political Geography**	u/grad	--- *includes sustainability*	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.
68.incl-u	GEOGRAPH	497N	**S-Ntl Parks & Protected Areas**	u/grad	--- *includes sustainability*	This course explores efforts in the U.S. and worldwide to promote biodiversity conservation, sustainability, and social justice through the designation and management of nationals parks and other protected areas.
69.incl-u	GEOGRAPH	397WG	**ST-Water Geographies**	u/grad	--- *includes sustainability*	Water Geographies focuses on current issues related to water, and individual and group action that can make a difference to improve water sustainability. It is a service learning class. We will read several journalistic books as well as news articles to explore current issues. We will think about the ways that people cause and face conflict over water, and how they strive to improve sustainability. Focus issues will include: freshwater sustainability and development; bottled water; dams, energy
70.incl-u	GEOGRAPH	220	**World Regional Geography**	u/grad	--- *includes sustainability*	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)
71.incl-u	GEOGRAPH	497C	**ST-Climate Crisis**	u/grad	--- *includes sustainability*	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 range from IPCC reports to popular authors such as Bill McKibben & Naomi Klein.
72.incl-u	GEOGRAPH	397EU	**ST-Geography/European Union**	u/grad	--- *includes sustainability*	This course is a survey of the geography of the European Union. The course will focus on cultural, political, and environmental realities of the EU. Special attention will be paid to it's origins and development as a supranational political entity.
73.incl-u	GEOGRAPH	354ISH	**Climatology (HnrsInd)**	u/grad	--- *includes sustainability*	
74.incl-u	GEOGRAPH	493W	**S- WebGIS**	u/grad	--- *includes sustainability*	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.

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75.incl-u	GEOGRAPH	493M	**S-Migration,Diaspora,Refugees**	u/grad	--- *includes sustainability*	This course provides an introduction to the literature, theory, and practice of geographies of migration, diaspora, and refugees. Students will examine historical migrations of humans beginning with the Out of Africa theory leading up to present day issues of the European migrant crisis and transnational migration phenomena. There will also be modules on refugee studies especially looking at internally displaced peoples and cases that destabilize what it means to be a "refugee."
76.incl-u	GEOGRAPH	397G	**ST-Intro to GIS**	u/grad	--- *includes sustainability*	
77.incl-u	GEOLOGY	101	**The Earth**	u/grad	--- *includes sustainability*	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.
78.incl-u	GEOLOGY	103	**Intro Oceanography**	u/grad	--- *includes sustainability*	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, biodi-versity 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.
79.incl-u	GEOLOGY	105	**Dynamic Earth**	u/grad	--- *includes sustainability*	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; and the hazards that they produce and their impact on humans.
80.incl-u	GEOLOGY	201	**History Of The Earth**	u/grad	--- *includes sustainability*	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 history of North America. Prerequisite: introductory geology course, preferably GEO-SCI 101, or one semester of biology.
81.incl-u	GEOLOGY	494LI	**Livng on Erth:Real-world Is**	u/grad	--- *includes sustainability*	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.
82.incl-u	GEOLOGY	197A	**ST-Intro/Physical Geology**	u/grad	--- *includes sustainability*	Not available at this time.
83.incl-u	GEOLOGY	101ISH	**The Earth (HnrsInd)**	u/grad	--- *includes sustainability*	
84.incl-u	HISTORY	346	**Twentieth-Century China**	u/grad	--- *includes sustainability*	The personalities, events, and forces that shaped China during the last century: collapse of the imperial order; warlordism, foreign invasion; political and cultural revolutions; Mao and the Chinese Communist Party; the struggle to "modernize" China's economy, society, and culture; role of China in today's world.
85.incl-u	HISTORY	389	**US Women's History Since 1890**	u/grad	--- *includes sustainability*	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)
86.incl-u	HISTORY	394CI	**Ideas That Changed History**	u/grad	--- *includes sustainability*	This class is about 1. Ideas that have chagned 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).

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
87.incl-u	HISTORY	395S	**History/SocPolcy/PolGendRaceCl**	u/grad	--- *includes sustainability*	What are the problems associated with developing equitable and just policy? Why does social policy in the United States continue to be marked by tensions between the principle of equality and the reality of inequalities in social, political, and economic realms? How might policy subvert or reinforce these differences and inequalities? This class examines the history of social policy in the U.S., particularly policies affecting gender, race, and class.
88.incl-u	HISTORY	397ST	**ST-SciTchWar-20thCentryUS/Euro**	u/grad	--- *includes sustainability*	This course will examine the nexus of science, technology, and war in the 20th century United States and Europe. This course will cover topics such as the development and use of chemical and biological warfare; scientific, political, medical, and philosophical implications of nuclear technology; the Manhattan Project and Big Science; Nazi science; Soviet agriculture; Cold War technology and the Space Race; missile technology; and psychological research and the military.
89.incl-u	HISTORY	220	**Capitalism & Altern/Latin Amer**	u/grad	--- *includes sustainability*	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.
90.incl-u	HISTORY	181	**Hist Western Sci&Technology II**	u/grad	--- *includes sustainability*	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)
91.incl-u	HISTORY	491J	**S-History of Modern China**	u/grad	--- *includes sustainability*	This is a course on the history of modern China (c. 1800 to present). Expecting that many students will come to the course with primary interests in other areas, it will emphasize comparative and transnational approaches that encourage cross-fertilization with other coursework.
92.incl-u	HT-MGT	433	**Tourism Policy and Planning**	u/grad	--- *includes sustainability*	Social, economic, and environmental dimensions of tourism. Selected problems in travel and tourism including psychological, sociocultural and economic impacts. Uses the discipline specific knowledge of Tourism Policy and Planning as a platform for integrating skills and knowledge that students have acquired from prior courses and life experiences. Satisfies the Integrative Experience requirement for BS-HTMGT majors.
93.incl-u	JOURNAL	460	**Journalism Ethics**	u/grad	--- *includes sustainability*	This course will develop an understanding of the ethical questions raised by media coverage in a democratic society at a time of focus on profit over news values and on entertainment over substance. Issues discussed will include: accuracy and fairness, diversity, conflicts of interest, privacy, deception, relationships with sources and photojournalism. We will also learn to identify news values--or lack of them--both as professionals and as consumers. Satisfies the Integrative Experience require
94.incl-u	JOURNAL	383	**ST-Entrepreneurial Journalism**	u/grad	--- *includes sustainability*	This is the class for you if you are looking to create your own news site, magazine or brand. We will look at new and emerging for-profit and non-profit news organizations, how they work and how they sustain themselves (or not) financially. We'll learn about tech tools that help us work successfully as independent news publishers, including content management systems, tech tools and other digital resources. Other topics include: idea strategizing and development, marketing and audience development
95.incl-u	LABOR	280	**Labor & Work In The US**	u/grad	--- *includes sustainability*	The evolution and current status of labor and work in the U.S. Examines multiple perspectives on workers, unions, workplace systems, and worker rights. (Gen.Ed. I, DU)
96.incl-u	LANDARCH	297A	**ST-Studio I**	u/grad	--- *includes sustainability*	Introduction to Design -- basic introduction to two-dimensional concepts of design. Line, form, contrast, repetition, symmetry, texture, scale, and other design techniques. Models -- introduction to three-dimensional design thinking by creating spaces through land form, vegetation, and structure.
97.incl-u	LANDARCH	297B	**ST-Studio I**	u/grad	--- *includes sustainability*	Introduction to Design -- basic introduction to two-dimensional concepts of design. Line, form, contrast, repetition, symmetry, texture, scale, and other design techniques. Models -- introduction to three-dimensional design thinking by creating spaces through land form, vegetation, and structure.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
98.incl-u	LANDARCH	297C	**ST-Studio II**	u/grad	--- *includes sustainability*	Spaces/places in contextointroduction to design processes. The relationship of site context factors and design program to the formation of landscape spaces. A series of small problems such as: courtyard, plaza, small park, ceremonial space, each with a well defined program. Site visits and analysis, diagramming relationships between various activities, and developing an understanding of design processes.
99.incl-u	LANDARCH	297D	**ST-Studio II**	u/grad	--- *includes sustainability*	Spaces/places in contextointroduction to design processes. The relationship of site context factors and design program to the formation of landscape spaces. A series of small problems such as: courtyard, plaza, small park, ceremonial space, each with a well defined program. Site visits and analysis, diagramming relationships between various activities, and developing an understanding of design processes.
100.incl-u	LANDARCH	397C	**ST-Studio IV**	u/grad	--- *includes sustainability*	Institutional and commercial scale -- issues of design for commercial and industrial uses. May cover the spectrum from a site plan for an office complex to a marina. Issues of cost, client needs, program, and politics. Site planning -- introduction to concepts of site planning for housing developments. Students perform a detailed site assessment using methods learned in natural factors and previous studio on a 100-acre (+/-) site and apply them to development of a master plan.
101.incl-u	LANDARCH	397D	**ST-Studio IV**	u/grad	--- *includes sustainability*	Institutional and commercial scale -- issues of design for commercial and industrial uses. May cover the spectrum from a site plan for an office complex to a marina. Issues of cost, client needs, program, and politics. Site planning -- introduction to concepts of site planning for housing developments. Students perform a detailed site assessment using methods learned in natural factors and previous studio on a 100-acre (+/-) site and apply them to development of a master plan.
102.incl-u	LANDARCH	497A	**ST-Studio V**	u/grad	--- *includes sustainability*	Town/urban scale -- issues of design in an urban situation with a focus on areas of public use. Topics on historic preservation. Urban detail design -- issues of urban design at a detailed level. Information from construction, plant materials, planting design, and other studios to develop a complete package of drawings.
103.incl-u	LANDARCH	497B	**ST-Studio V**	u/grad	--- *includes sustainability*	Town/urban scale -- issues of design in an urban situation with a focus on areas of public use. Topics on historic preservation. Urban detail design -- issues of urban design at a detailed level. Information from construction, plant materials, planting design, and other studios to develop a complete package of drawings.
104.incl-u	LANDARCH	397B	**ST-Studio III**	u/grad	--- *includes sustainability*	Residential garden -- introduction to translating client needs into a program of activities. Recreation and open space -- a systematic view of open space networks. Concepts of public, semi-public, and private spaces. Methods of site analysis and programming activities emphasized.
105.incl-u	LANDARCH	494LI	**Landscape Planning & Cultural**	u/grad	--- *includes sustainability*	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 for BS-LdArch majors.
106.incl-u	LANDARCH	294A	**S-Construction Materials**	u/grad	--- *includes sustainability*	Introduction to materials used in landscape construction, their design potential and limitations. Design details and construction methods discussed.
107.incl-u	LANDARCH	494A	**S-Professional Pract**	u/grad	--- *includes sustainability*	Models of professional office structure: management, organizational behavior, and economics. Guest professionals give insights into the profession and how an office should be managed. Topics include: ethics, contracts, compensation, specifications, contract management, marketing, budgets, and cost analysis.
108.incl-u	LANDARCH	294B	**S-Cnstr Matls/Ldcont**	u/grad	--- *includes sustainability*	Not available at this time
109.incl-u	LANDARCH	297M	**ST-BusinessConcepts/Landcont**	u/grad	--- *includes sustainability*	The varied aspects of running a small landscape contracting business.
110.incl-u	LANDCONT	107	**Land Form**	u/grad	--- *includes sustainability*	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.

