Harvard University

The following information was submitted through the STARS Reporting Tool.

Date Submitted: Feb. 27, 2015

STARS Version: 2.0

Table of Contents

The information presented in this submission is self-reported and has not been verified by AASHE or a third party. If you believe any of this information is erroneous, please see the process for inquiring about the information reported by an institution.

Institutional Characteristics

Institutional Characteristics

The passthrough subcategory for the boundary

Credit
Institutional Boundary
Operational Characteristics
Academics and Demographics

Institutional Boundary

Criteria

This won't display

"---" indicates that no data was submitted for this field

Institution type:

Doctorate

Institutional control:

Private non-profit

Which campus features are present and included in the institutional boundary?:

	Present?	Included?
Agricultural school	No	No
Medical school	Yes	Yes
Pharmacy school	No	No
Public health school	Yes	Yes
Veterinary school	No	No
Satellite campus	No	No
Hospital	No	No
Farm larger than 5 acres or 2 hectares	No	No
Agricultural experiment station larger than 5 acres or 2 hectares	Yes	Yes

Reason for excluding agricultural school:

Reason for excluding medical school:

Reason for excluding pharmacy school:

Reason for excluding public health school:

Reason for excluding veterinary school:

Reason for excluding satellite campus:

Reason for excluding hospital:

Reason for excluding farm:

Reason for excluding agricultural experiment station:

Narrative:

Where possible Harvard reports on all North American properties (GHG emissions for example). However, due to limitations in data collection and decentralization across 12 Schools and many administrative departments, many of which have independent operational control, certain answers may only cover Harvard's primary campus. We use the Notes section to specify when data might not include all N. American properties.

Operational Characteristics

Criteria

n/a

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Academics and Demographics

Criteria

n/a

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Academics

Curriculum

This subcategory seeks to recognize institutions that have formal education programs and courses that address sustainability. One of the primary functions of colleges and universities is to educate students. By training and educating future leaders, scholars, workers, and professionals, higher education institutions are uniquely positioned to prepare students to understand and address sustainability challenges. Institutions that offer courses covering sustainability issues help equip their students to lead society to a sustainable future.

Credit
Academic Courses
Learning Outcomes
Undergraduate Program
Graduate Program
Immersive Experience
Sustainability Literacy Assessment
Incentives for Developing Courses
Campus as a Living Laboratory

Academic Courses

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Part 1

Institution offers sustainability courses and/or courses that include sustainability and makes an inventory of those courses publicly available.

Part 2

Institution's academic departments (or the equivalent) offer sustainability courses and/or courses that include sustainability.

In order to report and earn points for this credit, the institution must conduct a course inventory. The inventory should consist of two parts:

1) An inventory of sustainability courses that includes, at minimum, the title, department (or equivalent), and level of each course (i.e. undergraduate or graduate), as well as a brief description if the sustainability focus of the course is not apparent from its title

2) An inventory of other courses that include sustainability. The inventory includes, at minimum, the title, department (or the equivalent), and level of each course and a description of how sustainability is integrated into each course.

A course may be a sustainability course or it may include sustainability; no course should be identified as both:

• A sustainability course is a course in which the primary and explicit focus is on sustainability and/or on understanding or solving one or more major sustainability challenge (e.g. the course contributes toward achieving principles outlined in the Earth Charter).

• A course that includes sustainability is primarily focused on a topic other than sustainability, but incorporates a unit or module on sustainability or a sustainability challenge, includes one or more sustainability-focused activities, or integrates sustainability issues throughout the course.

For guidance on conducting a course inventory and distinguishing between sustainability courses and courses that include sustainability, see *Standards and Terms* and the Credit Example in the STARS Technical Manual. An institution that has developed a more refined approach to course classification may use that approach as long as it is consistent with the definitions and guidance provided.

Each institution is free to choose a methodology to identify sustainability courses that is most appropriate given its unique circumstances. Asking faculty and departments to self-identify sustainability courses and courses that include sustainability using the definitions outlined in *Standards and Terms* or looking at the stated learning outcomes and course objectives associated with each course may provide a richer view of sustainability course offerings than simply reviewing course descriptions, but it is not required.

This credit does not include continuing education and extension courses, which are covered by *EN 11: Continuing Education*.

Submission Note:

Only courses that counted towards a degree were counted (and not performances, internships, etc as listed above).

"---" *indicates that no data was submitted for this field*

Figures required to calculate the percentage of courses with sustainability content::

	Undergraduate	Graduate
Total number of courses offered by the institution	5,571	3,469
Number of sustainability courses offered	61	63
Number of courses offered that include sustainability	135	108

Number of academic departments (or the equivalent) that offer at least one sustainability course and/or course that includes sustainability (at any level):

26

Total number of academic departments (or the equivalent) that offer courses (at any level):

45

Number of years covered by the data:

One

A copy of the institution's inventory of its course offerings with sustainability content (and course descriptions):

TotaHarvardCourses.docx

An inventory of the institution's course offerings with sustainability content (and course descriptions):

Total Energy/Environmental Courses at Harvard University
2014-2015 Academic Year

Engineering Sciences 137. Energy within Environmental Constraints
This course provides a systematic introduction to the energy system for students in engineering and applied sciences. Students should gain a working understanding of the some of the most important energy technologies, from prime movers--gas turbines, steam cycles, and reciprocating engines--to secondary energies including fuel production and refining technologies and the electricity transmission and distribution system. The course aims at a systematic understanding of the energy system's environmental footprint as a tool to help students who will work to reduce it. Energy is a commodity. One cannot hope to re-shape the energy system to meet environmental constrains without a rough working understanding of energy markets--costs, prices and elasticities of supply and demand. So the course

will integrate engineering economics and other applied social sciences into the treatment of energy technologies to enable a system's view of energy.
Prerequisite(s)
Advanced high school mathematics, chemistry, and physics.
Professor:
David Keith
Professor:
Season:
Fall
Days:
T
Th
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
19461
Subject Area:
Engineering Sciences
Research Areas:
• Energy
Configure
Engineering Sciences 137. Energy within Environmental Constraints
This course provides a systematic introduction to the energy system for students in engineering and applied sciences. Students should gain a working understanding of the some of the most important energy technologies, from prime movers--gas turbines, steam cycles, and reciprocating engines--to secondary energies including fuel production and refining technologies and the electricity transmission and distribution system. The course aims at a systematic understanding of the energy system's environmental footprint as a tool to help students who will work to reduce it. Energy is a commodity. One cannot hope to re-shape the energy system to meet environmental constrains without a rough working understanding of energy markets--costs, prices and elasticities of supply and demand. So the course will integrate engineering economics and other applied social sciences into the treatment of energy technologies to enable a system's view of energy.
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Th
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
19461
Subject Area:
Engineering Sciences
Research Areas:
• Energy
English 190n. Writing Nature: Creativity, Poetry, Ethics, Science
What can writing tell us about nature and the relation of humans to it? Readings in William Wordsworth, Henry David Thoreau, John Muir, John Burroughs, Aldo Leopold, and Rachel Carson, who form a tradition blending poetry, ethics, and science. Additional nature and conservation writing (e.g., Susan Fenimore Cooper, Theodore Roosevelt), recent poets (e.g., Gary Snyder, Mary Oliver, Jorie Graham) and prose writers (e.g., Annie Dillard, Gretel Ehrlich, John Elder). Critical papers assigned, also individual nature writing as essays or poems.
Professor:
James Engell
Professor:
Season:
Spring
Days:

M
W
Time:
12:00-1:00
School:
• Faculty of Arts and Sciences
Catalog Number:
90776
Subject Area:
English
Research Areas:
• Arts and Humanities
English 190n. Writing Nature: Creativity, Poetry, Ethics, Science
What can writing tell us about nature and the relation of humans to it? Readings in William Wordsworth, Henry David Thoreau, John Muir, John Burroughs, Aldo Leopold, and Rachel Carson, who form a tradition blending poetry, ethics, and science. Additional nature and conservation writing (e.g., Susan Fenimore Cooper, Theodore Roosevelt), recent poets (e.g., Gary Snyder, Mary Oliver, Jorie Graham) and prose writers (e.g., Annie Dillard, Gretel Ehrlich, John Elder). Critical papers assigned, also individual nature writing as essays or poems.
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James Engell
Professor:
Season:
Spring
Days:
M
W
Time:
12:00-1:00
School:
• Faculty of Arts and Sciences
Catalog Number:
90776
Subject Area:
English
Research Areas:
• Arts and Humanities
*Environmental Science and Public Policy 90e. Conservation Biology
Conservation biology strives to describe, understand, and preserve biodiversity by applying ecological and evolutionary theory within the contexts of resource management, economics, sociology, and political science. This course will explore the moral and scientific motivations for preserving biodiversity and practice decision-making under conflicting interests. Case studies will focus on the examination of major contemporary issues in conservation biology such as endangered species protection and reintroduction, habitat fragmentation, over-harvesting of biological resources, exotic species invasions, and sustainable development. Local field trips within New England to be arranged.
Professor:
TBD
Season:
Spring
School:

• Faculty of Arts and Sciences
Catalog Number:
6879
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
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TBD
Season:
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TBD
Season:
Spring
School:
• Faculty of Arts and Sciences
Catalog Number:
6879
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity

Economics 1687. Advanced Economics of the Environment, Natural Resources, and Climate Change
Survey of foundations and applications of the modern theory of environmental and natural-resource economics. What are the basic models and what are they suggesting about policy? Externalities, public goods, common property, strategies for controlling pollution. Dynamics of renewable resources (fisheries, forestry) and dynamics of non-renewable resources (minerals like oil). Discounting, uncertainty, cost-benefit analysis, investment criteria for environmental projects, green accounting, sustainability. Basic economic analysis of climate change as prototype example.
Note: Students from other concentrations are welcome to take this course for credit.
Prerequisite: Economics 1010a1 or 1010a2.
Professor:
Martin Weitzman
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
44432
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Climate
• Energy
• Social Sciences
Economics 1687. Advanced Economics of the Environment, Natural Resources, and Climate Change
Survey of foundations and applications of the modern theory of environmental and natural-resource economics. What are the basic models and what are they suggesting about policy? Externalities, public goods, common property, strategies for controlling pollution. Dynamics of renewable resources (fisheries, forestry) and dynamics of non-renewable resources (minerals like oil). Discounting, uncertainty, cost-benefit analysis, investment criteria for environmental projects, green accounting, sustainability. Basic economic analysis of climate change as prototype example.
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Catalog Number:
44432
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Climate
• Energy
• Social Sciences
[*Environmental Science and Public Policy 90p. Biotechnology, Sustainability and Public Policy]
This seminar examines the implications of biotechnology for sustainability. Using case studies, it focuses on policy approaches for maximizing the benefits of biotechnology and minimizing their risks. It addresses the following themes: (1) scientific and technological advances in biotechnology and sustainability; (2) social responses to the use of biotechnology; (3) application of biotechnology specific

sectors such as agriculture; industry; energy; bioremediation and species conservation; (4) socio-economic impacts; and (5) policy and institutional considerations.
Note: Expected to be given in 2015-16.
Professor:
Calestous Juma
Season:
Spring
Days:
W
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
62576
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Energy
[*Environmental Science and Public Policy 90p. Biotechnology, Sustainability and Public Policy]
This seminar examines the implications of biotechnology for sustainability. Using case studies, it focuses on policy approaches for maximizing the benefits of biotechnology and minimizing their risks. It addresses the following themes: (1) scientific and technological advances in biotechnology and sustainability; (2) social responses to the use of biotechnology; (3) application of biotechnology specific sectors such as agriculture; industry; energy; bioremediation and species conservation; (4) socio-economic impacts; and (5) policy and institutional considerations.
Note: Expected to be given in 2015-16.
Professor:
Calestous Juma
Season:
Spring
Days:
W
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
62576
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Energy
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Note: Expected to be given in 2015-16.
Professor:
Calestous Juma
Season:
Spring
Days:
W
Time:
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Note: Expected to be given in 2015-16.
Professor:
Calestous Juma
Season:
Spring
Days:
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Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
62576
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Energy

[Science of the Physical Universe 25. Energy: Perspectives, Problems and Prospects]
The course provides an historical account of the evolution of the modern energy system, from early dependence on human and animal power, to the subsequent use of wind and water, to more recent reliance on fossil fuels—coal, oil and natural gas—and even more recently to the development of the ability to tap the energy contained in the nucleus. It will discuss the important historical advances in the applications of energy, notably in the production and distribution of electricity and in the transportation sector - where oil-derived products provide the motive force for cars, trucks, trains, ships and planes. It will highlight the energy related problems we confront today, with particular emphasis on air pollution, on the threat of global climate change, on the hazards of nuclear proliferation, and on the risks to national security imposed by our increasing reliance on imported sources of oil. It concludes with a discussion of options for a more sustainable energy future.
Note: Expected to be given in 2015-16. Students who have taken Science A-52 may not take this course for credit. This course, when taken for a letter grade, meets the Core area requirement for Science A.
Prerequisite: Students are expected to have a background in high school algebra and trigonometry.
Professor:
Michael B. McElroy
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
1387
Subject Area:
Core
General Education
Research Areas:
• Energy
[Science of the Physical Universe 25. Energy: Perspectives, Problems and Prospects]
The course provides an historical account of the evolution of the modern energy system, from early dependence on human and animal power, to the subsequent use of wind and water, to more recent reliance on fossil fuels—coal, oil and natural gas—and even more recently to the development of the ability to tap the energy contained in the nucleus. It will discuss the important historical advances in the applications of energy, notably in the production and distribution of electricity and in the transportation sector - where oil-derived products provide the motive force for cars, trucks, trains, ships and planes. It will highlight the energy related problems we confront today, with particular emphasis on air pollution, on the threat of global climate change, on the hazards of nuclear proliferation, and on the risks to national security imposed by our increasing reliance on imported sources of oil. It concludes with a discussion of options for a more sustainable energy future.
Note: Expected to be given in 2015-16. Students who have taken Science A-52 may not take this course for credit. This course, when taken for a letter grade, meets the Core area requirement for Science A.
Prerequisite: Students are expected to have a background in high school algebra and trigonometry.
Professor:
Michael B. McElroy
Season:
Spring
Days:
M