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111.incl-u	LANDCONT	112	**Intro to Landscape Design**	u/grad	--- *includes sustainability*	The landscape media of plants, landforms, structures, and water. Graphic techniques, including modeling, drafting, and plan and cross-section drawings initiated. Examination of built landscape designs in the field and on paper.
112.incl-u	LLCAR	31	**HVAC Rooftop Units**	u/grad	--- *includes sustainability*	
113.incl-u	LLCAR	115	**Intro to Smart Labs Ventil Sys**	u/grad	--- *includes sustainability*	
114.incl-u	MANAGMNT	362	**Law of Enterprise Organization**	u/grad	--- *includes sustainability*	The economic functions and consequences of agency, partnerships, and corporations. Prerequisite: MANAGMNT 260.
115.incl-u	MARKETNG	301	**Fundamentals Of Mktg**	u/grad	--- *includes sustainability*	Introduction to marketing; survey of topics relevant to comprehensive study of marketing. Emphasis on describing the marketing process and on stressing the implications of these activities for society.
116.incl-u	MARKETNG	410	**Consumer Behavior**	u/grad	--- *includes sustainability*	Application of behavioral science theories and marketing theories to an understanding of the behavior of consumers. Exploration of consumer decision making and involvement as well as psychological and social factors that influence the consumer. Prerequisites: MARKETNG 301
117.incl-u	MICROBIO	494PI	**Poverty Race and AIDS in the U**	u/grad	--- *includes sustainability*	HIV rates in U.S. poverty areas rival those found in Haiti, Burundi, Ethiopia, and Angola. HIV prevalence in high-poverty neighborhoods is more than double that of the nation overall. Within high-poverty neighborhoods, prevalence among people living below the poverty line was double that of those living above it. Blacks disproportionately bear the brunt of the HIV epidemic in the US (48% of all new cases of the disease while representing only 12% of the population.)
118.incl-u	MIDEAST	190A	**WtrOil&Blood:MdEast/GlblPol**	u/grad	--- *includes sustainability*	This course is a basic, interdisciplinary introduction to the contemporary Middle East, and uses three substances central to contemporary society as organizing metaphors for issues that help define the region that stretches from Morocco to Iran. We consider a wide range of topics including the modern legacy of Western colonialism in the region, the impact of oil, the roles of religion, gender politics, Arab-Israeli conflicts, and US policies towards the region.
119.incl-u	NATSCI	494I	**Global Issues/Applied Biology**	u/grad	--- *includes sustainability*	This course will consist of three case study modules. Each module is a real-world problem that integrates knowledge from a biological, social, political, and economic perspective. Students are expected to transfer their knowledge from the broader General Education training into specific real-world issues. This courses satisfies the Integrative Experience requirement for PLSOIL majors.
120.incl-u	NATSCI	387	**CNS Junior Writing**	u/grad	--- *includes sustainability*	Multidisciplinary professional writing course. Research, analyze, reference and write in the formal and informal text conventions used by Environmental Sciences, Natural Resources Conservation, & Veterinary and Animal Sciences.
121.incl-u	NRC	225	**Forests and People**	u/grad	--- *includes sustainability*	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.
122.incl-u	NRC	213	**Arboricultural Field Tech III**	u/grad	--- *includes sustainability*	Description not available at this time
123.incl-u	NRC	126	**Insects & Human Society**	u/grad	--- *includes sustainability*	Survey with emphasis on the successful design of insects and their innovative features. Aspects of insect biology, including communication, defense, feeding, and mating behaviors. Social behavior with a focus on termite, ant, and honey bee societies. Beneficial uses of insects such as silk and pollination, and negative interactions with humans, including disease vectors, parasites, and crop pests.
124.incl-u	NRC	261	**Wildlife Conservation**	u/grad	--- *includes sustainability*	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.
125.incl-u	NRC	232	**Prin Of Arboriculture**	u/grad	--- *includes sustainability*	The use and maintenance of trees in the urban environment from both a private and government perspective.

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126.incl-u	NRC	305	**Commercial Arboriculture**	u/grad	--- *includes sustainability*	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.
127.incl-u	NRC	260	**Fish Consrvatn & Mgt**	u/grad	--- *includes sustainability*	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
128.incl-u	NRC	310	**Community Forestry**	u/grad	--- *includes sustainability*	Management principles of municipal and utility tree care, land use problems, tree laws and ordinances.
129.incl-u	NRC	409	**Nat Res Policy&Admin**	u/grad	--- *includes sustainability*	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.
130.incl-u	NRC	333	**Prin of Arbor II**	u/grad	--- *includes sustainability*	Not available at this time.
131.incl-u	NRC	252	**Fundamentals Applied Ecology**	u/grad	--- *includes sustainability*	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. Restricted to majors in the Department of Natural Resources Conservation.
132.incl-u	NRC	390G	**Plant Health Care Diagnostics**	u/grad	--- *includes sustainability*	Using the understanding gained from previous coursework in pathology, entomology, dendrology, soil science and professional knowledge from work experience in the green industry, students will explore proper techniques and procedures relative to the identification of plant health-related concerns, proper sample submission to lab facilities and plant health care policy and decision-making.
133.incl-u	NRC	260ISH	**Fish Conserv & Mgmt (HnrsInd)**	u/grad	--- *includes sustainability*	
134.incl-u	NRC	497M	**ST-Eco&Conserv/MigratrySpecies**	u/grad	--- *includes sustainability*	Migration is an essential life history strategy for a diverse group of species, from whales to butterflies, songbirds to wildebeest, and bats to fish. Many of these species are experiencing significant population declines and their complex life cycles pose novel conservation challenges. We will explore the conservation and full life-cycle ecology of these amazing animals and include discussions on new technological advances.
135.incl-u	NRC	290B	**Intro to Quantitative Ecology**	u/grad	--- *includes sustainability*	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. The objective of the course is to demystify statistics and help develop the basic level of understanding
136.incl-u	NRC	497C	**ST-HumanCarnivoreConflict&Cons**	u/grad	--- *includes sustainability*	As the needs of an expanding human population continues to grow, so do interactions between people and wildlife. Though many interactions are exciting and positive, interactions with carnivores, in particular, are often negative. These human-carnivore conflicts can pose a threat to people, their belongings, and their livelihoods through competition over resources. This course looks at ways to mitigate these conflicts.
137.incl-u	NRC	391A	**Sem-Curric Planning**	u/grad	--- *includes sustainability*	Development of individualized curricula for the major's elective credits. University and program graduation requirements, second majors, minors, and curriculum plans discussed.
138.incl-u	NRC	191A	**Arboriculture&Community Forest**	u/grad	--- *includes sustainability*	Contact department for description.
139.incl-u	NRC	197FF	**ST-Forest Fire Control**	u/grad	--- *includes sustainability*	Topics covered in lecture and weekly assignments will include wildland fire management policy, principles and procedures of forest fire control, fire-line safety, fire weather, and fire behavior.

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140.incl-u	NRC	390E	**Evolution and Conservation**	u/grad	--- *includes sustainability*	This course provides the evolutionary basis for understanding biological problems in conservation. Evolutionary thinking provides more comprehensive approaches to conservation biology and future conservation practitioners must be equipped with the ability to think about conservation from an evolutionary perspective. Major topics will include: (1) a survey of evolutionary theory; (2) the application of evolutionary thinking to case studies and problems in conservation biology.
141.incl-u	NUTRITN	230	**Basic Nutrition**	u/grad	--- *includes sustainability*	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.
142.incl-u	NUTRITN	352	**Nutrition in the Life Cycle**	u/grad	--- *includes sustainability*	Nutritional needs and effects of intakes during pregnancy and lactation, infancy, preschool period, middle childhood, adolescence, adulthood and aging. Relation of nutrition to physical and physiological growth, development, maturation, and decline.
143.incl-u	NUTRITN	130	**Nutrition/Healthy Lifestyle**	u/grad	--- *includes sustainability*	Introduction to the science of human nutrition and the relationship of food and nutrients to health 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)
144.incl-u	NUTRITN	201	**Intro Profession of Nutrition**	u/grad	--- *includes sustainability*	History of nutrition; career options and decision-making alternatives; professional societies and their roles; introduction to the faculty, curriculum, and facilities of the department.
145.incl-u	NUTRITN	140	**Nutrition, Weight & Fitness**	u/grad	--- *includes sustainability*	Concepts in basic nutrition, healthy weight and fitness. Topics include: dietary guidelines, meal planning, obesity and weight management, eating disorders, vegetarianism, sports nutrition, weight reduction diets, dietary supplements. (GenEd. BS)
146.incl-u	NUTRITN	480	**MedTermnlgy/NutritnCareProcess**	u/grad	--- *includes sustainability*	An introduction to Medical Terminology and the nutrition care process. This will include the steps involved in writing a nutrition care plan.
147.incl-u	NUTRITN	430	**Nutrition and Metabolism**	u/grad	--- *includes sustainability*	The nutrients and their metabolic fate. The interdependent and interrelated nature of nutrients, and the effects of diet upon metabolic functions.
148.incl-u	NUTRITN	494A	**Sem-Human Nutrition**	u/grad	--- *includes sustainability*	Student presentations of topics which integrate previous coursework.
149.incl-u	PHYSICS	118	**Energy and Society**	u/grad	--- *includes sustainability*	This course provides a thorough introduction to basic energy science; society's evolving portfolio of both carbon intensive and alternative energy sources; the greenhouse effect and global warming. Uses high school algebra. (Gen. Ed. PS)
150.incl-u	POLISCI	101	**American Politics**	u/grad	--- *includes sustainability*	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)
151.incl-u	POLISCI	214	**Urban Gov & Politics**	u/grad	--- *includes sustainability*	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.
152.incl-u	POLISCI	395S	**History/SocPolcy/PolGendRaceCl**	u/grad	--- *includes sustainability*	What are the problems associated with developing equitable and just policy? Why does social policy in the United States continue to be marked by tensions between the principle of equality and the reality of inequalities in social, political, and economic realms? How might policy subvert or reinforce these differences and inequalities? This class examines the history of social policy in the U.S., particularly policies affecting gender, race, and class.
153.incl-u	POLISCI	297W	**ST-Intro:Women&Politics in USA**	u/grad	--- *includes sustainability*	This course examines women's political incorporation in the United States primarily, but not exclusively, with respect to electoral politics. We explore women's pre-suffrage political activities before delving into the campaign for women's suffrage. We study the effects of achieving suffrage on women's political behavior during the period immediately following their achievement of the right to vote and beyond.
154.incl-u	POLISCI	499D	**Honors Thesis-Energy Politics**	u/grad	--- *includes sustainability*	

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155.incl-u	PUBHLTH	160	**My Body, My Health**	u/grad	--- *includes sustainability*	Principles of health promotion and wellness with an emphasis on helping you get the most out of your college experience. Using active, socially engaged approaches we will examine topics such as resilience and stress, social image, healthy eating, social activism, substance use, healthy relationships, and human sexuality (Gen.Ed. SI, DU).
156.incl-u	PUBHLTH	129	**Health Care For All**	u/grad	--- *includes sustainability*	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)
157.incl-u	PUBHLTH	302	**Comm Devlpm & Health Education**	u/grad	--- *includes sustainability*	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.
158.incl-u	PUBHLTH	320	**Principles of Pub Hth Practice**	u/grad	--- *includes sustainability*	This course is designed to give students a broad overview of public health and public health systems within the United States. This course will provide students with an understanding of the core disciplines with public health and will then focus in on the social and political aspects of health.
159.incl-u	PUBHLTH	494CI	**Public Health Sciences Capston**	u/grad	--- *includes sustainability*	The culminating experience of the Public Health Sciences Major, this course is designed for students to synthesize and integrate their learning from previous coursework, internship, and extra-curricular activities in the discipline. Course leads to a project, presentation, initiative, or research paper that is present at the Statewide Research Conference. Class also helps develop skills in teamwork, communication and leadership.
160.incl-u	PUBHLTH	324	**Epidemiology in Public Health**	u/grad	--- *includes sustainability*	This course is intended to introduce the science of epidemiology and to explore how epidemiologic methods are applied to solving public health problems. Students will learn basic quantitative methods, study design concepts, and critical thinking skills relating to infectious and chronic disease epidemiology.
161.incl-u	PUBHLTH	390G	**Holistic Health and Healing**	u/grad	--- *includes sustainability*	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.
162.incl-u	PUBHLTH	397A	**ST-Intro to Global Health**	u/grad	--- *includes sustainability*	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.
163.incl-u	PUBHLTH	390CT	**Intro to Hlth Srvcs Mgmt**	u/grad	--- *includes sustainability*	This course presents an undergraduate-level introduction to the principles and practice of management in health service organizations. Specific topics include leadership, organizational behavior and theory, strategic planning, marketing, quality and process improvement, finance and insurance, and human resource management. This course will inform and prepare future managers to lead successful health organizations.
164.incl-u	PUBHLTH	499O	**Hons Project Sem- 2nd Semester**	u/grad	--- *includes sustainability*	The course introduces topics on organization, power, and leadership in public health and has grown out of existing coursework in Commonwealth Honors College. Satisfies the Integrative Experience requirement for BS-PubHlth majors.
165.incl-u	PUBHLTH	290B	**Intro to Public Health**	u/grad	--- *includes sustainability*	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.
166.incl-u	PUBHLTH	160ISH	**My Body, My Health (HnrsInd)**	u/grad	--- *includes sustainability*	
167.incl-u	PUBHLTH	301	**Princ of Comm Health Education**	u/grad	--- *includes sustainability*	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.

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168.incl-u	PUBHLTH	390TL	**Ecotoxicology & Public Health**	u/grad	--- *includes sustainability*	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.
169.incl-u	PUBHLTH	323	**Public Health Communications**	u/grad	--- *includes sustainability*	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 and use of communication strategies to inform and influence individual and community decisions that enhance health."
170.incl-u	PUBP&ADM	190A	**WaterOil&Blood:MidEast/GlblPol**	u/grad	--- *includes sustainability*	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.
171.incl-u	PUBP&ADM	397N	**ST-Natural Resource Pol & Admn**	u/grad	--- *includes sustainability*	
172.incl-u	PUBP&ADM	395S	**S- Rethinking Springfield**	u/grad	--- *includes sustainability*	Springfield was the birthplace of the industrial revolution in America and a manufacturing powerhouse into the 1960s when its major industries left for lower cost locations and the city?s economy collapsed. After decades of economic challenges and demographic changes that made Springfield a ?majority minority? city, significant projects are under development including a casino, union station, and subway manufacturing by a Chinese company, Changchun Railway.
173.incl-u	PUBP&ADM	497A	**ST-Social-Mission Enterprises**	u/grad	--- *includes sustainability*	This course is for students who dream of starting, running, or working for a social mission enterprise---an organization that meets a specific social mission, makes its financial goals, and considers the environmental and personal impacts of its actions. 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 a current social issue.
174.incl-u	RES-ECON	452	**Industrial Organization**	u/grad	--- *includes sustainability*	Market structure models with application to various industries. Firm behavioral strategies under different market structures. The role of product differentiation, advertising, market power, mergers, barriers to entry, price and non-price rivalry. Market performance including prices, costs, profits, labor issues, and progressiveness. BS-ResEc majors can satisfy their Integrative Experience requirement by taking this course plus Res-Econ 394LI and 453.
175.incl-u	RES-ECON	162	**Consumer In Society**	u/grad	--- *includes sustainability*	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)
176.incl-u	RES-ECON	362	**ConsumerProtectionLegislation**	u/grad	--- *includes sustainability*	An introduction to basic issues in the seller-consumer relationship and to laws designed to protect consumers from unsafe products and fraudulent business practices. Topics include: product safety, consumer fraud, unfair business practices, and analysis of economic and social impact of consumer regulation.
177.incl-u	RES-ECON	394LI	**Life is Full of Choices**	u/grad	--- *includes sustainability*	Students will reflect on and integrate their learning and experience through the following activities: 1) Update a personal Reflective Portfolio and complete a series of activities in which they inventory and map courses taken, work experience, and extracurricular activities and identify skills they have attained through this experience; develop an updated resume, a networking website profile, and explore careers in Resource Economics.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
178.incl-u	SCH-MGMT	397K	**ST-Ubuntu&Business/S.Africa**	u/grad	--- *includes sustainability*	Through readings, case studies, guest speakers, reflective writing, and a research paper, students will learn about South African culture and history, the power of the South African economy within Africa and the rest of the world, and the concept of Ubuntu as it applies to business: coming up with African solutions to African challenges.
179.incl-u	SOCIOL	360	**Urban Sociology**	u/grad	--- *includes sustainability*	Basic urban sociological concepts. Topics include the development of cities, the emergence of suburbs, the residential segregation of ethnic minorities. Considers trends in the US and abroad.
180.incl-u	SOCIOL	103	**Social Problems**	u/grad	--- *includes sustainability*	Introduction to sociology. America's major social problems--past and present--are examined. These include crime, mental health, drug addiction, family tensions and inequalities based on race, gender, ethnicity and social class. (Gen.Ed. SB, DU)
181.incl-u	SOCIOL	325	**Political Sociology**	u/grad	--- *includes sustainability*	Basic issues in political sociology and politics: interaction between the political and social-cultural spheres, sources and manifestations of political inequality; variety of social conflict and its major theories; relationship between political ideas and political behavior. Issues of political violence and coercion, political propaganda and legitimation, intellectuals and political power.
182.incl-u	SOCIOL	341	**Social Welfare**	u/grad	--- *includes sustainability*	Critical introduction to American welfare programs, past and present. Analysis of why programs change over time and of the effects of those changes on the people that welfare purports to `help'.
183.incl-u	SOCIOL	245	**Race & Society**	u/grad	--- *includes sustainability*	A social-historical approach to race relations in the U.S. Analysis of contemporary race relations links to major social issues in American society. (Gen.Ed. SB, DU)
184.incl-u	SOCIOL	106	**Race,Gender, Class & Ethnicity**	u/grad	--- *includes sustainability*	Introduction to Sociology. Analysis of the consequences of membership in racial, gender, class and ethnic groups on social, economic and political life. (Gen.Ed. SB, DU)
185.incl-u	SOCIOL	283	**Gender & Society**	u/grad	--- *includes sustainability*	Analysis of: 1) historical and cross-cultural variation in positions and relationships of women and men; 2) contemporary creation and internalization of gender and maintenance of gender differences in adult life; 3) recent social movements to transform or maintain "traditional" positions of women and men. Prerequisite: 100-level Sociology course.
186.incl-u	SOCIOL	297W	**STIntro to Social Welfare**	u/grad	--- *includes sustainability*	Critical introduction to various conceptions of "welfare" across contexts, exploring notions of deservingness and entitlement, various methods of provision, changes in programs over time, as well as the ways that welfare programs create, reproduce, and mitigate enduring inequalities. Each course unit will include historical and contemporary issues related to the topic to provide students with a sense of the origin of welfare programs and provision methods.
187.incl-u	SRVCLRNG	393	**Adv Community Service Learning**	u/grad	--- *includes sustainability*	This course is designe for students who have successfully completed an introductory course in Community Service Learning. Students will continue exploration of the topic from their introductory course, and will continue a service placement of at least 30 hours in a community organization the same as or similar to their first-semester placement. Reflection on service experience is a key part of classroom discussion and assignments.
188.incl-u	SRVCLRNG	293	**Learning Through Comm Engmnt**	u/grad	--- *includes sustainability*	This course engages students in the practice of Community Service Learning, including consideration of what constitutes appropriate and effective community service, and how to learn deeply from this experience. Each time it is offered, it is organized around a topic of public concern that draws on a variety of perspectives, and it places students with community organizations in service that relates directly to the course topic.
189.incl-u	SRVCLRNG	193	**Leadership and Service**	u/grad	--- *includes sustainability*	This course is the second of a two-semester service-learning set of courses in the IMPACT! Residential Academic Program. In the spring seminar, students continue the reflective learning process begun during the fall seminar, examining in greater depth the role of social identity and social justice theory in the context of their community service experiences. Each student will complete 30 hours of community service over the course of the semester.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
190.incl-u	STOCKSCH	100	**Botany for Gardeners**	u/grad	--- *includes sustainability*	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)
191.incl-u	STOCKSCH	200	**Plant Propagation**	u/grad	--- *includes sustainability*	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.
192.incl-u	STOCKSCH	315	**Greenhouse Management**	u/grad	--- *includes sustainability*	With lab. Introduction to the greenhouse environment and the technology used in production of greenhouse crops. Greenhouse experiments in crop production; exercises on greenhouse structures, heating and cooling, growing media, crop nutrition, photoperiod control and lighting, and crop scheduling; field trip to local greenhouses.
193.incl-u	STOCKSCH	305	**Small Fruit Production**	u/grad	--- *includes sustainability*	Principles and practices governing the establishment and management of small fruit plantings. Basic botany course suggested.
194.incl-u	STOCKSCH	120	**Organic Farming and Gardening**	u/grad	--- *includes sustainability*	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)
195.incl-u	STOCKSCH	106	**Soil Science and Management**	u/grad	--- *includes sustainability*	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.
196.incl-u	STOCKSCH	310	**Principles of Weed Management**	u/grad	--- *includes sustainability*	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
197.incl-u	STOCKSCH	104	**Plant Nutrients**	u/grad	--- *includes sustainability*	Functions of mineral nutrients in plants, effects of mineral deficiencies, and sources of these nutrients to prevent or alleviate deficiencies in crop production.
198.incl-u	STOCKSCH	235	**Pruning Fruit Crops**	u/grad	--- *includes sustainability*	Theory and practice of pruning deciduous fruit plants/trees. Practical, hands-on experience is the focus of the class.
199.incl-u	STOCKSCH	255	**Herbaceous Plants**	u/grad	--- *includes sustainability*	Study and identification of herbaceous plants; their uses as ornamental plants for home, park, and business.
200.incl-u	STOCKSCH	105	**Soils**	u/grad	--- *includes sustainability*	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)
201.incl-u	STOCKSCH	335	**Principles&Prace/GrnhouseCultv**	u/grad	--- *includes sustainability*	Greenhouse culture of spring greenhouse crops.
202.incl-u	STOCKSCH	170	**Pesticide Certfication**	u/grad	--- *includes sustainability*	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.
203.incl-u	STOCKSCH	370	**Tropical Agriculture**	u/grad	--- *includes sustainability*	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.
204.incl-u	STOCKSCH	211	**Pasture Management**	u/grad	--- *includes sustainability*	Potential of pasture to provide nutritional needs of livestock and the integration of well-managed pasture systems can contribute significantly to the sustainability of the farm. Major topics include a review of major forage species selection, grazing management, establishment of new pastures, and pasture renovation.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
205.incl-u	STOCKSCH	379	**Agricultural Systems Thinking**	u/grad	--- *includes sustainability*	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.
206.incl-u	STOCKSCH	186	**Intro to Permaculture**	u/grad	--- *includes sustainability*	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 for permaculture design.
207.incl-u	STOCKSCH	172	**Plants in our World**	u/grad	--- *includes sustainability*	This course will enable students to study the intricate and often intimate relationship between plants and people, taking an interdisciplinary approach. Students will learn fundamental concepts in plant biology including fundamental properties of life, food chains and food webs, plants as primary producers and humans as consumers One of the primary learning goals will be society's historical connection to plants and how plants have made an impact on civilizations.
208.incl-u	STOCKSCH	286	**Permaculture Design & Practice**	u/grad	--- *includes sustainability*	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.
209.incl-u	STOCKSCH	320	**Organic Vegetable Prodctn**	u/grad	--- *includes sustainability*	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.
210.incl-u	STOCKSCH	378	**Agroecology**	u/grad	--- *includes sustainability*	An overview of the ecology related to agricultural production, emphasizing crop production. The course will introduce students to ecological principles related to agricultural ecosystems, and to the ways these principles work in modern industrialized agriculture, in traditional agricultural systems, and in alternative systems such as organic agriculture. Students will learn ways by which ecological principles to determine the sustainability of agroecosystems and used to make them more sustainable.
211.incl-u	STOCKSCH	197GS	**ST-UMass Green School**	u/grad	--- *includes sustainability*	Green School is a comprehensive course for Green Industry and agricultural professionals taught by UMass Extension specialists and University of Massachusetts faculty. This course is designed for horticultural practitioners such as landscapers, lawn care specialists, nursery operators, sports field managers, public and private grounds managers and arborists, as well as vegetable producers wishing to gain an understanding of plant care fundamentals and strategies and their relation to environment
212.incl-u	STOCKSCH	266	**Managing/Small Farm Enterprise**	u/grad	--- *includes sustainability*	This course is designed for students who foresee starting a farming operation in the future or who currently own, manage or work on a small diversified farm. The complexity of whole farm planning is covered through agricultural business planning, organizational design, decision making, leadership and management of employees, production systems and record keeping.
213.incl-u	STOCKSCH	297AL	**ST-AgrcltrlLeadrshp&CommtyEd**	u/grad	--- *includes sustainability*	Learn to work with community groups and schools as a community educator.
214.incl-u	STOCKSCH	290D	**Small Farm Husbandry: Meat**	u/grad	--- *includes sustainability*	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.
215.incl-u	STOCKSCH	190P	**PersonWellnes/Farmers&Gardnrs**	u/grad	--- *includes sustainability*	This class will help to develop the skills and understanding of how to maintain a healthy lifestyle while being a successful farmer or gardener. Students will learn basic anatomy for safe and sustainable manual labor and practice applying safe body mechanics to typical farming labor tasks.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
216.incl-u	STOCKSCH	390F	**Student Farm Management I**	u/grad	--- *includes sustainability*	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.
217.incl-u	STOCKSCH	297P	**ST-SmallFarm Husbandry II-Pigs**	u/grad	--- *includes sustainability*	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. On completion, students will be able to incorporate pigs and poultry as an integral part of their small farm plan.
218.incl-u	STOCKSCH	497SF	**ST-StdntFarmMgmt2:Harvest,Mktg**	u/grad	--- *includes sustainability*	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.
219.incl-u	STOCKSCH	297PA	**ST- Pastured Poultry**	u/grad	--- *includes sustainability*	This course explores sustainable methods of raising poultry for meat and egg production, whether for home or commercial use. It will cover planning and managing a pastured poultry operation, including chickens, turkeys, ducks, geese, and exotic fowl, such as guineas, quail, and partridge. It will integrate current research on poultry health issues with management practices. Hatching and brooding chicks will be discussed in detail, including information on broody hens and incubator use.
220.incl-u	STOCKSCH	100ISH	**Botany for Gardeners (HnrsInd)**	u/grad	--- *includes sustainability*	
221.incl-u	STOCKSCH	397PT	**ST-Plant Trends/Landscape Hort**	u/grad	--- *includes sustainability*	
222.incl-u	STOCKSCH	397AL	**ST-AgrcltrlLdrshp&CommtyEd II**	u/grad	--- *includes sustainability*	This course will build upon STOCKSCH 297AL through deepening students' understanding of teaching methodologies and community-building strategies for Sustainable Food and Farming majors.
223.incl-u	STOCKSCH	197CP	**ST-CropPlanning/DiversfdVegFrm**	u/grad	--- *includes sustainability*	This course will give the students a clear understanding of how to set up and operate successful systems for crop planning for a diversified vegetable farm. All aspects from system design, data entry, mapping, scheduling, to record keeping will be addressed. Students will walk away with a very usable system for crop planning on a diversified vegetable farm plan.
224.incl-u	STOCKSCH	397R	**ST- Social Permaculture**	u/grad	--- *includes sustainability*	Permaculture mimics ecological systems to design gardens, farms and homesteads which have the resilience and benefits of natural systems. Human designed systems however cannot function without social systems such as decision making, communications, organizational structure, and policy. Through case studies, guest speakers and in-class exercises, we will explore how to apply permaculture ethics and principles to a variety of social systems.
225.incl-u	STOCKSCH	379ISH	**Agri Systems Thinking HnrsInd**	u/grad	--- *includes sustainability*	
226.incl-u	STOCKSCH	166	**Practical Beekeeping**	u/grad	--- *includes sustainability*	The practical aspects of beekeeping understood in terms of the life cycle of the bee and the bee colony, and the place of bees in our world. Learning how to acquire, set up, and manage bee colonies. Dissection may be required.
227.incl-u	STOCKSCH	182	**Principles of Pesticide Mgt**	u/grad	--- *includes sustainability*	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
228.incl-u	STOCKSCH	234	**Irrigation & Drainage**	u/grad	--- *includes sustainability*	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.