W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
1387
Subject Area:
Core
General Education
Research Areas:
• Energy
*Earth and Planetary Sciences 231. Climate Dynamics
Climate and climate variability phenomena and mechanisms using a hierarchical modeling approach. Basics: El Niño and thermohaline circulation, abrupt, millennial and glacial-interglacial variability, equable climates.
Note: Given in alternate years.
Prerequisite: Background in geophysical fluid dynamics or permission of instructor.
Professor:
Eli Tziperman
Season:
Spring
Days:
M
Th
Time:
M 2:30-4:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
6492
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
*Earth and Planetary Sciences 231. Climate Dynamics
Climate and climate variability phenomena and mechanisms using a hierarchical modeling approach. Basics: El Niño and thermohaline circulation, abrupt, millennial and glacial-interglacial variability, equable climates.
Note: Given in alternate years.
Prerequisite: Background in geophysical fluid dynamics or permission of instructor.
Professor:
Eli Tziperman
Season:
Spring
Days:
M
Th
Time:

M 2:30-4:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
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Research Areas:
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Professor:
Eli Tziperman
Season:
Spring
Days:
M
Th
Time:
M 2:30-4:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
6492
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
*Economics 2690hf. Environmental Economics and Policy Seminar
Selected topics in environmental and resource economics. Emphasizes theoretical models, quantitative empirical analysis, and public policy applications. Includes invited outside speakers.
Note: Primarily for graduate students in economics or related fields with environmental interests. Offered jointly with the Kennedy School as API-905y.
Prerequisite: Graduate-level course in microeconomic theory.
Professor:
Robert N. Stavins
Martin Weitzman
Season:
Spring
Fall
Days:
W
Time:

4:00-5:30
School:
• Faculty of Arts and Sciences
• Harvard Kennedy School
Catalog Number:
4324
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
*Economics 2690hf. Environmental Economics and Policy Seminar
Selected topics in environmental and resource economics. Emphasizes theoretical models, quantitative empirical analysis, and public policy applications. Includes invited outside speakers.
Note: Primarily for graduate students in economics or related fields with environmental interests. Offered jointly with the Kennedy School as API-905y.
Prerequisite: Graduate-level course in microeconomic theory.
Professor:
Robert N. Stavins
Martin Weitzman
Season:
Spring
Fall
Days:
W
Time:
4:00-5:30
School:
• Faculty of Arts and Sciences
• Harvard Kennedy School
Catalog Number:
4324
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
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Selected topics in environmental and resource economics. Emphasizes theoretical models, quantitative empirical analysis, and public policy applications. Includes invited outside speakers.
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Martin Weitzman
Season:
Spring

Fall
Days:
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Time:
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Martin Weitzman
Season:
Spring
Fall
Days:
W
Time:
4:00-5:30
School:
• Faculty of Arts and Sciences
• Harvard Kennedy School
Catalog Number:
4324
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
*Economics 3680hf. Research in Environmental Economics
Participants discuss recent research in environmental and natural resource economics and present their own work in progress.
Note: Open to doctoral students only.
Professor:
Robert N. Stavins
Season:
Spring

Fall
Days:
F
Time:
12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1227
Subject Area:
Economics
Research Areas:
• Social Sciences
*Economics 3680hf. Research in Environmental Economics
Participants discuss recent research in environmental and natural resource economics and present their own work in progress.
Note: Open to doctoral students only.
Professor:
Robert N. Stavins
Season:
Spring
Fall
Days:
F
Time:
12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1227
Subject Area:
Economics
Research Areas:
• Social Sciences
*Engineering Sciences 132. Introduction to Meteorology and Climate
Physical concepts necessary to understand atmospheric structure and motion. Phenomena studied include the formation of clouds and precipitation, solar and terrestrial radiation, dynamical balance of the large-scale wind, and the origin of cyclones. Concepts developed for understanding today's atmosphere are applied to understanding the record of past climate change and the prospects for climate change in the future.
Prerequisite(s)
Mathematics 21 or Applied Mathematics 21a and 21b; Physics 11 or 15; or permission of instructor.
Notes
ES 132 is also offered as EPS 132. Students may not take both EPS 132 and ES 132 for credit.
Professor:
Brian F. Farrell
Season:
Spring
Days:
T

Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
38742
Subject Area:
Engineering Sciences
Research Areas:
• Climate
*Engineering Sciences 132. Introduction to Meteorology and Climate
Physical concepts necessary to understand atmospheric structure and motion. Phenomena studied include the formation of clouds and precipitation, solar and terrestrial radiation, dynamical balance of the large-scale wind, and the origin of cyclones. Concepts developed for understanding today's atmosphere are applied to understanding the record of past climate change and the prospects for climate change in the future.
Prerequisite(s)
Mathematics 21 or Applied Mathematics 21a and 21b; Physics 11 or 15; or permission of instructor.
Notes
ES 132 is also offered as EPS 132. Students may not take both EPS 132 and ES 132 for credit.
Professor:
Brian F. Farrell
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
38742
Subject Area:
Engineering Sciences
Research Areas:
• Climate
*Engineering Sciences 132. Introduction to Meteorology and Climate
Physical concepts necessary to understand atmospheric structure and motion. Phenomena studied include the formation of clouds and precipitation, solar and terrestrial radiation, dynamical balance of the large-scale wind, and the origin of cyclones. Concepts developed for understanding today's atmosphere are applied to understanding the record of past climate change and the prospects for climate change in the future.
Prerequisite(s)
Mathematics 21 or Applied Mathematics 21a and 21b; Physics 11 or 15; or permission of instructor.
Notes
ES 132 is also offered as EPS 132. Students may not take both EPS 132 and ES 132 for credit.

Professor:
Brian F. Farrell
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
38742
Subject Area:
Engineering Sciences
Research Areas:
• Climate
*Engineering Sciences 229. Survey of Energy Technology
Principles governing energy generation and interconversion. Current and projected world energy use. Selected important current and anticipated future technologies for energy generation, interconversion, storage, and end usage.
Note: This course must be taken Sat/Unsat. Cannot be used for SEAS concentration credit. Students may not take both Engineering Sciences 229 and Engineering Sciences 231 for credit.
Prerequisite: Calculus of a single variable, one semester of college-level physics, and familiarity with chemistry at the high school advanced placement level.
Professor:
David Keith
Season:
Spring
Days:
W
F
Time:
2:30-4:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
94822
Subject Area:
Engineering Sciences
Research Areas:
• Energy
*Engineering Sciences 229. Survey of Energy Technology
Principles governing energy generation and interconversion. Current and projected world energy use. Selected important current and anticipated future technologies for energy generation, interconversion, storage, and end usage.
Note: This course must be taken Sat/Unsat. Cannot be used for SEAS concentration credit. Students may not take both Engineering Sciences 229 and Engineering Sciences 231 for credit.
Prerequisite: Calculus of a single variable, one semester of college-level physics, and familiarity with chemistry at the high school

advanced placement level.
Professor:
David Keith
Season:
Spring
Days:
W
F
Time:
2:30-4:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
94822
Subject Area:
Engineering Sciences
Research Areas:
• Energy
*Engineering Sciences 231. Energy Technology
Principles governing energy generation and interconversion. Current and projected world energy use. Selected important current and anticipated future technologies for energy generation, interconversion, storage, and end usage.
Prerequisite: One full year of college-level physics and familiarity with chemistry at the high school advanced placement level.
Note: Students may not take both Engineering Science 231 and 229 for credit.
Professor:
David Keith
Season:
Spring
Days:
W
F
Time:
2:30-4:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
1486
Subject Area:
Engineering Sciences
Research Areas:
• Energy
*Engineering Sciences 231. Energy Technology
Principles governing energy generation and interconversion. Current and projected world energy use. Selected important current and anticipated future technologies for energy generation, interconversion, storage, and end usage.
Prerequisite: One full year of college-level physics and familiarity with chemistry at the high school advanced placement level.
Note: Students may not take both Engineering Science 231 and 229 for credit.
Professor:
David Keith
Season:

Spring
Days:
W
F
Time:
2:30-4:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
1486
Subject Area:
Engineering Sciences
Research Areas:
• Energy
*Environmental Science and Public Policy 90j. Environmental Crises and Population Flight
War, disaster, drought, or famine force people to flee their land. Climate change is contributing to many of these factors. The humanitarian consequences of this loss of place and livelihood are filled with complexity, relating to the extent and permanence of environmental destruction wrought by these crises, people's attachment to their homes and ecosystems, the circumstances of departure, the destinations of refuge, and the possibilities for return. Issues will be examined through case studies and review of literature on forced migration and calamity.
Professor:
Jennifer Leaning
James J. McCarthy
Season:
Fall
Days:
M
Time:
2:00-4:30
School:
• Faculty of Arts and Sciences
Catalog Number:
9841
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Climate
• Human Health
*Environmental Science and Public Policy 90j. Environmental Crises and Population Flight
War, disaster, drought, or famine force people to flee their land. Climate change is contributing to many of these factors. The humanitarian consequences of this loss of place and livelihood are filled with complexity, relating to the extent and permanence of environmental destruction wrought by these crises, people's attachment to their homes and ecosystems, the circumstances of departure, the destinations of refuge, and the possibilities for return. Issues will be examined through case studies and review of literature on forced migration and calamity.
Professor:
Jennifer Leaning
James J. McCarthy

Season:
Fall
Days:
M
Time:
2:00-4:30
School:
• Faculty of Arts and Sciences
Catalog Number:
9841
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Climate
• Human Health
*Environmental Science and Public Policy 90j. Environmental Crises and Population Flight
War, disaster, drought, or famine force people to flee their land. Climate change is contributing to many of these factors. The humanitarian consequences of this loss of place and livelihood are filled with complexity, relating to the extent and permanence of environmental destruction wrought by these crises, people’s attachment to their homes and ecosystems, the circumstances of departure, the destinations of refuge, and the possibilities for return. Issues will be examined through case studies and review of literature on forced migration and calamity.
Professor:
Jennifer Leaning
James J. McCarthy
Season:
Fall
Days:
M
Time:
2:00-4:30
School:
• Faculty of Arts and Sciences
Catalog Number:
9841
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Climate
• Human Health
*Environmental Science and Public Policy 90j. Environmental Crises and Population Flight
War, disaster, drought, or famine force people to flee their land. Climate change is contributing to many of these factors. The humanitarian consequences of this loss of place and livelihood are filled with complexity, relating to the extent and permanence of environmental destruction wrought by these crises, people’s attachment to their homes and ecosystems, the circumstances of departure, the destinations of refuge, and the possibilities for return. Issues will be examined through case studies and review of literature on forced migration and calamity.
Professor:

Jennifer Leaning
James J. McCarthy
Season:
Fall
Days:
M
Time:
2:00-4:30
School:
• Faculty of Arts and Sciences
Catalog Number:
9841
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Climate
• Human Health
*Environmental Science and Public Policy 90s. The Technology, Economics, and Public Policy of Renewable Energy
Energy is the lifeblood of economic activity, and there is little prospect of this changing. However, the planet's stores of easily accessed fossil fuels are limited, and the climatological cost of continuing to rely on fossil fuels is high. This course examines the long run and short run prospects for renewable energy. We start by understanding the technology of hydro, solar, wind, and biomass. We then examine the economics of these technologies, and how subsidies and taxes affect their viability. Special attention will be paid to the interaction of technology, economics, and public policy.
Note: This course will be offered in a seminar format with an enrollment limit of 50.
Prerequisite: Economics 10a.
Professor:
George Baker
Season:
Spring
Days:
Th
Time:
1:00–4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
53953
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Energy
*Environmental Science and Public Policy 90s. The Technology, Economics, and Public Policy of Renewable Energy
Energy is the lifeblood of economic activity, and there is little prospect of this changing. However, the planet's stores of easily accessed fossil fuels are limited, and the climatological cost of continuing to rely on fossil fuels is high. This course examines the long run and short run prospects for renewable energy. We start by understanding the technology of hydro, solar, wind, and biomass. We then examine the economics of these technologies, and how subsidies and taxes affect their viability. Special attention will be paid to the interaction of

technology, economics, and public policy.
Note: This course will be offered in a seminar format with an enrollment limit of 50.
Prerequisite: Economics 10a.
Professor:
George Baker
Season:
Spring
Days:
Th
Time:
1:00–4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
53953
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Energy
*Environmental Science and Public Policy 90s. The Technology, Economics, and Public Policy of Renewable Energy
Energy is the lifeblood of economic activity, and there is little prospect of this changing. However, the planet's stores of easily accessed fossil fuels are limited, and the climatological cost of continuing to rely on fossil fuels is high. This course examines the long run and short run prospects for renewable energy. We start by understanding the technology of hydro, solar, wind, and biomass. We then examine the economics of these technologies, and how subsidies and taxes affect their viability. Special attention will be paid to the interaction of technology, economics, and public policy.
Note: This course will be offered in a seminar format with an enrollment limit of 50.
Prerequisite: Economics 10a.
Professor:
George Baker
Season:
Spring
Days:
Th
Time:
1:00–4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
53953
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Energy
*Environmental Science and Public Policy 90t. Environmental Health: Your World and Your Life at Risk
Through the seminar course students will be introduced to ongoing environmental health research. They will read published articles and interview faculty. Studies will include birth outcomes and heavy metals; neurological and cognitive development in children exposed to

lead; dietary interventions and pesticide exposure; asthma and public housing; air pollution and cardiovascular health; exposures and effects of plasticizers, flame retardants, polychlorinated biphenyls (PCBs), bisphenol A (BPA) and other synthetic organic compounds; cell phone use and brain cancer; respiratory effects of biomass cooking and heat fuels on children and women; heat waves and heat stress mortality; and land-use factors and obesity.
Professor:
Douglas Dockery
Season:
Spring
Days:
M
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
40047
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Human Health
*Environmental Science and Public Policy 90t. Environmental Health: Your World and Your Life at Risk
Through the seminar course students will be introduced to ongoing environmental health research. They will read published articles and interview faculty. Studies will include birth outcomes and heavy metals; neurological and cognitive development in children exposed to lead; dietary interventions and pesticide exposure; asthma and public housing; air pollution and cardiovascular health; exposures and effects of plasticizers, flame retardants, polychlorinated biphenyls (PCBs), bisphenol A (BPA) and other synthetic organic compounds; cell phone use and brain cancer; respiratory effects of biomass cooking and heat fuels on children and women; heat waves and heat stress mortality; and land-use factors and obesity.
Professor:
Douglas Dockery
Season:
Spring
Days:
M
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
40047
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Human Health
*Environmental Science and Public Policy 91r. Supervised Reading and Research
Supervised reading and research on topics not covered by regular courses of instruction. Students must complete a registration form, including permission from their faculty sponsor, with the concentration office before course enrollment. A final paper describing the research/reading completed during the term is due in duplicate to the Head Tutor on the first day of reading period.
Note: Intended for junior and senior concentrators in Environmental Science and Public Policy; open to sophomore concentrators only

under exceptional circumstances. Permission of the Head Tutor is required for enrollment. May be counted for concentration only with the special permission of the Head Tutor.
Professor:
Paul Moorcroft
Season:
Spring
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
1705
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
*Environmental Science and Public Policy 91r. Supervised Reading and Research
Supervised reading and research on topics not covered by regular courses of instruction. Students must complete a registration form, including permission from their faculty sponsor, with the concentration office before course enrollment. A final paper describing the research/reading completed during the term is due in duplicate to the Head Tutor on the first day of reading period.
Note: Intended for junior and senior concentrators in Environmental Science and Public Policy; open to sophomore concentrators only under exceptional circumstances. Permission of the Head Tutor is required for enrollment. May be counted for concentration only with the special permission of the Head Tutor.
Professor:
Paul Moorcroft
Season:
Spring
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
1705
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
*Environmental Science and Public Policy 99. Tutorial — Senior Year
Full course.
Research and writing of the senior thesis under faculty direction. Senior honors candidates must take at least one term of this course while writing a thesis. The signature of the faculty adviser is required.
Professor:
Paul Moorcroft
Season:
Spring
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
5666

Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
*Environmental Science and Public Policy 99. Tutorial — Senior Year
Full course.
Research and writing of the senior thesis under faculty direction. Senior honors candidates must take at least one term of this course while writing a thesis. The signature of the faculty adviser is required.
Professor:
Paul Moorcroft
Season:
Spring
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
5666
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
*ENVR E-153: Social Responsibility in Product Supply Chains
In recent years, the topic of products and social impacts has risen in the agendas of policymakers, investors, and corporations. This course looks at the need for studying holistically the social impacts of products and offers a detailed background both on social responsibility (SR) issues and why they matter and on SR instruments and how they are applied. It presents the theory and method of social life cycle assessment (LCA) and provides students the opportunity to explore various topics of interest such as the challenge of standardizing environmental indicators, the weighting of positive and negative impacts, product usefulness to consumers, prioritization, and the identification of improvement opportunities. (4 credits)
Prerequisite(s): ENVR E-151 or LCA experience is a prerequisite, or permission of the instructor.
Professor:
Catherine Benoit
Season:
Spring
Days:
Th
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24258
Research Areas:
• Business, Law and Policy
• Social Sciences
*ENVR E-153: Social Responsibility in Product Supply Chains
In recent years, the topic of products and social impacts has risen in the agendas of policymakers, investors, and corporations. This course looks at the need for studying holistically the social impacts of products and offers a detailed background both on social responsibility (SR) issues and why they matter and on SR instruments and how they are applied. It presents the theory and method of social life cycle

assessment (LCA) and provides students the opportunity to explore various topics of interest such as the challenge of standardizing environmental indicators, the weighting of positive and negative impacts, product usefulness to consumers, prioritization, and the identification of improvement opportunities. (4 credits)
Prerequisite(s): ENVR E-151 or LCA experience is a prerequisite, or permission of the instructor.
Professor:
Catherine Benoit
Season:
Spring
Days:
Th
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24258
Research Areas:
• Business, Law and Policy
• Social Sciences
*ENVR E-153: Social Responsibility in Product Supply Chains
In recent years, the topic of products and social impacts has risen in the agendas of policymakers, investors, and corporations. This course looks at the need for studying holistically the social impacts of products and offers a detailed background both on social responsibility (SR) issues and why they matter and on SR instruments and how they are applied. It presents the theory and method of social life cycle assessment (LCA) and provides students the opportunity to explore various topics of interest such as the challenge of standardizing environmental indicators, the weighting of positive and negative impacts, product usefulness to consumers, prioritization, and the identification of improvement opportunities. (4 credits)
Prerequisite(s): ENVR E-151 or LCA experience is a prerequisite, or permission of the instructor.
Professor:
Catherine Benoit
Season:
Spring
Days:
Th
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24258
Research Areas:
• Business, Law and Policy
• Social Sciences
*Freshman Seminar 21w. Research at the Harvard Forest: Global Change Ecology-Forests, Ecosystem Function, the Future
This course explores state-of-the-art research, tools and measurements used to investigate and predict climate change through ongoing studies at the Harvard Forest’s 3,000-acre outdoor laboratory in Petersham, MA. The seminar consists of three weekend long field trips (Friday evening-Sunday) to the Harvard Forest and a final on-campus meeting. Students develop skills for evaluating, discussing, and presenting the ecological evidence for climate change, including feedbacks between forests and the atmosphere and longterm impacts on forest ecosystems.

Note: Four weekends at the Harvard Forest in Petersham, MA (Fri, 3pm-Sun, late afternoon) dates TBA. Transportation, accommodations, and meals at the Harvard Forest will be provided. Enrollment limited to 11. Open to freshman only.
Professor:
David Foster
Season:
Spring
Time:
Four weekends at the Harvard Forest in Petersham, MA
School:
• Faculty of Arts and Sciences
Catalog Number:
0060
Subject Area:
Freshman Seminars
Research Areas:
• Climate
• Ecology and Biodiversity
*Freshman Seminar 21w. Research at the Harvard Forest: Global Change Ecology-Forests, Ecosystem Function, the Future
This course explores state-of-the-art research, tools and measurements used to investigate and predict climate change through ongoing studies at the Harvard Forest’s 3,000-acre outdoor laboratory in Petersham, MA. The seminar consists of three weekend long field trips (Friday evening-Sunday) to the Harvard Forest and a final on-campus meeting. Students develop skills for evaluating, discussing, and presenting the ecological evidence for climate change, including feedbacks between forests and the atmosphere and longterm impacts on forest ecosystems.
Note: Four weekends at the Harvard Forest in Petersham, MA (Fri, 3pm-Sun, late afternoon) dates TBA. Transportation, accommodations, and meals at the Harvard Forest will be provided. Enrollment limited to 11. Open to freshman only.
Professor:
David Foster
Season:
Spring
Time:
Four weekends at the Harvard Forest in Petersham, MA
School:
• Faculty of Arts and Sciences
Catalog Number:
0060
Subject Area:
Freshman Seminars
Research Areas:
• Climate
• Ecology and Biodiversity
*Freshman Seminar 21w. Research at the Harvard Forest: Global Change Ecology-Forests, Ecosystem Function, the Future
This course explores state-of-the-art research, tools and measurements used to investigate and predict climate change through ongoing studies at the Harvard Forest’s 3,000-acre outdoor laboratory in Petersham, MA. The seminar consists of three weekend long field trips (Friday evening-Sunday) to the Harvard Forest and a final on-campus meeting. Students develop skills for evaluating, discussing, and presenting the ecological evidence for climate change, including feedbacks between forests and the atmosphere and longterm impacts on forest ecosystems.
Note: Four weekends at the Harvard Forest in Petersham, MA (Fri, 3pm-Sun, late afternoon) dates TBA. Transportation, accommodations, and meals at the Harvard Forest will be provided. Enrollment limited to 11. Open to freshman only.

Professor:
David Foster
Season:
Spring
Time:
Four weekends at the Harvard Forest in Petersham, MA
School:
• Faculty of Arts and Sciences
Catalog Number:
0060
Subject Area:
Freshman Seminars
Research Areas:
• Climate
• Ecology and Biodiversity
*Freshman Seminar 24p. Getting to Know Charles Darwin
We will read a selection of Darwin's publications, as well as his private correspondence, paying close attention to the man behind the science as revealed by his writings. We will get to know Darwin, the avid breeder of pigeons, lover of barnacles, devoted father and husband, gifted correspondent and tactician, and remarkable backyard scientist. Together, the class will reproduce ten of Darwin's classic Down House experiments and observations that were central to his case for natural selection and evolution.
Note: Open to Freshmen only. Required fied trips to Arnold Arboretum, Museum of Comparative Zoology, and a pigeon fancier are included.
Professor:
William (Ned) Friedman
Season:
Fall
Days:
W
Time:
2:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
36551
Subject Area:
Freshman Seminars
Research Areas:
• Ecology and Biodiversity
*Freshman Seminar 24p. Getting to Know Charles Darwin
We will read a selection of Darwin's publications, as well as his private correspondence, paying close attention to the man behind the science as revealed by his writings. We will get to know Darwin, the avid breeder of pigeons, lover of barnacles, devoted father and husband, gifted correspondent and tactician, and remarkable backyard scientist. Together, the class will reproduce ten of Darwin's classic Down House experiments and observations that were central to his case for natural selection and evolution.
Note: Open to Freshmen only. Required fied trips to Arnold Arboretum, Museum of Comparative Zoology, and a pigeon fancier are included.
Professor:
William (Ned) Friedman
Season:

Fall
Days:
W
Time:
2:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
36551
Subject Area:
Freshman Seminars
Research Areas:
• Ecology and Biodiversity
*Freshman Seminar 25p. Neurotoxicology: Biological Effects of Environmental Poisons
Explores wide range of environmental neurotoxic substances and effects on human and animal populations. Attention to pediatric exposure to neurotoxic agents and associated neurodevelopmental disabilities, as well as neurobehavioral and immunological changes. Examines impact of lead and mercury poisoning, PCBs. Investigates neurophysiology and neurochemistry of a number of other neurotoxins, including arsenic, tetrodotoxin, saxitoxin, botulinum, curare, cocaine, and "nerve gas." What dangers do these toxins pose? What can or should be done to prevent exposure?
Note: Open to Freshmen only.
Professor:
S. Counter
Season:
Fall
Days:
W
Time:
2:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1838
Subject Area:
Freshman Seminars
Research Areas:
• Human Health
*Freshman Seminar 25p. Neurotoxicology: Biological Effects of Environmental Poisons
Explores wide range of environmental neurotoxic substances and effects on human and animal populations. Attention to pediatric exposure to neurotoxic agents and associated neurodevelopmental disabilities, as well as neurobehavioral and immunological changes. Examines impact of lead and mercury poisoning, PCBs. Investigates neurophysiology and neurochemistry of a number of other neurotoxins, including arsenic, tetrodotoxin, saxitoxin, botulinum, curare, cocaine, and "nerve gas." What dangers do these toxins pose? What can or should be done to prevent exposure?
Note: Open to Freshmen only.
Professor:
S. Counter
Season:
Fall
Days:

W
Time:
2:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1838
Subject Area:
Freshman Seminars
Research Areas:
• Human Health
*Freshman Seminar 44g. Public Policy Approaches to Global Climate Change
Reviews what is known about greenhouse gas emissions' possible impact on climate. Explores possible impact of climate change on social and economic conditions over the next century. Investigates possible public policy responses to these developments, including actions both to adapt to and to mitigate climate change. What would be the costs of adaptation? Would an investment in mitigating the changes be worthwhile? Are there possibilities for international cooperation in dealing with the problem?
Note: Open to Freshmen only.
Professor:
Richard N. Cooper
Season:
Fall
Days:
W
Time:
2:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1032
Subject Area:
Freshman Seminars
Research Areas:
• Business, Law and Policy
• Climate
*Freshman Seminar 44g. Public Policy Approaches to Global Climate Change
Reviews what is known about greenhouse gas emissions' possible impact on climate. Explores possible impact of climate change on social and economic conditions over the next century. Investigates possible public policy responses to these developments, including actions both to adapt to and to mitigate climate change. What would be the costs of adaptation? Would an investment in mitigating the changes be worthwhile? Are there possibilities for international cooperation in dealing with the problem?
Note: Open to Freshmen only.
Professor:
Richard N. Cooper
Season:
Fall
Days:
W
Time:
2:00-4:00

School:
• Faculty of Arts and Sciences
Catalog Number:
1032
Subject Area:
Freshman Seminars
Research Areas:
• Business, Law and Policy
• Climate
*Freshman Seminar 44g. Public Policy Approaches to Global Climate Change
Reviews what is known about greenhouse gas emissions' possible impact on climate. Explores possible impact of climate change on social and economic conditions over the next century. Investigates possible public policy responses to these developments, including actions both to adapt to and to mitigate climate change. What would be the costs of adaptation? Would an investment in mitigating the changes be worthwhile? Are there possibilities for international cooperation in dealing with the problem?
Note: Open to Freshmen only.
Professor:
Richard N. Cooper
Season:
Fall
Days:
W
Time:
2:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1032
Subject Area:
Freshman Seminars
Research Areas:
• Business, Law and Policy
• Climate
*Government 94dn (formerly Government 98dn). Mapping Social and Environmental Space
This seminar will use mapping as a methodological technique to examine social and environmental issues. Students will be expected to use mapping software to examine spatial data for a location and topic of their choice for their final paper. Weekly discussions will be conducted in class on various mapping related topics. References will range from books like "How to lie with Maps" to current journal articles examining the use of GIS in social science.
Note: Enrollment limited to 16.
Professor:
S. Srinivasan
Season:
Fall
Days:
Th
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences

Catalog Number:
2017
Subject Area:
Government
Research Areas:
• Social Sciences
*Government 94dn (formerly Government 98dn). Mapping Social and Environmental Space
This seminar will use mapping as a methodological technique to examine social and environmental issues. Students will be expected to use mapping software to examine spatial data for a location and topic of their choice for their final paper. Weekly discussions will be conducted in class on various mapping related topics. References will range from books like “How to lie with Maps” to current journal articles examining the use of GIS in social science.
Note: Enrollment limited to 16.
Professor:
S. Srinivasan
Season:
Fall
Days:
Th
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
2017
Subject Area:
Government
Research Areas:
• Social Sciences
*History of Science 134. Nature on Display
Advanced seminar for undergraduates. We concentrate on the history of animal and plant collecting, exploration, and the way that "nature" is put on display in museums, zoos, botanic gardens, etc. ranging from the 17th century to the present. We also think about media and imagery including illustrations in books to early wildlife film. The course hopes to enlarge your understanding of the complex relations between display, entertainment, and scientific knowledge-as well as the natural history tradition in North America. Visits will be made to museums and archives at Harvard.
Note: Limited to 15 students.
Professor:
Janet Browne
Season:
Fall
Days:
W
Time:
4:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
4987
Subject Area:

History of Science
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
*History of Science 134. Nature on Display
Advanced seminar for undergraduates. We concentrate on the history of animal and plant collecting, exploration, and the way that "nature" is put on display in museums, zoos, botanic gardens, etc. ranging from the 17th century to the present. We also think about media and imagery including illustrations in books to early wildlife film. The course hopes to enlarge your understanding of the complex relations between display, entertainment, and scientific knowledge-as well as the natural history tradition in North America. Visits will be made to museums and archives at Harvard.
Note: Limited to 15 students.
Professor:
Janet Browne
Season:
Fall
Days:
W
Time:
4:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
4987
Subject Area:
History of Science
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
*History of Science 134. Nature on Display
Advanced seminar for undergraduates. We concentrate on the history of animal and plant collecting, exploration, and the way that "nature" is put on display in museums, zoos, botanic gardens, etc. ranging from the 17th century to the present. We also think about media and imagery including illustrations in books to early wildlife film. The course hopes to enlarge your understanding of the complex relations between display, entertainment, and scientific knowledge-as well as the natural history tradition in North America. Visits will be made to museums and archives at Harvard.
Note: Limited to 15 students.
Professor:
Janet Browne
Season:
Fall
Days:
W
Time:
4:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
4987
Subject Area:

History of Science
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
*LAW-2512: Environmental Practice Skills, Methods, and Controversies: Siting and Permitting of a Wind Farm as a Case Study
This seminar teaches the actual practice of environmental law, including mechanisms for raising and resolving controversies. We will examine—and work through—a wind farm project from a variety of perspectives and meet with people who represent some of these interests: regulatory, community, NGO and private sector. The emphasis will not be on mastering the substance of the various environmental laws that are triggered (although some of that will be necessary), but instead on the practical skills and knowledge necessary to: identify the environmental impacts of a project; parse and apply relevant statutes and regulations; analyze mechanisms for mitigating project impacts and managing controversies; identify the permits and approvals needed for a project; select and hire environmental scientists and experts to support or oppose a project; and, defend (or challenge) a project in administrative and judicial proceedings. Students in this class will learn how projects proceed through environmental review, challenges, and permitting. Depending on the time available and level of class interest, we will also look at some of the project financing issues.
The seminar is practical, hands-on and participatory. Students will develop and apply the skills and methods needed to site a wind farm through class discussions, problem solving, and role-playing exercises. The wind farm is a proxy for any project that has both positive and adverse environmental impacts and that must work its way through multiple types of administrative and judicial proceedings and negotiation. There is no final exam. There will be short written and oral exercises through the semester and, at the end of the semester, a short final paper that focuses on ethical issues raised by the practice of environmental law. Grading will be based on the quality of class participation as well as of the exercises and final paper.
Students in the seminar are encouraged (but not required) to enroll in the Environmental Law & Policy Clinic, which will provide students with the opportunity to put the skills they learn into practice.
Enrollment for LLM and 1L students is by permission of the faculty member.
Professor:
Wendy Jacobs
Season:
Spring
Days:
Th
Time:
4:30-7:30
School:
• Harvard Law School
Catalog Number:
2512
Research Areas:
• Business, Law and Policy
*LAW-2512: Environmental Practice Skills, Methods, and Controversies: Siting and Permitting of a Wind Farm as a Case Study
This seminar teaches the actual practice of environmental law, including mechanisms for raising and resolving controversies. We will examine—and work through—a wind farm project from a variety of perspectives and meet with people who represent some of these interests: regulatory, community, NGO and private sector. The emphasis will not be on mastering the substance of the various environmental laws that are triggered (although some of that will be necessary), but instead on the practical skills and knowledge necessary to: identify the environmental impacts of a project; parse and apply relevant statutes and regulations; analyze mechanisms for mitigating project impacts and managing controversies; identify the permits and approvals needed for a project; select and hire environmental scientists and experts to support or oppose a project; and, defend (or challenge) a project in administrative and judicial proceedings. Students in this class will learn how projects proceed through environmental review, challenges, and permitting. Depending on the time available and level of class interest, we will also look at some of the project financing issues.
The seminar is practical, hands-on and participatory. Students will develop and apply the skills and methods needed to site a wind farm

through class discussions, problem solving, and role-playing exercises. The wind farm is a proxy for any project that has both positive and adverse environmental impacts and that must work its way through multiple types of administrative and judicial proceedings and negotiation. There is no final exam. There will be short written and oral exercises through the semester and, at the end of the semester, a short final paper that focuses on ethical issues raised by the practice of environmental law. Grading will be based on the quality of class participation as well as of the exercises and final paper.

Students in the seminar are encouraged (but not required) to enroll in the Environmental Law & Policy Clinic, which will provide students with the opportunity to put the skills they learn into practice.

Enrollment for LLM and 1L students is by permission of the faculty member.

Professor:

Wendy Jacobs

Season:

Spring

Days:

Th

Time:

4:30-7:30

School:

• Harvard Law School

Catalog Number:

2512

Research Areas:

• Business, Law and Policy

*OEB 234. Topics in Marine Biology

Human impacts on marine life and ecosystems of the sea.

Note: Weekly class meeting including lectures, class presentations, several laboratories, and one field trip through the course of term.

Professor:

R. Woollacott

Season:

Spring

Days:

W

Time:

2:30-5:00

School:

• Faculty of Arts and Sciences

Catalog Number:

4637

Subject Area:

Organismic and Evolutionary Biology

Research Areas:

• Ecology and Biodiversity

*OEB 234. Topics in Marine Biology

Human impacts on marine life and ecosystems of the sea.

Note: Weekly class meeting including lectures, class presentations, several laboratories, and one field trip through the course of term.

Professor:

R. Woollacott

Season:

Spring

Days:
W
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
4637
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 290. Microbial Sciences: Chemistry, Ecology and Evolution
This is an interdisciplinary graduate-level and advanced undergraduate-level course in which students explore topics in molecular microbiology, microbial diversity, and microbially-mediated geochemistry in depth. This course will be taught by faculty from the Microbial Sciences Initiative. Topics include the origins of life, biogeochemical cycles, microbial diversity, and ecology.
Note: Co-listed as Microbiology 210. Enrollment limited to 30.
Prerequisite: For advanced undergraduates, Life Sciences 1a and 1b are required, or permission of instructor. MCB 52 is recommended.
Professor:
Michael S. Gilmore
Season:
Spring
Days:
F
Time:
8:30-9:30; 9:45-11:45
School:
• Faculty of Arts and Sciences
Catalog Number:
7185
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 290. Microbial Sciences: Chemistry, Ecology and Evolution
This is an interdisciplinary graduate-level and advanced undergraduate-level course in which students explore topics in molecular microbiology, microbial diversity, and microbially-mediated geochemistry in depth. This course will be taught by faculty from the Microbial Sciences Initiative. Topics include the origins of life, biogeochemical cycles, microbial diversity, and ecology.
Note: Co-listed as Microbiology 210. Enrollment limited to 30.
Prerequisite: For advanced undergraduates, Life Sciences 1a and 1b are required, or permission of instructor. MCB 52 is recommended.
Professor:
Michael S. Gilmore
Season:
Spring
Days:
F
Time:
8:30-9:30; 9:45-11:45

School:
• Faculty of Arts and Sciences
Catalog Number:
7185
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 299r. Forest Practice and Research
Field and laboratory research into the history, biology, ecology, culture, and economic problems of local, regional, and world forests. Individual research projects.
Note: Seminars, conferences, field, and laboratory work at the Harvard Forest, Petersham, Massachusetts.
Professor:
David Foster
Season:
Spring
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
6128
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 299r. Forest Practice and Research
Field and laboratory research into the history, biology, ecology, culture, and economic problems of local, regional, and world forests. Individual research projects.
Note: Seminars, conferences, field, and laboratory work at the Harvard Forest, Petersham, Massachusetts.
Professor:
David Foster
Season:
Spring
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
6128
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 311. Ecosystem Ecology
Professor:
Paul Moorcroft
School:
• Faculty of Arts and Sciences
Catalog Number:

6416
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 311. Ecosystem Ecology
Professor:
Paul Moorcroft
School:
• Faculty of Arts and Sciences
Catalog Number:
6416
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 345. Biological Oceanography
Professor:
James J. McCarthy
Season:
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
4676
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*OEB 345. Biological Oceanography
Professor:
James J. McCarthy
Season:
Fall
School:
• Faculty of Arts and Sciences
Catalog Number:
4676
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
*Visual and Environmental Studies 107. Studies of the Built North American Environment since 1580
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Notes: Offered jointly with the Graduate School of Design as 4105. Limited to 20 students.
Professor:

John R. Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
7883
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 107. Studies of the Built North American Environment since 1580
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Notes: Offered jointly with the Graduate School of Design as 4105. Limited to 20 students.
Professor:
John R. Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
7883
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 107. Studies of the Built North American Environment since 1580
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Notes: Offered jointly with the Graduate School of Design as 4105. Limited to 20 students.
Professor:

John R. Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
7883
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 107. Studies of the Built North American Environment since 1580
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Notes: Offered jointly with the Graduate School of Design as 4105. Limited to 20 students.
Professor:
John R. Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
7883
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 160. Modernization in the Visual United States Environment, 1890-2035
Modernization of the US visual environment as directed by a nobility creating new images and perceptions of such themes as wilderness, flight, privacy, clothing, photography, feminism, status symbolism, and futurist manipulation as illustrated in print-media and other advertising enterprise.
Note: Offered jointly with the Graduate School of Design as 4303. Limited to 20 students.
Prerequisite: VES 107 or permission of the instructor.

Professor:
John Stilgoe
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
6668
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 160. Modernization in the Visual United States Environment, 1890-2035
Modernization of the US visual environment as directed by a nobility creating new images and perceptions of such themes as wilderness, flight, privacy, clothing, photography, feminism, status symbolism, and futurist manipulation as illustrated in print-media and other advertising enterprise.
Note: Offered jointly with the Graduate School of Design as 4303. Limited to 20 students.
Prerequisite: VES 107 or permission of the instructor.
Professor:
John Stilgoe
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
6668
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 160. Modernization in the Visual United States Environment, 1890-2035
Modernization of the US visual environment as directed by a nobility creating new images and perceptions of such themes as wilderness, flight, privacy, clothing, photography, feminism, status symbolism, and futurist manipulation as illustrated in print-media and other advertising enterprise.

Note: Offered jointly with the Graduate School of Design as 4303. Limited to 20 students.
Prerequisite: VES 107 or permission of the instructor.
Professor:
John Stilgoe
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
6668
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 160. Modernization in the Visual United States Environment, 1890-2035
Modernization of the US visual environment as directed by a nobility creating new images and perceptions of such themes as wilderness, flight, privacy, clothing, photography, feminism, status symbolism, and futurist manipulation as illustrated in print-media and other advertising enterprise.
Note: Offered jointly with the Graduate School of Design as 4303. Limited to 20 students.
Prerequisite: VES 107 or permission of the instructor.
Professor:
John Stilgoe
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
6668
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
*Visual and Environmental Studies 166. North American Seacoasts and Landscapes, Discovery to Present: Seminar
Selected topics in the history of the North American coastal zone, including the seashore as wilderness, as industrial site, as area of

recreation, and as artistic subject; the shape of coastal landscape for conflicting uses over time; and the perception of the seashore as marginal zone in literature, photography, film, television, and advertising.
Note: Offered jointly with the Graduate School of Design as HIS 4304
Prerequisite: VES 107 and VES 160, or permission of the instructor.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
5873
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Ecology and Biodiversity
*Visual and Environmental Studies 166. North American Seacoasts and Landscapes, Discovery to Present: Seminar
Selected topics in the history of the North American coastal zone, including the seashore as wilderness, as industrial site, as area of recreation, and as artistic subject; the shape of coastal landscape for conflicting uses over time; and the perception of the seashore as marginal zone in literature, photography, film, television, and advertising.
Note: Offered jointly with the Graduate School of Design as HIS 4304
Prerequisite: VES 107 and VES 160, or permission of the instructor.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
5873
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Ecology and Biodiversity

*Visual and Environmental Studies 166. North American Seacoasts and Landscapes, Discovery to Present: Seminar
Selected topics in the history of the North American coastal zone, including the seashore as wilderness, as industrial site, as area of recreation, and as artistic subject; the shape of coastal landscape for conflicting uses over time; and the perception of the seashore as marginal zone in literature, photography, film, television, and advertising.
Note: Offered jointly with the Graduate School of Design as HIS 4304
Prerequisite: VES 107 and VES 160, or permission of the instructor.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
5873
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Ecology and Biodiversity
*Visual and Environmental Studies 166. North American Seacoasts and Landscapes, Discovery to Present: Seminar
Selected topics in the history of the North American coastal zone, including the seashore as wilderness, as industrial site, as area of recreation, and as artistic subject; the shape of coastal landscape for conflicting uses over time; and the perception of the seashore as marginal zone in literature, photography, film, television, and advertising.
Note: Offered jointly with the Graduate School of Design as HIS 4304
Prerequisite: VES 107 and VES 160, or permission of the instructor.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
5873
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design

• Arts and Humanities
• Ecology and Biodiversity
*Visual and Environmental Studies 166. North American Seacoasts and Landscapes, Discovery to Present: Seminar
Selected topics in the history of the North American coastal zone, including the seashore as wilderness, as industrial site, as area of recreation, and as artistic subject; the shape of coastal landscape for conflicting uses over time; and the perception of the seashore as marginal zone in literature, photography, film, television, and advertising.
Note: Offered jointly with the Graduate School of Design as HIS 4304
Prerequisite: VES 107 and VES 160, or permission of the instructor.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
• Graduate School of Design
Catalog Number:
5873
Subject Area:
Visual and Environmental Studies
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Ecology and Biodiversity
Anthropology 2111. Changes in the Land: The Archaeology of Humans and the Earth
How have humans shaped the environment and how has the environment shaped humans throughout their (pre)history? We will explore key theories and case studies and students will further explore these questions through independent research.
Professor:
Christian Tryon
Professor:
Jeffrey Quilter
Season:
Spring
Days:
Time:
TBD
School:
• Faculty of Arts and Sciences
Catalog Number:
50321
Subject Area:
Anthropology
Research Areas:
• Social Sciences
Anthropology 2111. Changes in the Land: The Archaeology of Humans and the Earth

How have humans shaped the environment and how has the environment shaped humans throughout their (pre)history? We will explore key theories and case studies and students will further explore these questions through independent research.
Professor:
Christian Tryon
Professor:
Jeffrey Quilter
Season:
Spring
Days:
Time:
TBD
School:
• Faculty of Arts and Sciences
Catalog Number:
50321
Subject Area:
Anthropology
Research Areas:
• Social Sciences
API-135: Fundamentals of Environmental Economics and Policy
Provides a survey, from the perspective of economics, of public policy issues associated with environmental protection and natural resources management. Lectures on conceptual and methodological topics are combined with examinations of specific resource and environmental issues, with particular focus on global climate change economics and policy.
Prerequisite: Introductory microeconomics.

Offered jointly with the Faculty of Arts and Sciences as ECON-1661.
Professor:
Robert N. Stavins
Season:
Spring
Days:
M
W
F
Time:
M/W 1:10-2:30; F 10:10-11:30
School:
• Harvard Kennedy School
Catalog Number:
API-135
Research Areas:
• Business, Law and Policy
• Social Sciences
API-135: Fundamentals of Environmental Economics and Policy
Provides a survey, from the perspective of economics, of public policy issues associated with environmental protection and natural resources management. Lectures on conceptual and methodological topics are combined with examinations of specific resource and environmental issues, with particular focus on global climate change economics and policy.
Prerequisite: Introductory microeconomics.