Row #	DEPT/SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y, or incl. sustainability?	Course Description
229.incl-u	STOCKSCH	258	**Urban Agriculture**	u/grad	--- *includes sustainability*	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.
230.incl-u	STOCKSCH	290F	**Holistic Fruit Production**	u/grad	--- *includes sustainability*	In this course we will study the principles and practices governing the establishment and management of fruit plantings from a holistic or systems perspective. The class will cover the four main small fruit or berry crops (strawberries, raspberries/blackberries, blueberries and grapes) and four main tree fruit crops (apples, pears, peaches and plums). Information covered will be oriented to growing conditions found in the Northeastern United States including traditional practices and innovations.
231.incl-u	STOCKSCH	197F	**ST-Fin Mgmt/Diversfd Veg Farms**	u/grad	--- *includes sustainability*	This course will give students a clear understanding of how to set up and operate successful systems for financial management of a diversified vegetable farm. All aspects from system design, budgeting, financial recording, reporting, to data entry, will be addressed by a series of lecturers on these special topics. Students will walk away with a very usable system for financial management on a diversified vegetable farm plan.
232.incl-u	SUSTCOMM	205	**Dynamics of Human Habitation**	u/grad	--- *includes sustainability*	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)
233.incl-u	SUSTCOMM	335	**Plants In Landscape**	u/grad	--- *includes sustainability*	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.
234.incl-u	SUSTCOMM	125	**Global Cities & Global Issues**	u/grad	--- *includes sustainability*	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 require for a quality life may be lacking. 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 be overcome.
235.incl-u	SUSTCOMM	395S	**S- Reinventing Springfield**	u/grad	--- *includes sustainability*	This class will provide an overview of economic development issues, debates and analysis using Springfield, Massachusetts as an extended case study.
236.incl-u	UWW	310	**Exp Refl: Technological World**	u/grad	--- *includes sustainability*	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
237.incl-u	UWW	330	**Exp Refl: Public Policy**	u/grad	--- *includes sustainability*	In this course non-traditional students will learn how to apply a selection of principles and frameworks of public policy 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 an
238.incl-u	WGSS	301	**Theorizng Gender, Race & Power**	u/grad	--- *includes sustainability*	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.

List compiled by Craig Nicolson for School of Earth and Sustainability, March 2018.

Updated May 2018 in response to AASHE query.

Graduate Level Sustainability Course Inventory, AY2016/2017.

Row #	DEPT / SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y course, or includes sust?	Course Description
1.s-gr	REGIONPL	580	Sustainable Cities	graduate	SUST'Y course	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.
2.s-gr	ARCH	591S	**S-Sustainble&HighPerformFacade**	graduate	*SUST'Y course*	Not available at this time.
3.s-gr	LANDARCH	591I	**S-SustaingGrnInfrastrPlng&Des**	graduate	*SUST'Y course*	Course description not available at this time.
4.s-gr	REGIONPL	591I	**S-SustaingGrnInfrastrPlng&Des**	graduate	*SUST'Y course*	Course description not available at this time.
5.s-gr	ARCH	597SB	**ST-Sustainable Buildng Systems**	graduate	*SUST'Y course*	Course description not available at this time.
6.s-gr	ARCH	597SD	**ST-Sustainable Design**	graduate	*SUST'Y course*	Course description not available at this time.
7.s-gr	BCT	597D	**ST-Sustain Bldg & LEED Certif.**	graduate	*SUST'Y course*	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.
8.s-gr	ECO	697DL	**ST-Sust Building & LEED Certif**	graduate	*SUST'Y course*	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.
9.s-gr	STOCKSCH	691S	**S-Research/SustainableSoilMgmt**	graduate	*SUST'Y course*	This journal club will explore current research relating to sustainable soil health and nutrient management. Topics will include developments in cover cropping systems, soil biology and metagenomics, biochar, weed suppression, and soil nutrient management.
10.s-gr	CE-ENGIN	597S	**ST-Transportation Sustainablty**	graduate	*SUST'Y course*	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.
11.s-gr	CE-ENGIN	697G	**ST-Transportation Sustainablty**	graduate	*SUST'Y course*	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.
12.s-gr	ECO	697PS	**S-Perspectives on Sustainablty**	graduate	*SUST'Y course*	Description not available at this time
13.s-gr	NRC	579	**Cree Culture, NatRes&Sustnblty**	graduate	*SUST'Y course*	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.
14.s-gr	CE-ENGIN	597W	**ST- Water Res Engin & Sustain**	graduate	*SUST'Y course*	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.
15.s-gr	REGIONPL	662	**CuturalHeritage/IntlSustnb**	graduate	*SUST'Y course*	This course is a comprehensive introduction to the evolution of heritage conservation theories and practices at the international level, particularly focusing on sustainability and the urban environment.
16.s-gr	ECON	766	**Econ Dev-Policy Iss**	graduate	*SUST'Y course*	Policy decisions involved in efforts of underdeveloped countries to induce development. Prerequisite: ECON 765.
17.s-gr	PUBP&ADM	605	**Econ & Public Policy**	graduate	*SUST'Y course*	Introduction to microeconomics theory and policy analysis. Examines economic rationales for and against government policy and the economic consequences of public policy.

Row #	DEPT / SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y course, or includes sust?	Course Description
18.s-gr	REGIONPL	643	**Econ Dev Iss In Plan**	graduate	*SUST'Y course*	General introduction to methods and techniques for analyzing and solving problems related to planning, resource allocation, and policy analysis.
19.s-gr	RES-ECON	702	**Econometric Methods**	graduate	*SUST'Y course*	Introduction to econometric methods: the general linear models, nonspherical properties, generalized least squares, and restricted least squares. Also estimation with limited dependent variables, dichotomous choice and causality testing.
20.s-gr	ANTHRO	697AE	**ST-Economic Anthropology**	graduate	*SUST'Y course*	Description not available at this time
21.s-gr	ECON	781	**Labor Economics**	graduate	*SUST'Y course*	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.
22.s-gr	HPP	726	**Health Economics&Reimbursement**	graduate	*SUST'Y course*	This course introduces the applictions of economics to health and health care. The topics to be covered include: alloction of health care resources with respect to deman and supply of health care; the roles of hospitals physicians, and health insurance; market imperfections and their role in economics of health care.
23.s-gr	ECON	797UD	**ST-Poli Econ/Urban Development**	graduate	*SUST'Y course*	
24.s-gr	ECON	708	**Political Economy I**	graduate	*SUST'Y course*	Marxian theory. Topics include historical materialism, class, value and surplus val-ue, the labor process, and accumulation and crisis. Additional topics vary with instructor.
25.s-gr	ECON	710	**Political Economy III**	graduate	*SUST'Y course*	Current issues in political economy, focusing on race and gender inequalities. Consideration of Marxian, feminist, institutionalist and neoclassical approaches. Some attention to empirical and econometric research.
26.s-gr	ECON	804	**Political Economy Workshop**	graduate	*SUST'Y course*	Not available at this time
27.s-gr	ECON	709	**Political Economy II**	graduate	*SUST'Y course*	Presents the leading and contending Marxian theories of society and knowledge. Class and value analysis of capitalist institutions, markets, and economy stressed. Comparison between capitalist and non-capitalist societies examined.
28.s-gr	ECON	797X	**ST-African Economic Developmnt**	graduate	*SUST'Y course*	This course offers a survey of key structural and policy issues in African economic development. It is intended to provide retrospective and prospective views of African economies, taking into account domestic, regional and global dimensions. The themes covered include: growth; structural transformation; institutions; macroeconomic frameworks; human development, poverty and inequality; gender and development; foreign aid and financing for Africa?s development; capital flight from Africa.
29.s-gr	POLISCI	792PE	**S-Political Economy of Develop**	graduate	*SUST'Y course*	This course will cover foundational texts and core debates in the study of development. What is development? How have conceptualizations of "development" and theories of "development" changed over the past century? The course will focus on both domestic and international processes to illuminate a range of development challenges using examples from around the world.
30.s-gr	LABOR	697F	**ST-Labor in the US Economy**	graduate	*SUST'Y course*	Introduction to labor economics. Addresses issues such as income inequality, poverty, unemployment and underemployment, declining real wages, bargaining power, and capital flight.
31.s-gr	BCT	521	**Environmental Control Systems**	graduate	*SUST'Y course*	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.
32.s-gr	CE-ENGIN	671	**Envirnmtl Biological Processes**	graduate	*SUST'Y course*	The major biological phenomena and processes used in environmental engineering. Fundamentals of microbiology and biochemistry as applied to wastewater treatment, bioremediation drinking water treatment, and biological air pollution control.
33.s-gr	CE-ENGIN	573	**Environmental Engin Microbiol**	graduate	*SUST'Y course*	Microbiological and biochemical properties of microorganisms important in environmental engineering practice. General fundamentals of microbiology and application to drinking water treatment and distribution, water pollution control, and natural systems.
34.s-gr	CE-ENGIN	692A	**Environmental Engineering Sem**	graduate	*SUST'Y course*	Presentations by the graduate student of selected current literature and research. Visiting lecturers.

Row #	DEPT / SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y course, or includes sust?	Course Description
35.s-gr	EHS	565	**Environmental Health Practices**	graduate	*SUST'Y course*	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.
36.s-gr	EHS	666	**Env. & Occupational Toxicology**	graduate	*SUST'Y course*	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.
37.s-gr	EHS	667	**Env. & Occupa. Toxicology II**	graduate	*SUST'Y course*	Not available at this time
38.s-gr	EHS	567	**Environ Compliance Regulations**	graduate	*SUST'Y course*	Principles of environmental compliance obligations, common law, trespass, nuisance, and negligence. The major federal environmental laws affecting companies and agencies, and selected state and local regulations. Civil and criminal penalties and liabilities attached to environmental regulations. Strategies for compliance including proactive and environmental management as a method for reducing legal exposure to environmental issues.
39.s-gr	ENVIRSCI	575	**Environmental Soil Chemistry**	graduate	*SUST'Y course*	With lab. Fundamental chemical processes in soils such as precipitation/dissolution, ion exchange, redox reactions, partitioning and adsorption, and ion speciation as well as the nature of soil minerals and organic matter. Chemical processes affecting fate, transport, availability and remediation of heavy metals and organic contaminants in soils and other related terrestrial environments also addressed. Applied to current environmental, agricultural, and engineering problems.
40.s-gr	ENVIRSCI	590A	**Environmental Soil Science**	graduate	*SUST'Y course*	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.
41.s-gr	GEO-SCI	573	**Envrnmntl Geophysics**	graduate	*SUST'Y course*	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. Lectures, laboratory and field problems.
42.s-gr	RES-ECON	720	**Envrmntl&Resource Ec**	graduate	*SUST'Y course*	Economics of environmental quality and natural resource management; theory of externalities, public goods, and resource extraction. Benefit-cost analyses of natural resource use and preservation of unique resources.
43.s-gr	STOCKSCH	575	**Environmental Soil Chemistry**	graduate	*SUST'Y course*	Fundamental chemical concepts/processes in soils, such as ion exchange, precipitation/dissolution, redox reactions, partitioning and adsorption, and solution speciation and nature of soil minerals and organic matter. Computer models used to examine current environmental, agricultural, and engineering problems. Examination of how chemical processes affect fate, transport, availability, and remediation of trace elements, heavy metals and organic contaminants in soils and sediments.
44.s-gr	EHS	592E	**S-Environmental Epigenetics**	graduate	*SUST'Y course*	This seminar will introduce students to the new field of environmental epigenetics. Through videos and discussion of recent research papers, students will learn how the environment (nutrition, chemicals, psychosocial stress) can shape our genetic makeup and ultimately influence disease susceptibility.
45.s-gr	CE-ENGIN	597N	**ST-Env Nanoscience & Nanotech**	graduate	*SUST'Y course*	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.