Offered jointly with the Faculty of Arts and Sciences as ECON-1661.
Professor:
Robert N. Stavins
Season:
Spring
Days:
M
W
F
Time:
M/W 1:10-2:30; F 10:10-11:30
School:
• Harvard Kennedy School
Catalog Number:
API-135
Research Areas:
• Business, Law and Policy
• Social Sciences
API-135: Fundamentals of Environmental Economics and Policy
Provides a survey, from the perspective of economics, of public policy issues associated with environmental protection and natural resources management. Lectures on conceptual and methodological topics are combined with examinations of specific resource and environmental issues, with particular focus on global climate change economics and policy.
Prerequisite: Introductory microeconomics.

Offered jointly with the Faculty of Arts and Sciences as ECON-1661.
Professor:
Robert N. Stavins
Season:
Spring
Days:
M
W
F
Time:
M/W 1:10-2:30; F 10:10-11:30
School:
• Harvard Kennedy School
Catalog Number:
API-135
Research Areas:
• Business, Law and Policy
• Social Sciences
API-905Y: Seminar on Environmental Economics and Policy
This is an advanced research seminar on selected topics in environmental and resource economics. Emphasizes theoretical models, quantitative empirical analysis, and public policy applications. Includes presentations by invited outside speakers. Students prepare critiques of presented papers and prepare a research paper of their own.
Prerequisites: This course is intended primarily for PhD students in economics, political economy and government, public policy, or related fields with interests in applications in the environmental and natural resource area. Prerequisites include a graduate-level course in microeconomic theory, such as Econ. 2010a, Econ 2020a, API-109, API-110, or permission of instructor.

Also offered by the Department of Economics as Ec 2690hf.
Professor:
Robert N. Stavins
Martin Weitzman
Season:
Spring
Fall
Days:
W
Time:
4:10-6:00
School:
• Harvard Kennedy School
Catalog Number:
API-905Y
Research Areas:
• Business, Law and Policy
• Social Sciences
API-905Y: Seminar on Environmental Economics and Policy
This is an advanced research seminar on selected topics in environmental and resource economics. Emphasizes theoretical models, quantitative empirical analysis, and public policy applications. Includes presentations by invited outside speakers. Students prepare critiques of presented papers and prepare a research paper of their own.
Prerequisites: This course is intended primarily for PhD students in economics, political economy and government, public policy, or related fields with interests in applications in the environmental and natural resource area. Prerequisites include a graduate-level course in microeconomic theory, such as Econ. 2010a, Econ 2020a, API-109, API-110, or permission of instructor.

Also offered by the Department of Economics as Ec 2690hf.
Professor:
Robert N. Stavins
Martin Weitzman
Season:
Spring
Fall
Days:
W
Time:
4:10-6:00
School:
• Harvard Kennedy School
Catalog Number:
API-905Y
Research Areas:
• Business, Law and Policy
• Social Sciences
API-905Y: Seminar on Environmental Economics and Policy
This is an advanced research seminar on selected topics in environmental and resource economics. Emphasizes theoretical models, quantitative empirical analysis, and public policy applications. Includes presentations by invited outside speakers. Students prepare critiques of presented papers and prepare a research paper of their own.
Prerequisites: This course is intended primarily for PhD students in economics, political economy and government, public policy, or

related fields with interests in applications in the environmental and natural resource area. Prerequisites include a graduate-level course in microeconomic theory, such as Econ. 2010a, Econ 2020a, API-109, API-110, or permission of instructor.

Also offered by the Department of Economics as Ec 2690hf.
Professor:
Robert N. Stavins
Martin Weitzman
Season:
Spring
Fall
Days:
W
Time:
4:10-6:00
School:
• Harvard Kennedy School
Catalog Number:
API-905Y
Research Areas:
• Business, Law and Policy
• Social Sciences
BGP-204M: Food Policy and Agribusiness
Deals with public and private management of an industry sector that encompasses half the world's labor force, half the world's assets, and 40% of consumer purchases. The public policy issues of economic development, trade, nutrition, food safety, the environment, maintaining limited natural resources, protecting plant and animal diversity, intellectual property, genetics, and social and economic priorities will all be developed in case study format. Positioning public agencies and private firms within the developed and developing economies will be an integral part of the course. Wherever possible, the CEO or leading government official involved will be a guest at the class. Students may do a reading and research report for an additional one-half credit.
Professor:
Robert Goldberg
Season:
Spring
Days:
M
W
Time:
11:40-1:00
School:
• Harvard Kennedy School
Catalog Number:
BGP-204M
Research Areas:
• Business, Law and Policy
BGP-204M: Food Policy and Agribusiness
Deals with public and private management of an industry sector that encompasses half the world's labor force, half the world's assets, and 40% of consumer purchases. The public policy issues of economic development, trade, nutrition, food safety, the environment, maintaining limited natural resources, protecting plant and animal diversity, intellectual property, genetics, and social and economic priorities will all be developed in case study format. Positioning public agencies and private firms within the developed and developing economies will be an integral part of the course. Wherever possible, the CEO or leading government official involved will be a guest at

the class. Students may do a reading and research report for an additional one-half credit.
Professor:
Robert Goldberg
Season:
Spring
Days:
M
W
Time:
11:40-1:00
School:
• Harvard Kennedy School
Catalog Number:
BGP-204M
Research Areas:
• Business, Law and Policy
BIOS E-118: Deep Sea Biology
The oceans contain 97 percent of the Earth's water, and host the most disparate ecosystems on the planet. This course provides an introduction to deep sea ocean habitats, animals, and microorganisms. Emphasis is placed on the physiological adaptations of organisms to their environment, as well as the role of microorganisms in mediating ocean biogeochemical cycles.
Professor:
Peter Girguis
Season:
Spring
Days:
M
Time:
5:30-7:30
Catalog Number:
13746
Research Areas:
• Ecology and Biodiversity
BUS 1164: Innovation in Business, Energy, and Environment
This course explores advanced and emerging topics in business, energy, and the environment. There is a focus on opportunities for firms whose offerings are significantly involved in or impacted by energy, water, resource efficiency, transportation, and conservation. The course is team taught in one section by the primary faculty of the Business and Environment Initiative.
Career Focus
The course will benefit students who expect to have important product development, division leadership, finance, or consulting responsibilities in business segments that are particularly influenced by issues relating to energy, water, waste, transportation, and the other topics listed below. Organizations studied range from startups to some of the largest companies in the world and include government entities and NGOs.
This course is designed for students who expect to be general managers or entrepreneurs in businesses which are particularly influenced by issues in energy, power, water, or other factors that engage natural resources and the environment. Students who anticipate careers in consulting, VC/PE, or investing in businesses touching these areas (including fossil and nuclear energy) will also find the course useful.
Educational Objectives
IB2E has two objectives. The first is to explore the tools of finance, strategy, and marketing as businesses decide how to respond to opportunities - and threats - in conventional energy, new energy, water, food, transit, and related areas. The second is to enhance technical knowledge as the foundation for assessing many of these topics. In addition, the impact on these businesses of regulations, incentives,

public opinion, and disruptions to supply chains are explicitly considered.

Typical cases involve new methods and technologies like hydro fracturing, wafers, membranes and materials, or sensors and "big data," or the deployment of innovative business models including optimization, collaborative consumption, and the circular economy. Firms range from startups to very large multinational corporations to investment firms, and from the environmentally dedicated to the environmentally noncommittal. Many firms are not primarily in the energy, water, power, agriculture, or similar businesses but rather experience cost or revenue problems stemming from pressures on these resources. Several not for profit organizations are also studied.

The course takes more of a business strategy and entrepreneurship approach than a policy approach. The course does not look deeply at macro issues in energy and geopolitics, nor extensively at corporate social responsibility. Current events in business, energy, environment, and Cleantech are frequently incorporated into class discussions.

Course Content and Organization

The course is co-taught in one section by the three professors. Prof. Macomber is the course head. There are five modules organized around resource types. The themes of business models, resource efficiency, regulation and incentives, disruptive innovation, and finance recur through all of the modules.

1. Innovation in conventional energy (including hydro fracturing and nuclear as well as generation and distribution)
2. Opportunities in new energy (including generation, transmission, storage, and efficiency)
3. New business models based on resource effectiveness (notably in the water, energy, food nexus)
4. Transit innovation (including internal combustion vehicles, alternate fuel vehicles, mass transit, and individual transport like bicycles and driverless cars)
5. Assessing and communicating unknowns (for example scenario modeling, resiliency, adaptation, and mitigation including possible effects of increased weather volatility; the valuation of externalities).

Course Administration

Students will submit two short papers early in the term and one 8-10 page paper on a topic of their choosing at the end of the term. There is no exam. The paper is often a good way to go deeper on a topic and frame possible Independent Projects for the Winter term.

Cross Registration

Cross-registrants are welcome, with permission in advance.

Complementary Offerings

Complementary offerings include: Energy, Entrepreneurial Finance, Building and Sustaining a Successful Enterprise, Business and the Big Problems, Building Cities, Real Asset Finance, and Agribusiness

Professor:

Rebecca Henderson

Joe Lassiter

John Macomber

Season:

Fall

Days:

M

T

W

Time:

1:15-3:15

School:

• Harvard Business School

Catalog Number:

1165

Research Areas:

• Business, Law and Policy

BUS 1164: Innovation in Business, Energy, and Environment

This course explores advanced and emerging topics in business, energy, and the environment. There is a focus on opportunities for firms whose offerings are significantly involved in or impacted by energy, water, resource efficiency, transportation, and conservation. The course is team taught in one section by the primary faculty of the Business and Environment Initiative.

Career Focus

The course will benefit students who expect to have important product development, division leadership, finance, or consulting responsibilities in business segments that are particularly influenced by issues relating to energy, water, waste, transportation, and the other topics listed below. Organizations studied range from startups to some of the largest companies in the world and include government entities and NGOs.

This course is designed for students who expect to be general managers or entrepreneurs in businesses which are particularly influenced by issues in energy, power, water, or other factors that engage natural resources and the environment. Students who anticipate careers in consulting, VC/PE, or investing in businesses touching these areas (including fossil and nuclear energy) will also find the course useful.

Educational Objectives

IB2E has two objectives. The first is to explore the tools of finance, strategy, and marketing as businesses decide how to respond to opportunities - and threats - in conventional energy, new energy, water, food, transit, and related areas. The second is to enhance technical knowledge as the foundation for assessing many of these topics. In addition, the impact on these businesses of regulations, incentives, public opinion, and disruptions to supply chains are explicitly considered.

Typical cases involve new methods and technologies like hydro fracturing, wafers, membranes and materials, or sensors and "big data," or the deployment of innovative business models including optimization, collaborative consumption, and the circular economy. Firms range from startups to very large multinational corporations to investment firms, and from the environmentally dedicated to the environmentally noncommittal. Many firms are not primarily in the energy, water, power, agriculture, or similar businesses but rather experience cost or revenue problems stemming from pressures on these resources. Several not for profit organizations are also studied.

The course takes more of a business strategy and entrepreneurship approach than a policy approach. The course does not look deeply at macro issues in energy and geopolitics, nor extensively at corporate social responsibility. Current events in business, energy, environment, and Cleantech are frequently incorporated into class discussions.

Course Content and Organization

The course is co-taught in one section by the three professors. Prof. Macomber is the course head. There are five modules organized around resource types. The themes of business models, resource efficiency, regulation and incentives, disruptive innovation, and finance recur through all of the modules.

1. Innovation in conventional energy (including hydro fracturing and nuclear as well as generation and distribution)
2. Opportunities in new energy (including generation, transmission, storage, and efficiency)
3. New business models based on resource effectiveness (notably in the water, energy, food nexus)
4. Transit innovation (including internal combustion vehicles, alternate fuel vehicles, mass transit, and individual transport like bicycles and driverless cars)
5. Assessing and communicating unknowns (for example scenario modeling, resiliency, adaptation, and mitigation including possible effects of increased weather volatility; the valuation of externalities).

Course Administration

Students will submit two short papers early in the term and one 8-10 page paper on a topic of their choosing at the end of the term. There is no exam. The paper is often a good way to go deeper on a topic and frame possible Independent Projects for the Winter term.

Cross Registration

Cross-registrants are welcome, with permission in advance.