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46.s-gr	GEO-SCI	519	**Aqueous Envrn Geochm**	graduate	*SUST'Y course*	With lab. Chemical processes affecting the distribution and circulation of chemical compounds in natural waters. Geochemistry of precipitation, rivers, lakes, groundwater, and oceans; applications of thermodynamic equilibria to predicting composition of aqueous systems. Behavior of trace metals and radionuclides in near surface environments. Prerequisite: Chem 111, 112.
47.s-gr	EHS	790VS	**Grad Sem/Environmental Health**	graduate	*SUST'Y course*	This course examines current advances in environmental health science via lectures from UMass faculty with research programs related to environmental health, UMass PhD students in the EHS program, as well as visiting scholars. Seminar topics will change from week to week and will include topics such as pollution, exposure assessments, mechanistic toxicology, environmental health policy, environmental epidemiology, and others.
48.s-gr	ECO	602	**Analysis of Environmental Data**	graduate	*SUST'Y course*	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.
49.s-gr	ECO	697EC	**ST- Readings/Envirn Social Sci**	graduate	*SUST'Y course*	This seminar aims to introduce and expand knowledge of the environmental social sciences. Students will be exposed to a wide range of theoretical and (inter-)disciplinary approaches to understanding and conducting research on humans and the environment through directed readings and seminar discussions.
50.s-gr	ECO	697WE	**ST-WindEnergy:EnvAssmnt/Reg**	graduate	*SUST'Y course*	Description not available at this time
51.s-gr	EHS	690X	**Expo Assess in Env/Publ Hlth**	graduate	*SUST'Y course*	General approach to and quantitative methods of exposure assessment; issues associated with interpretation of exposure information; statistical considerations, validation, and ethics; quantitative exposure modeling; concepts of biomarkers and biomonitoring.
52.s-gr	SUSTCOMM	597A	**ST-Computers In Envir Design**	graduate	*SUST'Y course*	Introduction to the range of computer applications available for the environmental design professions. Site analysis techniques, computer aided design, and methods of data management on the computer.
53.s-gr	ECO	691A	**S-Current Res in Environ Consv**	graduate	*SUST'Y course*	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.
54.s-gr	ECO	632	**ApplMultivartStats/EnvirConsrv**	graduate	*SUST'Y course*	This course provides students with a conceptual and practical understanding of the application of multivariate statistics in ecology and conservation science. Importantly, the conceptual development and organization of multivariate statistical techniques and the applications of these methods are presented strictly from an ecology and conservation science perspective. This course focuses on working with multivariate data (e.g., screening and adjusting multivariate data), evaluating grouped data
55.s-gr	FOOD-SCI	561	**Food Processing**	graduate	*SUST'Y course*	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.
56.s-gr	FOOD-SCI	792A	**Sem-Food Science**	graduate	*SUST'Y course*	Not available at this time
57.s-gr	FOOD-SCI	581	**Analysis Food Products**	graduate	*SUST'Y course*	Physical, chemical, and spectroscopic techniques in food analysis: proximate analysis, extraction, densimetry, spectroscopy, rheology, microscopy, refractometry, polarimetry, chromatography, enzymatic and immunological assays, and sensory evaluation methods emphasizing theoretical basis of measurements and laboratory calculations. Prerequisite: Chem 312 or equivalent.

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58.s-gr	NUTRITN	597S	**ST- Nutritn,Food,PhysActvy...**	graduate	*SUST'Y course*	This course will explore the relationship between nutrition, food and lifestyle with the development of cancer. We will look at : international variations and trends of cancer; basic concepts and principles of the cancer process; evidence for physical activity (including body fatness) and cancer prevention; dietary and lifestyle recommendations for cancer prevention. The course will help you develop insight into dietary and lifestyle strategies for cancer prevention.
59.s-gr	FOOD-SCI	797E	**ST-Bioactive Food Components**	graduate	*SUST'Y course*	To understand the biological significance of food. This course will cover basic physiology and pathology of significant diseases and describe foods or food components that can be used in disease prevention. Prerequisites: Food Chemistry, Biochemistry
60.s-gr	FOOD-SCI	797G	**ST-Functional Foods**	graduate	*SUST'Y course*	Description not available at this time
61.s-gr	NUTRITN	597G	**ST-Nutrition and Food Policy**	graduate	*SUST'Y course*	Description not available at this time
1.incl-gr	AFROAM	691F	**S-Black Pol Strg & Amer Pol S**	graduate	--- *includes sustainability*	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".
2.incl-gr	AFROAM	692G	**S-Afr Amer Women's Narrative**	graduate	--- *includes sustainability*	Gender, race, class, slavery, the woman as artist, domesticity, and the territory of love, all are concepts that are located in the narratives of the African American women writers we will read in this course. Participants in this course will interrogate these issues, among others, in the narratives of nineteenth and twentieth century African American women and will be encouraged to examine critically the challenges and the victories that these writers present in their texts.
3.incl-gr	ARCH	520	**Building Physics I**	graduate	--- *includes sustainability*	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. Limited to MArch, MS Design majors
4.incl-gr	ARCH	620	**Building Physics II**	graduate	--- *includes sustainability*	The importance of light in shaping the physical environment. Developing a lighting plan. Lecture topics include the physics of light and color, basic electricity, the characteristics of different lamp sources and the psychological impact of lighting. Field trip to view successful lighting installations.
5.incl-gr	ARCH	550	**Tectonics I**	graduate	--- *includes sustainability*	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. Limited to MArch and MS Design majors.
6.incl-gr	ARCH	597C	**ST-Building Conservation I**	graduate	--- *includes sustainability*	The intent of this course is to develop a general understanding of how to investigate historic buildings; including the analysis the existing conditions of a building's materials and systems. We will then examine the interaction between the building and the outside forces acting on it. Finally we will evaluate and develop methods for restoring buildings. Students will develop and reinforce knowledge of: buildings, building materials HVAC etc.
7.incl-gr	ARCH	597D	**ST-History&Theory:Preservation**	graduate	--- *includes sustainability*	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.
8.incl-gr	ARCH	697K	**ST-Green Bldg&Hist Preservtion**	graduate	--- *includes sustainability*	The design of this course is to examine the impact that buildings have on our environment, of how a building uses energy, of how energy flows within a building are quantified, and how building science and construction techniques control those flows. With that understanding in place the course will apply that knowledge to the unique demands of the wards of Historic Preservation whose both provenance and irreplaceable contribution to our historic legacy impose specific preservation requirements.

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9.incl-gr	ARCH	597K	**ST-Design for Climate Change**	graduate	--- *includes sustainability*	This class will unpack the issues that confront cities on the front lines of climate change, from food security and water access to energy, transportation and material resources. We will look at a number of different case studies to understand the types of design strategies and opportunities that are already underway.
10.incl-gr	ARCH	597G	**ST-Building Conservation II**	graduate	--- *includes sustainability*	The intent of this course is to develop a general understanding of how to investigate historic buildings; including the analysis the existing conditions of a building's materials and systems. We will then examine the interaction between the building and the outside forces acting on it. Finally we will evaluate and develop methods for restoring buildings. Students will develop and reinforce knowledge of: buildings, building materials HVAC etc.
11.incl-gr	ARCH	697N	**ST-Cultural Resource Managemnt**	graduate	--- *includes sustainability*	This course will introduce students to community-wide historic preservation planning, covering the identification, evaluation and protection of historic resources. Historic resources include buildings, neighborhoods, village centers, downtowns, agricultural lands, public parks, burial grounds and archaeological sites as well as others. Through this course, students will gain a thorough understanding of how historic resources are saved, protected and re-purposed.
12.incl-gr	ARCH	597GS	**ST-Great Spaces**	graduate	--- *includes sustainability*	Course description not available at this time.
13.incl-gr	BCT	520	**Energy and Buildings**	graduate	--- *includes sustainability*	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.
14.incl-gr	BCT	597SD	**ST-SolarEnergySys&BldgDesign**	graduate	--- *includes sustainability*	Introduces the fundamental concepts of solar building design and energy systems. Through project-based study and occasional field visits, students will explore the theory, technologies, applications, and benefits of solar design of buildings and discover how to utilize solar energy systems for residential and commercial buildings.
15.incl-gr	BCT	597R	**ST- Clean Energy Corps**	graduate	--- *includes sustainability*	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 high-level 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%.
16.incl-gr	BCT	530	**Mech Bld Mat Constrctn**	graduate	--- *includes sustainability*	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.
17.incl-gr	BCT	597BM	**PrblmSolving in BldngMechanics**	graduate	--- *includes sustainability*	Description not available at this time.
18.incl-gr	BIOLOGY	568	**Endocrinology**	graduate	--- *includes sustainability*	The role of hormones in the growth, metabolism and reproduction of mammals. Molecular mechanisms of hormone action, environmental and feedback control of secretion. Current issues in endocrine physiology. Prerequisite: An introductory course in physiology.
19.incl-gr	CE-ENGIN	662	**WaterResource Systems Analysis**	graduate	--- *includes sustainability*	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. Prerequisites: CE-ENGIN 270 and 357.
20.incl-gr	CE-ENGIN	510	**Public Transportation Systems**	graduate	--- *includes sustainability*	Relationship of public transportation to technological innovation; financing and regulation; supply, demand, and price considerations; performance evaluation; routing and scheduling; application of microcomputers; and project planning and design. Prerequisites: CE-ENGIN 310.

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21.incl-gr	CE-ENGIN	660	**Subsurface Hydraulics**	graduate	--- *includes sustainability*	The transport of water through the unsaturated and saturated zone using rigorous mathematical theory, analytical and numerical solutions. Topics include hydraulic properties of soils, infiltration, confined and unconfined aquifer flow, consolidations, and well hydraulics. Prerequisites: MATH 331 and CMPSCI 123
22.incl-gr	CE-ENGIN	672	**Physical&ChemTreatment Process**	graduate	--- *includes sustainability*	With lab. Fundamentals of physical and chemical processes used in environmental engineering. Applications include processes used in the treatment of drinking waters, industrial waters and wastewaters, municipal wastewaters, and hazardous waste remediation.
23.incl-gr	CE-ENGIN	511	**Traffic Engineering**	graduate	--- *includes sustainability*	Characteristics of traffic system components including drivers, vehicles, and roadways. Fundamental principles of traffic flow, operations, and controls. Traffic demand analysis and highway capacity analysis. Traffic engineering studies involving volume, speed, travel time, and delay. Techniques of field data collection and methodology of office analysis. Intersection design and analysis. Signalized intersection control.
24.incl-gr	CE-ENGIN	560	**Hydrology**	graduate	--- *includes sustainability*	A quantitative account of elements of the hydrologic cycle, including precipitation, evapotranspiration, snowmelt, infiltration, and surface runoff. Basic laws from such various disciplines as physics, chemistry, meteorology, astronomy, fluid mechanics, and thermodynamics, combined into simple mathematical descriptions used in the hydrologic design process.
25.incl-gr	CE-ENGIN	575	**Adv Solid & Harardous WasteMgt**	graduate	--- *includes sustainability*	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.
26.incl-gr	CE-ENGIN	516	**Transportation Design**	graduate	--- *includes sustainability*	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.
27.incl-gr	CE-ENGIN	509	**Transportation System Analysis**	graduate	--- *includes sustainability*	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.
28.incl-gr	CE-ENGIN	521	**TrafficFlowTheory&Simultion II**	graduate	--- *includes sustainability*	Applications of traffic flow theory involving traffic flow modeling at varying levels of details using manually-generated and commercially-available transportation simulation tools. Fundamentals involved in transportation simulation such as random number generation, input/output analysis, and macroscopic and microscopic traffic flow models.
29.incl-gr	CE-ENGIN	670	**Transport Processes in EWRE**	graduate	--- *includes sustainability*	Transport of fluids and constituents in environmental systems. Advection, diffusion, dispersion, zero and first-order reaction kinetics and equilibrium partitioning processes. Mathematical models solved with analytical and numerical methods. Multi-scale application to surface and subsurface waters and the atmosphere.
30.incl-gr	CE-ENGIN	597F	**ST-Desgn/FishPassage Facilties**	graduate	--- *includes sustainability*	Description not available at this time
31.incl-gr	CE-ENGIN	697W	**ST-AdvTop/WaterChem&ProcEngin**	graduate	--- *includes sustainability*	Description not available at this time
32.incl-gr	CE-ENGIN	697F	**ST-TrafficFlowTheory&SimultnII**	graduate	--- *includes sustainability*	Applications of traffic flow theory involving traffic flow modeling at varying levels of details using manually-generated and commercially-available transportation simulation tools. Fundamentals involved in transportation simulation such as random number generation, input/output analysis, and macroscopic and microscopic traffic flow models.
33.incl-gr	CE-ENGIN	597R	**ST-Water Resources Planning**	graduate	--- *includes sustainability*	Not available at this time.

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34.incl-gr	CE-ENGIN	597D	**ST-DrinkingWater&Sanit/DevCoun**	graduate	--- *includes sustainability*	Concepts include infrastructure used for drinking water and sanitation provision in urban and rural areas in developing countries and the fundamentals of the health-related impacts of water and sanitation including waterborne pathogens, their transmission routes, and prevention, control, and treatment measures. Students will gain insight into considerations of sustainability, reliability, and the non-health impacts of water and sanitation services.
35.incl-gr	CE-ENGIN	695A	**Transportation**	graduate	--- *includes sustainability*	Visiting lecturers. Research presentations by graduate students and faculty. Discussion of current transportation topics.
36.incl-gr	CE-ENGIN	570	**ST-GIS for Engineers**	graduate	--- *includes sustainability*	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, and visualization of spatial data. Laboratory exercises will address problems in hydrology, water treatment, renewable energy, and transportation.
37.incl-gr	CE-ENGIN	793D	**S-Transportation Doctoral Sem**	graduate	--- *includes sustainability*	
38.incl-gr	CE-ENGIN	611	**Trnspt Invest&Pricing Analysis**	graduate	--- *includes sustainability*	The application of economic principles to transportation investment and pricing analyses; emphasis on highway and public transportation in urban settings. Prerequisites: ECON 103, CE-ENGIN 310 or equivalents.
39.incl-gr	CE-ENGIN	697L	**ST-Freight and Logistics Sys**	graduate	--- *includes sustainability*	The course is focuses on mathematical and analytical tools planning and operating freight systems. The course will address aspects of transportation economics, environmental and sustainability issues, optimization, and algorithms related to logistics systems and terminals. Many aspects of the course will be treated in a way that is general to all modes. Some specific knowledge related to trucking, railroads, and maritime will be considered.
40.incl-gr	CHEM-ENG	590L	**Materials Sci and Eng Project**	graduate	--- *includes sustainability*	The course will provide the students with an experience in searching the current scientific literature in Materials Science and Engineering, preparing a technical report, and delivering a seminar while expanding their knowledge in a topic of their choice from a list of technologically relevant research areas provided by the instructors.
41.incl-gr	COMM	794T	**S- StuartHall&Roots/CultrlStud**	graduate	--- *includes sustainability*	Not available at this time
42.incl-gr	E&C-ENG	697GC	**ST- Green Computing**	graduate	--- *includes sustainability*	This course will introduce students to the area of green computing. The course will cover emerging problems associated with the rapid growth of energy consumption in modern computing infrastructures, i.e. data centers, and discuss new research focused on mitigating these problems. The course will also cover ways to leverage computation, networking, and sensing to improve the energy-efficiency of the electric grid, e.g. by automatically regulating energy consumption in buildings, homes, etc.
43.incl-gr	ECO	605	**UrbanForsts:Struct,Funct,Value**	graduate	--- *includes sustainability*	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.
44.incl-gr	ECO	758	**Advanced Wildlife Management**	graduate	--- *includes sustainability*	A discussion course with varying current topics in wildlife management, including habitat assessment and management, migratory bird management and conservation, and suburban wildlife ecology and management.
45.incl-gr	ECO	697AB	**ST-Applied Biostatistics**	graduate	--- *includes sustainability*	Intermediate statistics illustrated using examples from ecology. Topics include ANOVA, linear regression (simple and multiple), correlation, logistic regression, continency tables and noparametric methods. Techniques discussed in lectures and applied in laboratories.
46.incl-gr	ECO	757	**Advanced Fisheries Managmnt**	graduate	--- *includes sustainability*	Scientific basis for modern fisheries management, emphasizing coldwater fishes, anadromous species, large reservoir and river fisheries, and conflicts of interest with other water uses.

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47.incl-gr	ECO	622	**Conservation Biology**	graduate	--- *includes sustainability*	Conservation biology emerged roughly 30 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. Together, we will examine the state of conservation science today.
48.incl-gr	ECO	620	**Studies/Building Info Modeling**	graduate	--- *includes sustainability*	This course provides graduate students with an opportunity to deepen their studies in Building Information Modeling (BIM), a concept that is at the heart of contemporary digital building planning and execution. In addition to learning about basic concepts from BCT 420 (advanced 3D modeling, digital fabrication, and an overview of Autodesk Revit and Trimble SketchUp).
49.incl-gr	ECO	697SA	**ST-AdvancedStatistical Ecology**	graduate	--- *includes sustainability*	This course explores statistical problems beyond the classical linear models including mixed effects, non-normal error distributions, autocorrelations, etc. Hierarchical models, including explicit observer effects, will also be considered.
50.incl-gr	ECO	697SV	**ST-Design/Implem/Anlys:Surveys**	graduate	--- *includes sustainability*	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 i
51.incl-gr	ECO	797P	**ST-Population&CommunityEcology**	graduate	--- *includes sustainability*	Description not available at this time
52.incl-gr	ECO	697MP	**ST-Coastal Marine Spatial Plan**	graduate	--- *includes sustainability*	Not available at this time.
53.incl-gr	ECO	697K	**ST-Python for ARC GIS**	graduate	--- *includes sustainability*	This course will cover a number of methods and applications in GIS. Basic automation methods of repetitive or complex tasks using Model Builder and Python scripting will be covered first. Then these methods will be applied to a number of common problems in Natural Resources including home range definition species habitat relationships, occupancy models, and movement analysis.
54.incl-gr	ECO	691E	**S-Eco Responses/Climate Change**	graduate	--- *includes sustainability*	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.
55.incl-gr	ECON	706	**Macroecon Theory II**	graduate	--- *includes sustainability*	Systematic development of static and dynamic theories of aggregative economic behavior and their applications. Prerequisite: ECON 204.
56.incl-gr	ECON	763	**Hist of Captlst Dev/Euro&World**	graduate	--- *includes sustainability*	This course examines the emergence and evolution of capitalist forms of economic organization, and their interaction with noncapitalist forms. It begins with the Atlantic economy and the African slave trade, and then covers nineteenth-century industrialization in Britain, France, Germany and Russia. Other readings will address trade, the international division of labor, and international finance.
57.incl-gr	ECON	597DP	**ST-Practice/DvlpmntPlcy&IntlCo**	graduate	--- *includes sustainability*	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
58.incl-gr	ECON	597EM	**ST-Ecological Macroeconomics**	graduate	--- *includes sustainability*	This course focuses on the relationship between achieving climate stabilization, on the one hand; and advancing economic growth, expanding job opportunities and raising living standards, on the other. We consider these issues, and the relevant literature, for countries and regions of the global economy at all levels of development.

Row #	DEPT / SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y course, or includes sust?	Course Description
59.incl-gr	ENVIRSCI	515	**Microbiology of the Soil**	graduate	--- *includes sustainability*	Microbial processes in the soil and sediment environments. The ecology of the various microbial communities; the decomposition of organic matter, carbon transformations, nitrogen, sulfur, phosphorus, and other mineral transformations; chemistry of these reactions and their biogeochemical implications; biological equilibrium, the rhizosphere, and microbial associations.
60.incl-gr	ENVIRSCI	585	**InorgContmnts/Soil,Water,Sdmnt**	graduate	--- *includes sustainability*	Physical, chemical, and biological factors affecting the fate and transport of inorganic contaminants (including heavy metals) in soil, water and sediment. Sources, chemistry, pedogenic and geochemical behavior of these contaminants and methods used for their analysis. Risk assessment, and remediation technologies, options, and goals.
61.incl-gr	GEO-SCI	563	**Glacial Geology**	graduate	--- *includes sustainability*	Origin and forms of glaciers; erosional and depositional processes and recognition of erosional and constructional landforms and depositional systems. Pleistocene history of New England, sea level, and isostasy. Field trips by arrangement.
62.incl-gr	GEO-SCI	587	**Hydrogeology**	graduate	--- *includes sustainability*	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.
63.incl-gr	GEO-SCI	658	**Paleoclimatology**	graduate	--- *includes sustainability*	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.
64.incl-gr	GEO-SCI	763	**Quaternary Seminar**	graduate	--- *includes sustainability*	Current work and publications in glaciology, glacial geology, and related aspects of Quaternary history. Studies of related fields, such as archaeology, early man, geochronology, palynology, plant geography, and paleontology.
65.incl-gr	GEO-SCI	510	**Natural Hazards**	graduate	--- *includes sustainability*	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.
66.incl-gr	GEO-SCI	690O	**Investigating the Ocean**	graduate	--- *includes sustainability*	Course is designed to have in-service and pre-service teachers gain hands-on knowledge of the ocean environment. Course will focus on the scientific study of the ocean and the complex relationship humans have with the sea. Topics will include: geology of the ocean basin & relationship to plate tectonics, volcanoes, and earthquakes; how the ocean maintains its chemical composition; ocean circulation & global climate.
67.incl-gr	GEO-SCI	691EC	**ST-Ecohydrology**	graduate	--- *includes sustainability*	Not available at this time.
68.incl-gr	GEO-SCI	597SE	**ST-Intro Seismology**	graduate	--- *includes sustainability*	Advanced undergraduate and graduate course presents a basic study in seismology and the utilization of seismic waves for the study of Earth's interior. It introduces techniques necessary for understanding of elastic wave propagation in layered media. Students are expected to have taken Intro Geoscience classes and have good background in basic physics and mathematics.
69.incl-gr	GEO-SCI	787	**Hydrogeology Seminar**	graduate	--- *includes sustainability*	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.
70.incl-gr	GEO-SCI	591NE	**S-ClimChangeImpacts/NewEngland**	graduate	--- *includes sustainability*	
71.incl-gr	GEOGRAPH	604	**Geographic Theory and Analysis**	graduate	--- *includes sustainability*	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.

Row #	DEPT / SUBJ	COURSE #	COURSE TITLE	Level	SUST'Y course, or includes sust?	Course Description
72.incl-gr	GEOGRAPH	592M	**S-Computer Mapping**	graduate	--- *includes sustainability*	Contact department for description.
73.incl-gr	GEOGRAPH	694P	**S-Political Geography**	graduate	--- *includes sustainability*	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.
74.incl-gr	GEOGRAPH	597WG	**ST-Water Geographies**	graduate	--- *includes sustainability*	Water Geographies focuses on current issues related to water, and individual and group action that can make a difference to improve water sustainability. It is a service learning class. We will read several journalistic books as well as news articles to explore current issues. We will think about the ways that people cause and face conflict over water, and how they strive to improve sustainability. Focus issues will include: freshwater sustainability and development; bottled water; dams, energy
75.incl-gr	GEOGRAPH	593GIS	**ST- Introduction to GIS**	graduate	--- *includes sustainability*	
76.incl-gr	GEOGRAPH	668	**GIS and Spatial Analysis**	graduate	--- *includes sustainability*	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.
77.incl-gr	GEOGRAPH	593A	**S- Aquatic Remote Sensing**	graduate	--- *includes sustainability*	This course will focus on remote sensing theory, technology, and applications on aquatic ecosystem, including wetlands, inland and coastal waters. The course is composed of lectures, discussion, computer labs and final project. Background on introductory remote sensing are required.
78.incl-gr	GEOGRAPH	693W	**S- WebGIS**	graduate	--- *includes sustainability*	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.
79.incl-gr	GEOGRAPH	593T	**S-Teaching and Learning in GIS**	graduate	--- *includes sustainability*	Students in this course will learn about the pedagogy behind GIS curriculum and instruction through practice as lab assistants in an introductory GIS course. Alongside readings establishing evidence-based practices in GIS instruction, students will work to identify barriers and frustrations for GIS learners, and ways to overcome them.
80.incl-gr	GEOGRAPH	693M	**S-Migration,Diaspora,Refugees**	graduate	--- *includes sustainability*	This course provides an introduction to the literature, theory, and practice of geographies of migration, diaspora, and refugees. Students will examine historical migrations of humans beginning with the Out of Africa theory leading up to present day issues of the European migrant crisis and transnational migration phenomena. There will also be modules on refugee studies especially looking at internally displaced peoples and cases that destabilize what it means to be a "refugee."
81.incl-gr	GEOGRAPH	693E	**S-Energy&InfrastructureNetwork**	graduate	--- *includes sustainability*	This is an intensive graduate reading and discussion seminar, which approaches infrastructure networks as geographically interconnected constellations of technology and material flow, organized by institutions, policy, and economic and political relationships. Many of the readings will draw from the professor's expertise in dams, hydropower, and electric grids and policy, but readings will also touch on other water and energy infrastructure and policy, transportation networks, and other topics.
82.incl-gr	GEOGRAPH	693N	**S-Nat'lParksProtectAreas,Indig**	graduate	--- *includes sustainability*	
83.incl-gr	HISTORY	697I	**ST-Topics in US Women's Hist**	graduate	--- *includes sustainability*	This course will focus on selected topics in U.S. women's and gender history from the colonial era to the present. Our focus will be on how interpretations of women's experience have been influenced by changing conceptions of race ethnicity, sexuality, family, class, religion, region, immigration, economics, and politics. We will consider and compare the lives of Native American women, African American, Asian American women, Latina women, and European American women from the colonial period thro