Complementary Offerings

Complementary offerings include: Energy, Entrepreneurial Finance, Building and Sustaining a Successful Enterprise, Business and the Big Problems, Building Cities, Real Asset Finance, and Agribusiness

Professor:

Rebecca Henderson

Joe Lassiter

John Macomber

Season:

Fall

Days:
M
T
W
Time:
1:15-3:15
School:
• Harvard Business School
Catalog Number:
1165
Research Areas:
• Business, Law and Policy
BUS 1915: Agribusiness
The course will provide a survey of the global food and agribusiness system. In addition to studying the management problems of farmers, processors, branded consumer goods manufacturers and food retailers, we will consider consumer trends, technological advances, public policy issues, food safety and risk management. The pervasiveness of food and agribusiness makes the course suitable for future consultants and investment bankers in addition to those who have a direct interest in the industry; it may also be of interest as a general management course due to its integrative, cross-functional approach and emphasis on strategy.
Content
The structure of the course may evolve before the winter semester, but a representative outline is as follows:
The Agribusiness Value Chain : We consider the typical challenges faced by players in the value chain from input suppliers (seeds and "traits", machinery) to food manufacturers (how to adapt to powerful retailers and increased scrutiny of nutritional attributes) to retailers and consumers (from short term fads such as 'low carb' diets to long term changes in demographics and eating habits). In addition, the food chain now produces outputs other than food, including energy and pharmaceuticals.
The Global Food Industry: What was once the most local of industries is becoming global. We consider the world supply/demand balance ("Can we feed the world?") and think about balancing the virtues of free trade with the desire for national self-sufficiency. The case material for the course will be from many countries.
Food Safety and Environmental Sustainability: Food recalls get a lot of visibility but, at least in developed countries, food is plentiful and remarkably safe to eat despite the distance much of it travels. However, episodes of food poisoning, the debate over GMO food and ¬the perception of "industrial food" have heightened consumer sensitivity to the safety and origin of foods. Traceability has become an increasingly important factor in food production (e.g. detecting horse meat). In addition, as in other sectors, companies are being judged according to their environmental impact. Farmers are of course, important stewards of the land.
Current Issues: Every January, nearly 200 executives come to the HBS campus to discuss newly written cases on current topics in the food business. Each year this course is updated to include some of these fresh cases and, perhaps, case guests.
Professor:
David Bell
Season:
Winter
Time:
TBD
School:
• Harvard Business School
Catalog Number:
1915
Research Areas:
• Business, Law and Policy
BUS 1915: Agribusiness
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farmers, processors, branded consumer goods manufacturers and food retailers, we will consider consumer trends, technological advances, public policy issues, food safety and risk management. The pervasiveness of food and agribusiness makes the course suitable for future consultants and investment bankers in addition to those who have a direct interest in the industry; it may also be of interest as a general management course due to its integrative, cross-functional approach and emphasis on strategy.
Content
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The Agribusiness Value Chain : We consider the typical challenges faced by players in the value chain from input suppliers (seeds and "traits", machinery) to food manufacturers (how to adapt to powerful retailers and increased scrutiny of nutritional attributes) to retailers and consumers (from short term fads such as 'low carb' diets to long term changes in demographics and eating habits). In addition, the food chain now produces outputs other than food, including energy and pharmaceuticals.
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Current Issues: Every January, nearly 200 executives come to the HBS campus to discuss newly written cases on current topics in the food business. Each year this course is updated to include some of these fresh cases and, perhaps, case guests.
Professor:
David Bell
Season:
Winter
Time:
TBD
School:
• Harvard Business School
Catalog Number:
1915
Research Areas:
• Business, Law and Policy
DES-3338: Carbonurbanism
Carbon C is ubiquitous—it is one of the primary elements supporting life on earth, the fourth most abundant element in the universe, and it makes up 18.5% of the human body. Global economies have increasingly relied on carbon-based resources since the industrial revolution (fuel, plastics, paving, building materials, etc.), and its steady increase in release into the atmosphere is one of the major contributing factors to climate change. From the EPA: “Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). Human activities are altering the carbon cycle—both by adding more CO2 to the atmosphere and by influencing the ability of natural sinks, like forests, to remove CO2 from the atmosphere. While CO2 emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution.”
Within the discussions on sustainability, energy neutrality, etc., few have probed the relevance of or development of a carbon-based framework for framing and informing individual projects or—more appropriately—the broader projects of urbanism. Our work in this research seminar will do just this:
· what are the implications of a carbon-based future?
· how do we define and measure such a thing?
· what are its implications for how we live? and for how our urban systems and networks are conceived and realized?
The work in the seminar will be very much research-oriented, student-project-based, and both analytical and projective. Initial seminar

sessions will focus on broad-based topical approaches to urbanism, infrastructure, ecology, and landscape, and will be supplemented by workshops and tutorials on dynamic modeling software.

The primary thrust of the seminar will be student-generated research projects based around a topical interest, an in-depth study of the carbon- and infrastructure-based systems of particular representative places (Dallas, Miami, Barcelona, etc.), or the representation and digital modeling of those systems and dynamics. It is anticipated that some of the work may also be included on a new research website and/or public exhibitions that will be underway in the fall.

Students from MDesS, architecture, landscape architecture, and UPD are all encouraged to participate.

Professor:

Chris Reed

Professor:

Chris Reed

Season:

Fall

Days:

T

Time:

1:00-4:00

School:

• Graduate School of Design

Catalog Number:

0333800

Research Areas:

• Architecture and Environmental Design

DES-3338: Carbonurbanism

Carbon C is ubiquitous—it is one of the primary elements supporting life on earth, the fourth most abundant element in the universe, and it makes up 18.5% of the human body. Global economies have increasingly relied on carbon-based resources since the industrial revolution (fuel, plastics, paving, building materials, etc.), and its steady increase in release into the atmosphere is one of the major contributing factors to climate change. From the EPA: “Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). Human activities are altering the carbon cycle—both by adding more CO2 to the atmosphere and by influencing the ability of natural sinks, like forests, to remove CO2 from the atmosphere. While CO2 emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution.”

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· what are the implications of a carbon-based future?

· how do we define and measure such a thing?

· what are its implications for how we live? and for how our urban systems and networks are conceived and realized?

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The primary thrust of the seminar will be student-generated research projects based around a topical interest, an in-depth study of the carbon- and infrastructure-based systems of particular representative places (Dallas, Miami, Barcelona, etc.), or the representation and digital modeling of those systems and dynamics. It is anticipated that some of the work may also be included on a new research website and/or public exhibitions that will be underway in the fall.

Students from MDesS, architecture, landscape architecture, and UPD are all encouraged to participate.

Professor:

Chris Reed

Professor:
Chris Reed
Season:
Fall
Days:
T
Time:
1:00-4:00
School:
• Graduate School of Design
Catalog Number:
0333800
Research Areas:
• Architecture and Environmental Design
Earth and Planetary Sciences 109: Earth Resources and the Environment
An overview of the Earth's energy and material resources. Following introductions to hydrocarbons, nuclear fuels, and other economically important ores, the course emphasizes methods used to exploit these resources and the environmental impacts of these operations. Topics include: coal and acid rain; petroleum, photochemical smog, and oil spills; nuclear power and radioactive hazards; alternative energies; metals and mining. Labs emphasize methods for discovering and exploiting resources, as well as environmental remediation approaches.
Note: Given in alternate eyars. This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe.
Prerequisite: EPS 21 and ES 6 or permission of the instructor.
Professor:
John Shaw
Season:
Spring
Days:
T
Th
Time:
10:00 - 11:30; 3 hours of lab work
School:
• Faculty of Arts and Sciences
Catalog Number:
2218
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Energy
Earth and Planetary Sciences 109: Earth Resources and the Environment
An overview of the Earth's energy and material resources. Following introductions to hydrocarbons, nuclear fuels, and other economically important ores, the course emphasizes methods used to exploit these resources and the environmental impacts of these operations. Topics include: coal and acid rain; petroleum, photochemical smog, and oil spills; nuclear power and radioactive hazards; alternative energies; metals and mining. Labs emphasize methods for discovering and exploiting resources, as well as environmental remediation approaches.
Note: Given in alternate eyars. This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe.

Prerequisite: EPS 21 and ES 6 or permission of the instructor.
Professor:
John Shaw
Season:
Spring
Days:
T
Th
Time:
10:00 - 11:30; 3 hours of lab work
School:
• Faculty of Arts and Sciences
Catalog Number:
2218
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Energy
Earth and Planetary Sciences 132. Introduction to Meteorology and Climate
Prerequisite: Mathematics 21 or Applied Mathematics 21a or 21b, Physics 11 or 15, or permission of instructor.
Physical concepts necessary to understand atmospheric structure and motion. Phenomena studied include the formation of clouds and precipitation, solar and terrestrial radiation, dynamical balance of the large-scale wind, and the origin of cyclones. Concepts developed for understanding today's atmosphere are applied to understanding the record of past climate change and the prospects for climate change in the future.
Note: EPS 132 is also offered as ES 132. Students may not take both for credit.
Professor:
Brian F. Farrell
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
8495
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 132. Introduction to Meteorology and Climate
Prerequisite: Mathematics 21 or Applied Mathematics 21a or 21b, Physics 11 or 15, or permission of instructor.
Physical concepts necessary to understand atmospheric structure and motion. Phenomena studied include the formation of clouds and precipitation, solar and terrestrial radiation, dynamical balance of the large-scale wind, and the origin of cyclones. Concepts developed for understanding today's atmosphere are applied to understanding the record of past climate change and the prospects for climate change in the future.

Note: EPS 132 is also offered as ES 132. Students may not take both for credit.
Professor:
Brian F. Farrell
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
8495
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 133. Atmospheric Chemistry
Physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur, trace metal cycles. Climate and the greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe and the Core area requirement for Science A. EPS 133 also offered as Engineering Sciences 133.
Prerequisite: Physical Sciences 1, 2, Mathematics 1b; or equivalents.
Professor:
Steven Wofsy
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
7731
Subject Area:
Core
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 133. Atmospheric Chemistry
Physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur, trace metal cycles. Climate and the greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.

Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe and the Core area requirement for Science A. EPS 133 also offered as Engineering Sciences 133.
Prerequisite: Physical Sciences 1, 2, Mathematics 1b; or equivalents.
Professor:
Steven Wofsy
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
7731
Subject Area:
Core
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 133. Atmospheric Chemistry
Physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Origin of the atmosphere. Nitrogen, oxygen, carbon, sulfur, trace metal cycles. Climate and the greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of the atmosphere. Regional air pollution: aerosols, smog, acid rain.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe and the Core area requirement for Science A. EPS 133 also offered as Engineering Sciences 133.
Prerequisite: Physical Sciences 1, 2, Mathematics 1b; or equivalents.
Professor:
Steven Wofsy
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
7731
Subject Area:
Core
Earth and Planetary Sciences
Research Areas:
• Climate

Earth and Planetary Sciences 181. Historical Geobiology
A focused inquiry on the interactions of life and environment through geologic history. This term we will focus on mass extinctions, their causes and evolutionary consequences.
Note: Given in alternate years.
Prerequisite: EPS 8, OEB 10; or permission of instructor.
Professor:
Andrew Knoll
Season:
Fall
Days:
T
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
5162
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Ecology and Biodiversity
Earth and Planetary Sciences 181. Historical Geobiology
A focused inquiry on the interactions of life and environment through geologic history. This term we will focus on mass extinctions, their causes and evolutionary consequences.
Note: Given in alternate years.
Prerequisite: EPS 8, OEB 10; or permission of instructor.
Professor:
Andrew Knoll
Season:
Fall
Days:
T
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
5162
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Ecology and Biodiversity
Earth and Planetary Sciences 182. Stratigraphy and Sedimentology
Techniques in interpreting paleo-environmental information from sedimentary rocks, covering grain-flow, alluvial fans, siliciclastic shelves, carbonates, glacial deposits, and deep-sea environments, and culminating with cyclo-stratigraphy and basin dynamics.
Professor:

Francis Macdonald
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
37284
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 182. Stratigraphy and Sedimentology
Techniques in interpreting paleo-environmental information from sedimentary rocks, covering grain-flow, alluvial fans, siliciclastic shelves, carbonates, glacial deposits, and deep-sea environments, and culminating with cyclo-stratigraphy and basin dynamics.
Professor:
Francis Macdonald
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
37284
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 186. Low Temperature Geochemistry I: Introduction to Biogeochemical Cycles
An introduction to low temperature biogeochemistry. We will focus on key biogeochemical elements and look to understand the linkages between the biosphere, atmosphere and hydrosphere. The course begins with a description of marine geochemistry (alkalinity and chemical fluxes) and works toward understanding isotopic fractionation and what it can tell us about the environment. We will explore biogeochemistry over a range of physical and temporal scales.
Note: This course serves to prepare students for EPS 187. Given in alternate years.
Prerequisite: A course in college chemistry is recommended.
Professor:
David T. Johnston
Season:
Fall
Days:

T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
89929
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 186. Low Temperature Geochemistry I: Introduction to Biogeochemical Cycles
An introduction to low temperature biogeochemistry. We will focus on key biogeochemical elements and look to understand the linkages between the biosphere, atmosphere and hydrosphere. The course begins with a description of marine geochemistry (alkalinity and chemical fluxes) and works toward understanding isotopic fractionation and what it can tell us about the environment. We will explore biogeochemistry over a range of physical and temporal scales.
Note: This course serves to prepare students for EPS 187. Given in alternate years.
Prerequisite: A course in college chemistry is recommended.
Professor:
David T. Johnston
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
89929
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 187. Low Temperature Geochemistry II: Modern and Ancient Biogeochemical Processes
Introduction to biological and organic chemistry of the Earth's environment. Primary focus on formation, processing, and preservation of organic carbon, with emphasis on paleoenvironmental applications and on processes occurring at the molecular level. This class is intended to be taken in series with EPS 186.
Note: Given in alternate years.
Prerequisite: A course in college-level chemistry or equivalent. Chemistry 17 or 27 strongly recommended. EPS 186 strongly recommended.
Professor:
Ann Pearson
Season:
Spring
Days:

T
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1923
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 187. Low Temperature Geochemistry II: Modern and Ancient Biogeochemical Processes
Introduction to biological and organic chemistry of the Earth's environment. Primary focus on formation, processing, and preservation of organic carbon, with emphasis on paleoenvironmental applications and on processes occurring at the molecular level. This class is intended to be taken in series with EPS 186.
Note: Given in alternate years.
Prerequisite: A course in college-level chemistry or equivalent. Chemistry 17 or 27 strongly recommended. EPS 186 strongly recommended.
Professor:
Ann Pearson
Season:
Spring
Days:
T
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
1923
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 200. Atmospheric Chemistry and Physics
Atmospheric physics and chemistry: stratospheric and tropospheric transport, photochemistry, and aerosols; stratospheric ozone loss, tropospheric pollution; biogeochemical cycles.
Note: Students specializing in this area are expected to take EPS 200 and 236. These courses may serve as an introduction to atmospheric and oceanic processes for other students with strong preparation.
Prerequisite: Applied Mathematics 105b (may be taken concurrently), Physics 11 a, b or 15; a course in college-level chemistry or equivalent, or more advanced courses; or permission of the instructors.
Professor:
Steven Wofsy
Daniel Jacob
Season:
Fall

Days:
W
F
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2675
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 200. Atmospheric Chemistry and Physics
Atmospheric physics and chemistry: stratospheric and tropospheric transport, photochemistry, and aerosols; stratospheric ozone loss, tropospheric pollution; biogeochemical cycles.
Note: Students specializing in this area are expected to take EPS 200 and 236. These courses may serve as an introduction to atmospheric and oceanic processes for other students with strong preparation.
Prerequisite: Applied Mathematics 105b (may be taken concurrently), Physics 11 a, b or 15; a course in college-level chemistry or equivalent, or more advanced courses; or permission of the instructors.
Professor:
Steven Wofsy
Daniel Jacob
Season:
Fall
Days:
W
F
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2675
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 202. Mechanics in Earth and Environmental Science
Introduction to the mechanics of fluids and solids, organized around earth and environmental phenomena. Conservation laws, stress, deformation and flow. Inviscid fluids and ocean gravity waves; Coriolis dominated large scale flows. Viscosity and groundwater seepage; convective cells; boundary layers. Turbulent stream flows; flood surges; sediment transport. Elasticity and seismic waves. Pore fluid interactions with deformation and failure of earth materials, as in poro-mechanics of consolidation, cracking, faulting, and landslides. Ice sheets and glacial flow mechanics.
Note: Given in alternate years. Expected to be given in 2015-16.
Prerequisites: Calculus-based introductory physics at the level of Physics 11 or 15 and Mathematics at the level of Applied Mathematics 21 and 105.
Professor:

James Rice
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
9798
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 202. Mechanics in Earth and Environmental Science
Introduction to the mechanics of fluids and solids, organized around earth and environmental phenomena. Conservation laws, stress, deformation and flow. Inviscid fluids and ocean gravity waves; Coriolis dominated large scale flows. Viscosity and groundwater seepage; convective cells; boundary layers. Turbulent stream flows; flood surges; sediment transport. Elasticity and seismic waves. Pore fluid interactions with deformation and failure of earth materials, as in poro-mechanics of consolidation, cracking, faulting, and landslides. Ice sheets and glacial flow mechanics.
Note: Given in alternate years. Expected to be given in 2015-16.
Prerequisites: Calculus-based introductory physics at the level of Physics 11 or 15 and Mathematics at the level of Applied Mathematics 21 and 105.
Professor:
James Rice
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
9798
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 202. Mechanics in Earth and Environmental Science
Introduction to the mechanics of fluids and solids, organized around earth and environmental phenomena. Conservation laws, stress, deformation and flow. Inviscid fluids and ocean gravity waves; Coriolis dominated large scale flows. Viscosity and groundwater seepage; convective cells; boundary layers. Turbulent stream flows; flood surges; sediment transport. Elasticity and seismic waves. Pore fluid

interactions with deformation and failure of earth materials, as in poro-mechanics of consolidation, cracking, faulting, and landslides. Ice sheets and glacial flow mechanics.
Note: Given in alternate years. Expected to be given in 2015-16.
Prerequisites: Calculus-based introductory physics at the level of Physics 11 or 15 and Mathematics at the level of Applied Mathematics 21 and 105.
Professor:
James Rice
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
9798
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 208. Physics of Climate
Overview of the basic features of the climate system (global energy balance, atmospheric general circulation, ocean circulation, and climate variability) and the underlying physical processes.
Prerequisite: Applied Mathematics 105b (may be taken concurrently), Physics 11a, b, or 15; or permission of the instructor.
Professor:
Zhiming Kuang
Season:
Fall
Days:
T
Th
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
6561
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 208. Physics of Climate
Overview of the basic features of the climate system (global energy balance, atmospheric general circulation, ocean circulation, and climate variability) and the underlying physical processes.
Prerequisite: Applied Mathematics 105b (may be taken concurrently), Physics 11a, b, or 15; or permission of the instructor.

Professor:
Zhiming Kuang
Season:
Fall
Days:
T
Th
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
6561
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 22. The Fluid Earth: Oceans, Atmosphere, Climate, and Environment (formerly EPS 5)
Introduces students to the fluid Earth, emphasizing Earth's weather and climate, the carbon cycle, and global environmental change. Course begins with the physical concepts necessary for understanding the structure, motion and energy balance of the atmosphere, ocean, and cryosphere, and then applies these concepts in exploring major earth processes. Examples from Earth's past history, on-going changes in the climate, and implications for the future are highlighted.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe.
Professor:
Peter Huybers
Ann Pearson
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
79499
Subject Area:
Core
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 22. The Fluid Earth: Oceans, Atmosphere, Climate, and Environment (formerly EPS 5)
Introduces students to the fluid Earth, emphasizing Earth's weather and climate, the carbon cycle, and global environmental change. Course begins with the physical concepts necessary for understanding the structure, motion and energy balance of the atmosphere, ocean, and cryosphere, and then applies these concepts in exploring major earth processes. Examples from Earth's past history, on-going changes in the climate, and implications for the future are highlighted.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe.

Professor:
Peter Huybers
Ann Pearson
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
79499
Subject Area:
Core
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 236. Environmental Modeling
Chemical transport models: principles, numerical methods. Inverse models: Bayes' theorem, optimal estimation, Kalman filter, adjoint methods. Analysis of environmental data: visualization, time series analysis, Monte Carlo methods, statistical assessment. Students prepare projects and presentations.
Note: Students specializing in this area are expected to take EPS 200 and 236. These courses may serve as an introduction to atmospheric and oceanic processes for other students with strong preparation.
Prerequisite: Applied Mathematics 105b (may be taken concurrently); a course in atmospheric chemistry (EPS 133 or 200 or equivalent); or permission of the instructors.
Professor:
Steven Wofsy
Daniel Jacob
Season:
Fall
Days:
W
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
7250
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 236. Environmental Modeling
Chemical transport models: principles, numerical methods. Inverse models: Bayes' theorem, optimal estimation, Kalman filter, adjoint methods. Analysis of environmental data: visualization, time series analysis, Monte Carlo methods, statistical assessment. Students

prepare projects and presentations.
Note: Students specializing in this area are expected to take EPS 200 and 236. These courses may serve as an introduction to atmospheric and oceanic processes for other students with strong preparation.
Prerequisite: Applied Mathematics 105b (may be taken concurrently); a course in atmospheric chemistry (EPS 133 or 200 or equivalent); or permission of the instructors.
Professor:
Steven Wofsy
Daniel Jacob
Season:
Fall
Days:
W
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
7250
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 239. The Consequences of Energy Systems
This course provides an introduction to the physical and chemical impacts of energy choices on human society and natural ecosystems. Topics will include the carbon cycle, climate, air and water pollution, impacts of energy systems on health, land use consequences of energy technologies, and nuclear waste and proliferation.
Note: This course is a requirement for the Graduate Consortium on Energy and Environment.
Prerequisite: College level chemistry and physics and permission of the instructor.
Professor:
Daniel P. Schrag
Season:
Fall
Days:
F
Time:
10:00-12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98708
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
• Energy
• Human Health
Earth and Planetary Sciences 239. The Consequences of Energy Systems

This course provides an introduction to the physical and chemical impacts of energy choices on human society and natural ecosystems. Topics will include the carbon cycle, climate, air and water pollution, impacts of energy systems on health, land use consequences of energy technologies, and nuclear waste and proliferation.
Note: This course is a requirement for the Graduate Consortium on Energy and Environment.
Prerequisite: College level chemistry and physics and permission of the instructor.
Professor:
Daniel P. Schrag
Season:
Fall
Days:
F
Time:
10:00-12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98708
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
• Energy
• Human Health
Earth and Planetary Sciences 239. The Consequences of Energy Systems
This course provides an introduction to the physical and chemical impacts of energy choices on human society and natural ecosystems. Topics will include the carbon cycle, climate, air and water pollution, impacts of energy systems on health, land use consequences of energy technologies, and nuclear waste and proliferation.
Note: This course is a requirement for the Graduate Consortium on Energy and Environment.
Prerequisite: College level chemistry and physics and permission of the instructor.
Professor:
Daniel P. Schrag
Season:
Fall
Days:
F
Time:
10:00-12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98708
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
• Energy
• Human Health
Earth and Planetary Sciences 239. The Consequences of Energy Systems

This course provides an introduction to the physical and chemical impacts of energy choices on human society and natural ecosystems. Topics will include the carbon cycle, climate, air and water pollution, impacts of energy systems on health, land use consequences of energy technologies, and nuclear waste and proliferation.
Note: This course is a requirement for the Graduate Consortium on Energy and Environment.
Prerequisite: College level chemistry and physics and permission of the instructor.
Professor:
Daniel P. Schrag
Season:
Fall
Days:
F
Time:
10:00-12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98708
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
• Energy
• Human Health
Earth and Planetary Sciences 52. Introduction to Global Geophysics
A comprehensive introduction to global geophysics. This course serves as a bridge between introductory Earth science courses (EPS 21, EPS 22) and higher level level courses in EPS. Topics include: plate tectonics, the Earth's composition, thermal state and rheology, mantle convection, the geodynamo, the Earth's gravity field and geodesy, comparative planetology, and (modern and paleo) climate change.
Prerequisite: Applied Mathematics 21a,b (or Mathematics 1a,1b; or Mathematics 21a,b); Physics 11a,b or Physics 15a,b; or permission of the instructor.
Professor:
Jerry X. Mitrovica
Season:
Fall
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
48349
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
Earth and Planetary Sciences 52. Introduction to Global Geophysics

A comprehensive introduction to global geophysics. This course serves as a bridge between introductory Earth science courses (EPS 21, EPS 22) and higher level level courses in EPS. Topics include: plate tectonics, the Earth's composition, thermal state and rheology, mantle convection, the geodynamo, the Earth's gravity field and geodesy, comparative planetology, and (modern and paleo) climate change.
Prerequisite: Applied Mathematics 21a,b (or Mathematics 1a,1b; or Mathematics 21a,b); Physics 11a,b or Physics 15a,b; or permission of the instructor.
Professor:
Jerry X. Mitrovica
Season:
Fall
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
48349
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Climate
ECON E-1661: Environmental Economics
This course surveys the most critical topics in environmental economics. Economics, the science of how scarce resources are allocated, is at the core of our most challenging environmental issues. In a world of increasing scarcity and competing demands, economic analysis can guide public policy to efficient use of resources. Market failures are at the root of many of our most serious environmental problems. Remedies include getting prices to reflect true costs, providing productive incentive structures, and explicitly valuing environmental amenities. Topics covered in this course include the economics of population growth, poverty and income distribution, market failures, economic valuation, economic incentive instruments, food and water resources, international agricultural markets, fisheries, and wildlife conservation.
Professor:
Jennifer Clifford
Season:
Spring
Days:
T
Time:
7:40-9:40
Catalog Number:
24298
Research Areas:
• Social Sciences
Economics 1661. Fundamentals of Environmental Economics and Policy
Provides a survey, from the perspective of economics, of environmental and natural resource policy. Combines lectures on conceptual and methodological topics with examinations of public policy issues.
Note: This course offers an optional writing requirement which if completed will satisfy the concentration writing requirement. Offered jointly with the Kennedy School as API-135.

Prerequisite: Ec 10a and Ec 10b or permission of instructor.
Professor:
Robert N. Stavins
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2115
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
Economics 1661. Fundamentals of Environmental Economics and Policy
Provides a survey, from the perspective of economics, of environmental and natural resource policy. Combines lectures on conceptual and methodological topics with examinations of public policy issues.
Note: This course offers an optional writing requirement which if completed will satisfy the concentration writing requirement. Offered jointly with the Kennedy School as API-135.
Prerequisite: Ec 10a and Ec 10b or permission of instructor.
Professor:
Robert N. Stavins
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2115
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
Economics 1661. Fundamentals of Environmental Economics and Policy
Provides a survey, from the perspective of economics, of environmental and natural resource policy. Combines lectures on conceptual and methodological topics with examinations of public policy issues.
Note: This course offers an optional writing requirement which if completed will satisfy the concentration writing requirement. Offered jointly with the Kennedy School as API-135.

Prerequisite: Ec 10a and Ec 10b or permission of instructor.
Professor:
Robert N. Stavins
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2115
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
Economics 2680. Environmental and Natural Resource Economics
Basic theory and models. Externalities, common property, public goods, polution control, renewable and non-renewable resources, discounting, uncertainty, cost-benefit analysis, green accounting, sustainability, climate change.
Note: Students welcome from other departments and programs. There is a choice of a research paper or final exam.
Prerequisite: Graduate price theory at level of Economics 2010 or 2020.
Professor:
Martin Weitzman
Season:
Fall
Days:
T
Th
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
6529
Subject Area:
Economics
Research Areas:
• Social Sciences
Economics 2680. Environmental and Natural Resource Economics
Basic theory and models. Externalities, common property, public goods, polution control, renewable and non-renewable resources, discounting, uncertainty, cost-benefit analysis, green accounting, sustainability, climate change.
Note: Students welcome from other departments and programs. There is a choice of a research paper or final exam.
Prerequisite: Graduate price theory at level of Economics 2010 or 2020.
Professor:
Martin Weitzman

Season:
Fall
Days:
T
Th
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
6529
Subject Area:
Economics
Research Areas:
• Social Sciences
Economics 980cc. Readings on Market Imperfections and Implications for Government Intervention
This course focuses on rationales for and methods of government interventions in private markets. We cover various rationales, such as environmental externalities, fiscal externalities, and asymmetric information. And, we focus on various methods of intervention, such as taxes, regulation, direct government provision, mandates. We motivate our discussions using a combination of classic economics papers and more recent work focused on topical issues such as health insurance regulation and climate change.
Professor:
Nathaniel Hendren
Season:
Spring
Days:
M
Time:
2:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
77121
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
Economics 980cc. Readings on Market Imperfections and Implications for Government Intervention
This course focuses on rationales for and methods of government interventions in private markets. We cover various rationales, such as environmental externalities, fiscal externalities, and asymmetric information. And, we focus on various methods of intervention, such as taxes, regulation, direct government provision, mandates. We motivate our discussions using a combination of classic economics papers and more recent work focused on topical issues such as health insurance regulation and climate change.
Professor:
Nathaniel Hendren
Season:
Spring
Days:
M

Time:
2:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
77121
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
Economics 980cc. Readings on Market Imperfections and Implications for Government Intervention
This course focuses on rationales for and methods of government interventions in private markets. We cover various rationales, such as environmental externalities, fiscal externalities, and asymmetric information. And, we focus on various methods of intervention, such as taxes, regulation, direct government provision, mandates. We motivate our discussions using a combination of classic economics papers and more recent work focused on topical issues such as health insurance regulation and climate change.
Professor:
Nathaniel Hendren
Season:
Spring
Days:
M
Time:
2:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
77121
Subject Area:
Economics
Research Areas:
• Business, Law and Policy
• Social Sciences
Economics 985q. Research in Applied Microeconomics, Environmental, and Natural Resource Economics
Workshop for seniors writing theses. Especially for applied work in microeconomics, environmental, or natural resource economics, but open to all fields. Emphasis on choice of research topics, methodology, and data sources. Course requires written and oral presentations of work in progress leading toward completion of a major research paper or senior honors thesis.
Professor:
Rebecca Toseland
Season:
Spring
Fall
Days:
Time:
TBD
School:
• Faculty of Arts and Sciences
Catalog Number:

17303
Subject Area:
Economics
Research Areas:
• Social Sciences
Economics 985q. Research in Applied Microeconomics, Environmental, and Natural Resource Economics
Workshop for seniors writing theses. Especially for applied work in microeconomics, environmental, or natural resource economics, but open to all fields. Emphasis on choice of research topics, methodology, and data sources. Course requires written and oral presentations of work in progress leading toward completion of a major research paper or senior honors thesis.
Professor:
Rebecca Toseland
Season:
Spring
Fall
Days:
Time:
TBD
School:
• Faculty of Arts and Sciences
Catalog Number:
17303
Subject Area:
Economics
Research Areas:
• Social Sciences
EH 520: Research Design in Environmental Health
The seminars consist of student presentation of plans for collection and analysis of data, with discussion by students and faculty. Preparatory work is done under tutorial arrangements with members of the faculty. The emphasis is on conceptual issues necessary for the development of a feasible and informative study.
Professor:
Joel Schwartz
Professor:
Season:
Spring
Days:
Th
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH 520
Research Areas:
• Human Health
EH 520: Research Design in Environmental Health
The seminars consist of student presentation of plans for collection and analysis of data, with discussion by students and faculty. Preparatory work is done under tutorial arrangements with members of the faculty. The emphasis is on conceptual issues necessary for the development of a feasible and informative study.