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84.incl-gr	HISTORY	691J	**S-History of Modern China**	graduate	--- *includes sustainability*	This is a course on the history of modern China (c. 1800 to present). Expecting that many students will come to the course with primary interests in other areas, it will emphasize comparative and transnational approaches that encourage cross-fertilization with other coursework.
85.incl-gr	HPP	583	**Global Health in Dev World**	graduate	--- *includes sustainability*	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.
86.incl-gr	HPP	601	**App SocioBehav Thr Pub Hlth In**	graduate	--- *includes sustainability*	Survey of socio-behavioral theories commonly used in public health education interventions at the individual, group, and community levels.
87.incl-gr	HPP	602	**Com Dev & Hlth Ed**	graduate	--- *includes sustainability*	Latest approaches in community development and community organizing strategies. Exploratory readings, field assignments; emphasis on leadership development, capacity building, and coordinated community action.
88.incl-gr	HPP	524	**Intro/Health Politics & Policy**	graduate	--- *includes sustainability*	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.
89.incl-gr	HPP	690SJ	**Social Justice & Public Health**	graduate	--- *includes sustainability*	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.
90.incl-gr	HPP	590S	**SuicidePreven/MultiplePerspect**	graduate	--- *includes sustainability*	In the United States, suicide is one of the leading causes of death, and represents a health disparity for particular populations such as young Indigenous and older white men. Despite growing attention to the issue in recent years, suicide has been difficult to prevent or reduce in the United States. This is an experiential course, designed to give students from a range of disciplines a working knowledge of multiple meanings associated with the act of suicide.
91.incl-gr	HPP	690X	**Technology and Public Health**	graduate	--- *includes sustainability*	Electronic health (eHealth) and mobile health (mHealth) technologies are transforming healthcare and public health research and practice. This course will provide a broad foundation of knowledge about technology in the field of public health, with specific modules on (1) health and healthcare IT; (2) eHealth and mHealth tools for disease/injury surveillance, intervention, and advocacy; and (3) technology-related public health challenges.
92.incl-gr	HPP	580	**Comparative Healthcare Systems**	graduate	--- *includes sustainability*	Overview of the characteristics of main health care systems and policies in selected countries. Topics of study include financing, insurance and delivery, access, and cost of health care services.
93.incl-gr	HPP	690F	**Social Justice**	graduate	--- *includes sustainability*	
94.incl-gr	HPP	690DS	**Health Disparities**	graduate	--- *includes sustainability*	This course is a graduate introduction to social injustice and inequality issues which create conditions that lead to unconscionable health disparities according to race, ethnicity, childhood experiences, gender, income, nationality, and other factors. This course explores the multi-faceted origins of health disparities clearly essential to effective and humane programs, policies, and systems. The course will also continuously examine how to translate theory into practice.
95.incl-gr	HPP	690MC	**Global Maternal Child Health**	graduate	--- *includes sustainability*	This course is designed to give students an overview of the issues pertinent to the health of mothers and children globally. Topics will include morbidity and mortality, antenatal care, labor/delivery, family planning, child health, nutrition, and HIV/AIDS. The health status of mothers and children is an important indicator of the health of a nation, so in this course, the major maternal child health indicators of developed countries will be contrasted with those of underdeveloped countries.
96.incl-gr	LABOR	605	**Prac-Labor Resrch I**	graduate	--- *includes sustainability*	The principles and techniques of labor advocacy research. Includes survey research, qualitative methods, and corporate research techniques.
97.incl-gr	LABOR	697BB	**ST-Work and The Labor Process**	graduate	--- *includes sustainability*	

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98.incl-gr	LABOR	693A	**S-Issues&Debates/LaborStudies**	graduate	--- *includes sustainability*	This course is an introduction to the labor movement in the United States. It begins by exploring the recent history of labor and the rapidly changing circumstances that unions now find themselves in. We then move on to explore the current issues and debates in the emerging practices of labor in the U. S. The course has a dual focus, both analyzing the practice of unions, as well as providing a literature survey of the labor movement.
99.incl-gr	LABOR	742	**Labor&Employment Law**	graduate	--- *includes sustainability*	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.
100.incl-gr	LABOR	597W	**ST-Organizing**	graduate	--- *includes sustainability*	Introduction to the principles and practices of union organizing. Topics include theories of organizing, internal and external organizing, and a case analysis of current organizing campaigns.
101.incl-gr	LANDARCH	651	**Professional Practice**	graduate	--- *includes sustainability*	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.
102.incl-gr	LANDARCH	547	**Landscape Pattern & Process**	graduate	--- *includes sustainability*	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.
103.incl-gr	LANDARCH	604	**Studio VII**	graduate	--- *includes sustainability*	Application of urban design theories as they apply to various scales of urban design, with special attention focused on civic scale design elements and organization of spatial and functional requirements.
104.incl-gr	LANDARCH	635	**Research Issues in Land Arch**	graduate	--- *includes sustainability*	Survey of research issues and methods in landscape architecture and planning. Designed to assist students preparing their research for master's theses and projects. Includes selecting a topic for this research, synthesizing the pertinent literature, developing research questions and selecting a faculty advisor.
105.incl-gr	LANDARCH	504	**Studio III**	graduate	--- *includes sustainability*	Application of spatial theroy and design process to a specific site context. Develops map reading skills at various scales, strengthens drawing, lettering, and cross-section representation skills. Emphasis on landform design in a public park setting.
106.incl-gr	LANDARCH	592A	**S-Plants In Ldscpe**	graduate	--- *includes sustainability*	Not available at this time
107.incl-gr	LANDARCH	601	**Recreation Plan&Des**	graduate	--- *includes sustainability*	Not available at this time
108.incl-gr	LANDARCH	607	**Studio IX**	graduate	--- *includes sustainability*	Not available at this time
109.incl-gr	LANDARCH	544	**Hist Arch & Ldscp II**	graduate	--- *includes sustainability*	Completes the survey begun in LANDARCH 543. Covers the Renaissance to the present.
110.incl-gr	LANDARCH	606	**Studio VIII**	graduate	--- *includes sustainability*	Introduces students to the process of research, planning, design, and management of historically and culturally significant landscapes through selected real-world site projects.
111.incl-gr	LANDARCH	501	**Studio I**	graduate	--- *includes sustainability*	Introduces students to reading and responding to the site. Goals include learning to experience and record the landscape, to design in response to the site, to think creatively, to generate design ideas and understand design as a process, to gain knowledge of design precedents and principles, and to learn tools and techniques of visual expression
112.incl-gr	LANDARCH	503	**Studio II**	graduate	--- *includes sustainability*	An exploration of the modes of space: two-dimensional surfaces, three-dimensional objects, spatial enclosure, and the open continuous landscape. Emphasis on the media of landform, water, plants, and structures as the defining agents of human space in the garden and the landscape.
113.incl-gr	LANDARCH	597Q	**ST-Urban Design Workshop**	graduate	--- *includes sustainability*	
114.incl-gr	LANDARCH	661	**CultralLandscpes:DocValuesPolc**	graduate	--- *includes sustainability*	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.

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115.incl-gr	LANDARCH	691S	**S-CulturalLndscpes:Doc,Val&Pol**	graduate	--- *includes sustainability*	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 for this course will be the vernacular landscape.
116.incl-gr	LANDARCH	663	**Heritage Landscape Mgmt**	graduate	--- *includes sustainability*	This course offers students the opportunity to deepen their understanding of the theory and practice of heritage management generally and specifically in its application to the management, interpretation, and design of culturally significant landscapes, including urban landscapes, parks, gardens, historic sites, and agricultural landscapes all over the world.
117.incl-gr	LANDARCH	592M	**S-MaterialExperiments/Landarch**	graduate	--- *includes sustainability*	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.
118.incl-gr	M&I-ENG	573	**Engineering Windpower Systems**	graduate	--- *includes sustainability*	Engineering aspects of windpower systems including aerodynamic analysis, mechanical design, support structure design, wind field analysis, system concepts and analysis, and economics.
119.incl-gr	M&I-ENG	570	**Solar&Dir Enrgy Conv**	graduate	--- *includes sustainability*	Review of engineering principles of solar energy conversion including collection techniques, thermal and direct conversion, system performance prediction, and selected topics. Prerequisite: M&I-Eng 354.
120.incl-gr	M&I-ENG	674	**Offshore Wind Energy Systems**	graduate	--- *includes sustainability*	Students will become experts in offshore wind energy systems, including the technical aspects and the social, environmental, and economic issues.
121.incl-gr	M&I-ENG	597WC	**ST-Collegiate Wind Competition**	graduate	--- *includes sustainability*	Not available at this time.
122.incl-gr	NRC	572	**Insc & Dis of Forst & Sh Trees**	graduate	--- *includes sustainability*	Ecology, biology and control of insects which attack shade trees, forests and forest products. A brief introduction to insects; attention to the more important forest and shade tree insects.
123.incl-gr	NRC	540	**Forest Resources Mgt**	graduate	--- *includes sustainability*	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.
124.incl-gr	NRC	528	**Forest&Wetland Hydro**	graduate	--- *includes sustainability*	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.
125.incl-gr	NRC	590W	**WetlandsAssessment&FieldTech**	graduate	--- *includes sustainability*	The objective of this course is to develop an understanding of Massachusetts wetlands regulations and techniques for wetlands assessments with an emphasis on wildlife habitat evaluation. Indoor lectures for the first eight weeks of the course are used to familiarize students with various assessment methodologies as well as Massachusetts wetlands protection regulations. Outdoor labs during the last five weeks of the semester focus on applying information learned in lectures.
126.incl-gr	NRC	564	**Wildlife Habitat Mgt**	graduate	--- *includes sustainability*	The dynamics and management of forested, open woodland, and savanna habitats in North America and elsewhere. Topics include wildlife ecology, habitat classification, resource utilization, impacts on humans, and management techniques.
127.incl-gr	NRC	565	**Dyn&Mgt Of Wldlf Pop**	graduate	--- *includes sustainability*	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 estimating population parameters for wildlife.
128.incl-gr	NRC	571	**Fisheries Sci & Mgt**	graduate	--- *includes sustainability*	Introduction to the principles of fish stock assessment, with emphasis on harvest modeling and forecasting techniques. Implications of overfishing and habitat degradation.

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129.incl-gr	NRC	541	**Urban Forest Management**	graduate	--- *includes sustainability*	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.
130.incl-gr	NRC	526	**Silviculture**	graduate	--- *includes sustainability*	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.
131.incl-gr	NRC	534	**Forest Measurements**	graduate	--- *includes sustainability*	Forests provide tremendous public benefits. This course will teach methods for mapping forest resources and quantifying the forest species and structure that provide these many benefits, with the goal of informing forest conservation decisions. The course will also include methods for determining threats to forests, including invasive plants, exotic insects, and deer over populations.
132.incl-gr	NRC	590AE	**Aquatic Ecology**	graduate	--- *includes sustainability*	Advanced ecology course that examines the interplay between aquatic organisms and their physical, chemical, and biological environment, with an emphasis on freshwater lakes and streams. Students will learn basic concepts, ecological theory, methods in limnology, and apply them to understand the impacts of human activities on aquatic ecosystems.
133.incl-gr	NRC	590TP	**Adapting to Climate Change**	graduate	--- *includes sustainability*	Introduction to the policies and politics of climate change adaptation with a focus on the response of human systems in both the developed and developing world context. Overview of climate projections and potential hazards to socio-ecological systems. Examination of adaptation strategies, policies directing responses, knowledge and factors that facilitate or stymie action. The role of international climate community; state and non-state actors.
134.incl-gr	NRC	590RE	**Restoration Ecology**	graduate	--- *includes sustainability*	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.
135.incl-gr	NRC	578	**Watershed Sci & Mgmt**	graduate	--- *includes sustainability*	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.
136.incl-gr	NRC	576	**Water Resources Mgmt & Polcy**	graduate	--- *includes sustainability*	Water is one of the basic elements needed for life systems to exist and survive. While it is abundant in supply, it is not always available where it is needed. This course will cover concepts and issues related to managing water resources through regional and global ecosystem perspectives.
137.incl-gr	NRC	597FF	**ST- Family Forests/New England**	graduate	--- *includes sustainability*	New England is a heavily forested region providing tremendous public benefits. The majority of these forests are owned by families. This course will explore the critical role family forest owners play in conservation. The class will be part of a regional class also being offered at the Universities of Maine and Vermont. Each week our class will meet with students from all three universities using web technology, hear from a speaker, and have a New England wide discussion.
138.incl-gr	NRC	585	**Introduction to GIS**	graduate	--- *includes sustainability*	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.
139.incl-gr	NRC	590WS	**S-Wetland Soils**	graduate	--- *includes sustainability*	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.

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140.incl-gr	NRC	597GW	**ST- WebGIS**	graduate	--- *includes sustainability*	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.
141.incl-gr	NURSING	704	**Health Disparities & Soc Just**	graduate	--- *includes sustainability*	Using group discussion, research, and community-based assignments, students will gain knowledge regarding the historical dimensions leading to health disparities, social injustice, and concepts of marginalization, poverty, race, class, and gender.
142.incl-gr	NUTRITN	577	**Nutrition Problems in US**	graduate	--- *includes sustainability*	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 and nutritional complexities of major diet-related diseases in the United States. It satisfies the Integrated Experience requirement for
143.incl-gr	NUTRITN	572	**Community Nutrition**	graduate	--- *includes sustainability*	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.
144.incl-gr	NUTRITN	578	**Nutr Prob Devlp Wrld**	graduate	--- *includes sustainability*	Malnutrition as it exists in developing countries and its socioeconomic background. Protein-energy 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.
145.incl-gr	NUTRITN	640	**Public Health Nutrition**	graduate	--- *includes sustainability*	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.
146.incl-gr	NUTRITN	585	**Prac Skills in Nutrtn Counslng**	graduate	--- *includes sustainability*	Knowledge of dietary treatment of diseases (Medical Nutrition Therapy) applied in simulated one-on-one counseling settings. Topics include: interviewing/listening skills, assessing readiness, developing care plans, multicultural counseling, computerized diet analysis.
147.incl-gr	NUTRITN	597K	**ST-Culture, Nutrition & Health**	graduate	--- *includes sustainability*	How culture and ethnicity affect dietary practices and health in the U.S. Influence of food security, acculturation, and politics on food availability, food practices, and health outcomes. Health and health disparities in different cultural/ethnic groups, including overview of epigenetics. Emphasis on cross-cultural communication to address health and nutrition concerns.
148.incl-gr	PUBP&ADM	601	**Politcs&Policy Proc**	graduate	--- *includes sustainability*	Examination of the influence of political factors, including institutions and interests, on the initiation, formulation, and implementation of public policy. Examines the role of information and expertise in politics.
149.incl-gr	PUBP&ADM	603	**Publc Polcy Analysis**	graduate	--- *includes sustainability*	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.
150.incl-gr	PUBP&ADM	607	**Policy Methods**	graduate	--- *includes sustainability*	Introduction to methodologies for analyzing, implementing, and evaluating public policy. Topics include research methods, participant observation survey research and questionnaire construction, research design, measurement theory and practice, and framing categories.
151.incl-gr	PUBP&ADM	610	**Capstone In Pubp&A**	graduate	--- *includes sustainability*	Students synthesize what they learned in the M.P.A. program in a paper that addresses an important gap in knowledge about a particular issue in public policy or management.
152.incl-gr	PUBP&ADM	697B	**ST-Introduction to GIS**	graduate	--- *includes sustainability*	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.

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153.incl-gr	PUBP&ADM	611	**Comparative Public Policy**	graduate	--- *includes sustainability*	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.
154.incl-gr	PUBP&ADM	597GP	**ST-InternetGovernce&InfoPolicy**	graduate	--- *includes sustainability*	This seminar introduces students to enduring and emerging information policy issues in public interest battles fought locally, nationally and globally for the control of Internet infrastructure, code and content. We will analyze how policy and regulation, politics, commercial interests, nation-states, transnational organizations and organized civil society actors are shaping our digital communication environment.
155.incl-gr	PUBP&ADM	597EM	**ST-Ecological Macroeconomics**	graduate	--- *includes sustainability*	This course focuses on the relationship between achieving climate stabilization, on the one hand; and advancing economic growth, expanding job opportunities and raising living standards, on the other. We consider these issues, and the relevant literature, for countries and regions of the global economy at all levels of development.
156.incl-gr	PUBP&ADM	597B	**ST- Unmanned Aircraft Systems**	graduate	--- *includes sustainability*	This class will be 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 the basics of flight, mission planning, data analysis, data visualization and an overview UAS operations and applications across multiple sectors of industry and research. The class utilizes curriculum and content from Trillium Learning's Unmanned Aircraft Systems.
157.incl-gr	PUBP&ADM	597M	**ST- MakerspaceLeadership&Outr**	graduate	--- *includes sustainability*	This course is designed not to provide new instruction but to provide students an opportunity to design, develop, test, implement, manage and lead an outreach "makerspace" project and workshop targeting middle- and high-school youth. While there is some opportunity for creativity on what the project is about, in many cases they may focus on open source environmental sensing technologies built on Arduino microcontrollers, 3D design and printing applications, or projects related to "smart cities"
158.incl-gr	REGIONPL	656	**Judicial Plan Law**	graduate	--- *includes sustainability*	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.
159.incl-gr	REGIONPL	574	**City Planning**	graduate	--- *includes sustainability*	Contact department for description.
160.incl-gr	REGIONPL	651	**Plnng Hist & Theory**	graduate	--- *includes sustainability*	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.
161.incl-gr	REGIONPL	675	**Regional Planning Studio I**	graduate	--- *includes sustainability*	The first in a sequence of workshop-type courses, to integrate skills and knowledge from conventional courses and apply them to representative planning problems. Instructional goals: to develop the skills and techniques for collecting, analyzing, synthesizing and presenting spatial and non-spatial data; and to develop a sense of judgement about the comprehensiveness and reliability of the data and its utility for planning decisions.
162.incl-gr	REGIONPL	620	**Quant Meth In Plannng**	graduate	--- *includes sustainability*	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.
163.incl-gr	REGIONPL	645	**Growth Management**	graduate	--- *includes sustainability*	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.
164.incl-gr	REGIONPL	652	**Tools & Tech In Planning**	graduate	--- *includes sustainability*	Practical information, specific tools, regulatory processes, and analytic methods useful in the practice of public sector planning at the local level.
165.incl-gr	REGIONPL	577	**Urban Policies**	graduate	--- *includes sustainability*	Social, cultural, political, and economic analyses of urban policies and practices. Various disciplinary approaches used for critiquing and developing appropriate policies, including urban planning, anthropology, geography, political science, media studies, sociology, and economics. Includes service learning component. Ms. Pader

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166.incl-gr	REGIONPL	635	**Research Issues in Land Arch**	graduate	--- *includes sustainability*	Survey of research issues and methods in landscape architecture and planning. Designed to assist students preparing their research for master's theses and projects. Includes selecting a topic for this research, synthesizing the pertinent literature, developing research questions and selecting a faculty advisor.
167.incl-gr	REGIONPL	630	**Theory&Practice of PubParticp**	graduate	--- *includes sustainability*	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.
168.incl-gr	REGIONPL	661	**CultralLandscpes:DocValuesPolc**	graduate	--- *includes sustainability*	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.
169.incl-gr	REGIONPL	891	**Seminar**	graduate	--- *includes sustainability*	Contact department for description
170.incl-gr	REGIONPL	625	**Intro to GIS Systems/Planning**	graduate	--- *includes sustainability*	This is an introductory, graduate-level course in the use of Geographic Information Systems (GIS) in urban and regional planning.
171.incl-gr	REGIONPL	585	**Planning for Climate Change**	graduate	--- *includes sustainability*	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.
172.incl-gr	REGIONPL	663	**Heritage Landscape Mgmt**	graduate	--- *includes sustainability*	This course offers students the opportunity to deepen their understanding of the theory and practice of heritage management generally, and specifically in its application to the management, interpretation, and design of culturally significant landscapes, including urban landscapes, parks, gardens, historic sites, and agricultural landscapes all over the world.
173.incl-gr	RES-ECON	712	**Appl Microec Thry II**	graduate	--- *includes sustainability*	Principles of welfare economics; introduction to noncooperative game theory; theories of imperfect competition; the provision of public goods and the control of externalities, and the economics of information.
174.incl-gr	SCH-MGMT	758	**Supply Chain Mgt**	graduate	--- *includes sustainability*	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.
175.incl-gr	SCH-MGMT	797N	**ST-Sci-BasedEntrepr&LeanLaunch**	graduate	--- *includes sustainability*	This course will expose students to basic entrepreneurship concepts with an emphasis on validating business models through the Lean Launchpad methodology. In addition to the experiential component, content experts will contribute presentations on a variety of entrepreneurial topics. This course is designed primarily for graduate students in STEM disciplines.
176.incl-gr	SCH-MGMT	597LG	**ST-Humntrn Logstcs&Health Care**	graduate	--- *includes sustainability*	Description not available at this time
177.incl-gr	SOCIOL	697BB	**ST-Work and The Labor Process**	graduate	--- *includes sustainability*	Description not available at this time
178.incl-gr	STOCKSCH	515	**Micbiol Of The Soil**	graduate	--- *includes sustainability*	Microbial processes in the soil and sediment environment; ecology of the various microbial communities; the decomposition of organic matter, carbon transformation, nitrogen, sulfur, phosphorus and other mineral transformations. Chemistry of these reactions and their biogeochemical implications. Biological equilibrium, the rhizosphere, and microbial associations.

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179.incl-gr	STOCKSCH	530	**Plant Nutrition**	graduate	--- *includes sustainability*	With lab. The acquisition, translocation, distribution, and function of the essential inorganic elements in plants. Genetic control of plant nutrition and ecological adaptation to nutritional variables. Diagnosis of plant nutritional disorders. Prerequisites: STOCKSCH 105 and STOCKSCH 108, and either CHEM 110 or 111 or equivalent courses.
180.incl-gr	STOCKSCH	545	**Postharvest Biology**	graduate	--- *includes sustainability*	The basic biochemical and physiological processes occurring in fruits, vegetables, and flowers after harvest; postharvest treatments to modify these processes.
181.incl-gr	STOCKSCH	580	**Soil Fertility**	graduate	--- *includes sustainability*	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. Prerequisites: STOCKSCH 102 and STOCKSCH 105 (or equivalents), CHEM 110 or 111.
182.incl-gr	STOCKSCH	566	**Soil Formtn, Classif, Land Use**	graduate	--- *includes sustainability*	Effect of environmental factors on soil formation and land use. Relationship between soil morphology, classification, and use interpretations. Application of soils information to on-site sewage disposal, wetland identification, and other environmentally significant problem areas.
183.incl-gr	STOCKSCH	520	**Physiolgy Crop Yield**	graduate	--- *includes sustainability*	Physiology of crop plants, carbon fixation, partitioning, growth and development, competition in crops, environmental factors and yield relationships of crops.
184.incl-gr	STOCKSCH	510	**Mgt & Ecol of Plant Diseases**	graduate	--- *includes sustainability*	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.
185.incl-gr	STOCKSCH	597A	**ST-Phyto/Bioremediation**	graduate	--- *includes sustainability*	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.
186.incl-gr	STOCKSCH	523	**Plant Stress Physiology**	graduate	--- *includes sustainability*	This is an advanced course that will focus on plant responses to major abiotic stresses. Current research topics in stress physiology will also be discussed.
187.incl-gr	STOCKSCH	697PB	**ST-Phyto/Bioremediation**	graduate	--- *includes sustainability*	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.
188.incl-gr	STOCKSCH	590M	**MicrobeMineralOrgMatter/Soils**	graduate	--- *includes sustainability*	This course discusses fundamental interactions between microbes, minerals, and organic matter responsible for carbon cycling, mineral weathering, and nutrient dynamics in soils. Through a combination of lectures and in-class discussions, we will examine the importance of these interactions for soil development, carbon storage, and fertility. Further, we will discuss the underlying mechanisms and suitable analytical methods for their investigation.
189.incl-gr	STOCKSCH	585	**InorgContmnts/Soil,Water,Sdmnt**	graduate	--- *includes sustainability*	Physical, chemical, and biological factors affecting the fate and transport of inorganic contaminants (including heavy metals) in soil, water and sediment. Sources, chemistry, pedogenic and geochemical behavior of these contaminants and methods used for their analysis. Risk assessment, and remediation technologies, options, and goals.
190.incl-gr	STOCKSCH	591A	**S-Plant Biotech Journal Club**	graduate	--- *includes sustainability*	This journal club is open to both graduate students and advanced undergraduate students who have an interest in reviewing the current scientific literature in the field of plant biotechnology.
191.incl-gr	STOCKSCH	692A	**S-Topics in Plant-Path Intract**	graduate	--- *includes sustainability*	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 ?omic? methods have greatly increased understanding of how pathogens attack plants, how plants defend themselves, etc.

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192.incl-gr	SUSTCOMM	574	**City Planning**	graduate	--- *includes sustainability*	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.
193.incl-gr	SUSTCOMM	544	**Hist Arch & Ldscp II**	graduate	--- *includes sustainability*	

List compiled by Craig Nicolson for School of Earth and Sustainability, March 2018.

Updated May 2018 in response to AASHE query.