Professor:
Joel Schwartz
Professor:
Season:
Spring
Days:
Th
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH 520
Research Areas:
• Human Health
EH201: Introduction to Environmental Health
This course offers a general introduction to environmental health from local to global, addressing fundamental topics and current controversies. The first part of the course covers core topics that prepare students to more fully understand and address environmental health issues: toxicology, exposure assessment, environmental epidemiology, risk assessment/risk management, air pollution, water pollution, and environmental justice. Using the tools from the first part of the course, students then participate in sessions on occupational health, children's health and the environment, injuries, climate change and health, the built environment/urban sprawl, and debates concerning pesticide use.Students can actively engage with the course material through in-class and online, case discussions, debates, and review of environment-related current events. This course provides an excellent introductory foundation in environmental health for all professional master's degree candidates, whether or not specializing in environmental health. The course fulfills the environmental health requirement for all professional master's degree programs.
Professor:
Rose Goldman
Season:
Fall
Days:
M
W
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH201-01
Research Areas:
• Human Health
EH201: Introduction to Environmental Health
This course offers a general introduction to environmental health from local to global, addressing fundamental topics and current controversies. The first part of the course covers core topics that prepare students to more fully understand and address environmental health issues: toxicology, exposure assessment, environmental epidemiology, risk assessment/risk management, air pollution, water pollution, and environmental justice. Using the tools from the first part of the course, students then participate in sessions on occupational health, children's health and the environment, injuries, climate change and health, the built environment/urban sprawl, and debates concerning pesticide use.Students can actively engage with the course material through in-class and online, case discussions, debates, and review of environment-related current events. This course provides an excellent introductory foundation in environmental health for all

professional master's degree candidates, whether or not specializing in environmental health. The course fulfills the environmental health requirement for all professional master's degree programs.
Professor:
Rose Goldman
Season:
Fall
Days:
M
W
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH201-01
Research Areas:
• Human Health
EH202: Principles of Environmental Health
This course is appropriate for students interested in learning quantitative methods for assessing environmental exposures and hazards. This course is directed at first year Environmental Health students and MPH students with specific interest or experience in environmental health or for those students who have taken EH 201. Students who have taken EH 201 can take EH 202 as a sequel for more intensive training in environmental health. Students will learn methods for quantitative evaluation and public health responses to environmental hazards through lectures, problem solving, and case studies. The course is structured around specific tools including exposure assessment, epidemiology, toxicology and pathophysiology, risk assessment, life cycle analysis, and environmental policy.
Professor:
Douglas Dockery
Professor:
Alberto Juan Caban-Martinez
Season:
Spring
Days:
T
Th
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH202-01
Research Areas:
• Human Health
EH202: Principles of Environmental Health
This course is appropriate for students interested in learning quantitative methods for assessing environmental exposures and hazards. This course is directed at first year Environmental Health students and MPH students with specific interest or experience in environmental health or for those students who have taken EH 201. Students who have taken EH 201 can take EH 202 as a sequel for more intensive training in environmental health. Students will learn methods for quantitative evaluation and public health responses to environmental hazards through lectures, problem solving, and case studies. The course is structured around specific tools including exposure assessment, epidemiology, toxicology and pathophysiology, risk assessment, life cycle analysis, and environmental policy.

Professor:
Douglas Dockery
Professor:
Alberto Juan Caban-Martinez
Season:
Spring
Days:
T
Th
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH202-01
Research Areas:
• Human Health
EH232: Introduction to Occupational and Environmental Medicine
Overview of Occupational and Environmental Medicine including: the diagnosis and management of illnesses following exposure to specific workplace substances, environmental and community hazards, such as asbestos, lead, organic solvents, and vibration; methods of diagnosis of early organ system effects of chemicals and techniques for assessing impairment and disability; as well as, medicolegal aspects of occupational health. Course Activities: Mid-term exam and Final exam. Course Note: Basic course in toxicology recommended.
This is a clinical and preventive medicine course. The material is taught at a post-graduate level, and a medical or allied health background is required. The majority of students will be physicians, nurses, dentists, pharmacists and students in those fields. Persons without prior biomedical training may NOT take the class for an ordinal grade. Such students are welcome to audit the class. In certain exceptions, if discussed with the instructors, such students may be granted permission by the instructors to take the course on a pass/fail basis.
Professor:
David Christiani
Professor:
Stefanos Kales
Season:
Spring
Days:
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH232-01
Research Areas:
• Human Health
EH232: Introduction to Occupational and Environmental Medicine
Overview of Occupational and Environmental Medicine including: the diagnosis and management of illnesses following exposure to specific workplace substances, environmental and community hazards, such as asbestos, lead, organic solvents, and vibration; methods of diagnosis of early organ system effects of chemicals and techniques for assessing impairment and disability; as well as, medicolegal

aspects of occupational health. Course Activities: Mid-term exam and Final exam. Course Note: Basic course in toxicology recommended.
This is a clinical and preventive medicine course. The material is taught at a post-graduate level, and a medical or allied health background is required. The majority of students will be physicians, nurses, dentists, pharmacists and students in those fields. Persons without prior biomedical training may NOT take the class for an ordinal grade. Such students are welcome to audit the class. In certain exceptions, if discussed with the instructors, such students may be granted permission by the instructors to take the course on a pass/fail basis.
Professor:
David Christiani
Professor:
Stefanos Kales
Season:
Spring
Days:
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH232-01
Research Areas:
• Human Health
EH236: Epidemiology of Environmental & Occupational Health Regulations
Provides students with the opportunity to review the scientific basis for the association of selected occupational and environmental exposures and disease. Special emphasis is placed on the evaluation of the epidemiologic literature, cancer, and respiratory disease. Attention is directed to the interface of science and regulatory policy and the role of risk analysis in setting health standards.
Note: Any EH course required as a pre-requisite or concurrent requisite.
Professor:
Amar Mehta
Jennifer Cavallari
David Wegman
Gregiry Wagner
Season:
Spring
Days:
F
Time:
9:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH236-01
Research Areas:
• Human Health
EH236: Epidemiology of Environmental & Occupational Health Regulations
Provides students with the opportunity to review the scientific basis for the association of selected occupational and environmental exposures and disease. Special emphasis is placed on the evaluation of the epidemiologic literature, cancer, and respiratory disease.

Attention is directed to the interface of science and regulatory policy and the role of risk analysis in setting health standards.
Note: Any EH course required as a pre-requisite or concurrent requisite.
Professor:
Amar Mehta
Jennifer Cavallari
David Wegman
Gregiry Wagner
Season:
Spring
Days:
F
Time:
9:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH236-01
Research Areas:
• Human Health
EH257: Water Pollution
This course is designed to teach an understanding of the basic principles of water pollution and water pollution issues on local, regional and global scales. The course will begin with a discussion of the basic chemical, physical and biological properties of water and water contaminants. Subsequent lectures will cover specific chemical and biological contaminants in ground, surface, and marine waters; sources, fate, transport, and transformation of contaminants; monitoring techniques, water source protection and resource management; water and wastewater treatment; transmission of waterborne disease; toxicological concerns of chemicals in water, including disinfection byproducts; and interactions with the air and land environments. Invited lecturers will cover issues such as harmful algal blooms, groundwater modeling, coastal zone management, and regulatory approaches for aquatic ecosystem protection. Course Activities: Class discussions, homework assignments, exams and final project.

Professor:
James Shine
Season:
Spring
Days:
T
Th
Time:
8:30-10:20
School:
• Harvard School of Public Health
Catalog Number:
EH257-01
Research Areas:
• Human Health
EH257: Water Pollution
This course is designed to teach an understanding of the basic principles of water pollution and water pollution issues on local, regional and global scales. The course will begin with a discussion of the basic chemical, physical and biological properties of water and water contaminants. Subsequent lectures will cover specific chemical and biological contaminants in ground, surface, and marine waters;

sources, fate, transport, and transformation of contaminants; monitoring techniques, water source protection and resource management; water and wastewater treatment; transmission of waterborne disease; toxicological concerns of chemicals in water, including disinfection byproducts; and interactions with the air and land environments. Invited lecturers will cover issues such as harmful algal blooms, groundwater modeling, coastal zone management, and regulatory approaches for aquatic ecosystem protection. Course Activities: Class discussions, homework assignments, exams and final project.

Professor:
James Shine
Season:
Spring
Days:
T
Th
Time:
8:30-10:20
School:
• Harvard School of Public Health
Catalog Number:
EH257-01
Research Areas:
• Human Health
EH262: Introduction to the Work Environment
The course comprises introductory lectures and discussions on key aspects of industrial hygiene and occupational health covering recognition, evaluation and control of health hazards at work. Consideration is given to chemical, physical and biological hazards, and the criteria for the evaluation of each. While intended primarily for students planning a career in occupational health, this course provides background to the subject for students studying environmental issues and is strongly recommended for students intending to take ID263.
Professor:
Robert Herrick
James Stewart
Season:
Fall
Days:
M
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH262-01
Research Areas:
• Human Health
EH262: Introduction to the Work Environment
The course comprises introductory lectures and discussions on key aspects of industrial hygiene and occupational health covering recognition, evaluation and control of health hazards at work. Consideration is given to chemical, physical and biological hazards, and the criteria for the evaluation of each. While intended primarily for students planning a career in occupational health, this course provides background to the subject for students studying environmental issues and is strongly recommended for students intending to take ID263.
Professor:
Robert Herrick

James Stewart
Season:
Fall
Days:
M
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH262-01
Research Areas:
• Human Health
EH263: Analytical Methods and Exposure Assessment
This course will examine methodological issues associated with the design and execution of studies designed to measure environmental exposure to chemical and biological contaminants. The first half of the course will be lecture based, and will address topics such as: study design issues, implementation of quality control/ quality assurance programs, data analysis, protocols for sampling air, water, sediments, and soil for contaminants of concern, and analytical techniques used to measure chemical and biological constituents in the laboratory. During the second half of the semester, groups of students will design and execute their own field investigation using these techniques. The design and results of these projects are presented in class. Course Activities: Lectures, written reports, problem sets, exams, class presentations, field work and final paper.
Professor:
John Spengler
Professor:
Jamie Hart
Gary Adamkiewicz
Season:
Spring
Days:
T
Th
Time:
3:30-5:20
School:
• Harvard School of Public Health
Research Areas:
• Human Health
EH263: Analytical Methods and Exposure Assessment
This course will examine methodological issues associated with the design and execution of studies designed to measure environmental exposure to chemical and biological contaminants. The first half of the course will be lecture based, and will address topics such as: study design issues, implementation of quality control/ quality assurance programs, data analysis, protocols for sampling air, water, sediments, and soil for contaminants of concern, and analytical techniques used to measure chemical and biological constituents in the laboratory. During the second half of the semester, groups of students will design and execute their own field investigation using these techniques. The design and results of these projects are presented in class. Course Activities: Lectures, written reports, problem sets, exams, class presentations, field work and final paper.
Professor:
John Spengler
Professor:

Jamie Hart
Gary Adamkiewicz
Season:
Spring
Days:
T
Th
Time:
3:30-5:20
School:
• Harvard School of Public Health
Research Areas:
• Human Health
EH269: Exposure Assessment for Environmental and Occupational Epidemiology
Reviews the methods used to characterize environmental and occupational exposures. Presents approaches for biologically based exposure assessment matched to epidemiologic designs. Emphasizes evaluation of scientific literature. Course Activities: Students will critique 4 case study papers. Instructors will provide feedback.
Note: Course recommended for doctoral and post-doctoral students in epidemiology, environmental science and engineering, and environmental biostatistics.
Professor:
Thomas Smith
Season:
Spring
Days:
M
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH269-01
Research Areas:
• Human Health
EH269: Exposure Assessment for Environmental and Occupational Epidemiology
Reviews the methods used to characterize environmental and occupational exposures. Presents approaches for biologically based exposure assessment matched to epidemiologic designs. Emphasizes evaluation of scientific literature. Course Activities: Students will critique 4 case study papers. Instructors will provide feedback.
Note: Course recommended for doctoral and post-doctoral students in epidemiology, environmental science and engineering, and environmental biostatistics.
Professor:
Thomas Smith
Season:
Spring
Days:
M
Time:
1:30-3:20
School:

• Harvard School of Public Health
Catalog Number:
EH269-01
Research Areas:
• Human Health
EH278: Health and the Global Environment
Human activity has changed the atmosphere and altered terrestrial and marine ecosystems on a global scale for the first time in history. Evidence is mounting that these changes may already be having serious effects on human health, and there is growing concern that in coming decades the effects could be catastrophic. This course will examine in detail climate change and biodiversity loss as two primary examples of global environmental change and their human health dimensions. The challenges of addressing global environmental problems from a public policy and communications standpoint will also be explored. A multi-disciplinary faculty will provide an integrated assessment of these issues. The course will be open to all students at Harvard University, but preference will be given to students from HSPH, HMS, and HKS, as well as to Environmental Science Public Policy majors in the Faculty of Arts and Sciences.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard School of Public Health
Catalog Number:
EH278-01
Research Areas:
• Climate
• Human Health
EH278: Health and the Global Environment
Human activity has changed the atmosphere and altered terrestrial and marine ecosystems on a global scale for the first time in history. Evidence is mounting that these changes may already be having serious effects on human health, and there is growing concern that in coming decades the effects could be catastrophic. This course will examine in detail climate change and biodiversity loss as two primary examples of global environmental change and their human health dimensions. The challenges of addressing global environmental problems from a public policy and communications standpoint will also be explored. A multi-disciplinary faculty will provide an integrated assessment of these issues. The course will be open to all students at Harvard University, but preference will be given to students from HSPH, HMS, and HKS, as well as to Environmental Science Public Policy majors in the Faculty of Arts and Sciences.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard School of Public Health
Catalog Number:
EH278-01
Research Areas:
• Climate
• Human Health
EH278: Health and the Global Environment

Human activity has changed the atmosphere and altered terrestrial and marine ecosystems on a global scale for the first time in history. Evidence is mounting that these changes may already be having serious effects on human health, and there is growing concern that in coming decades the effects could be catastrophic. This course will examine in detail climate change and biodiversity loss as two primary examples of global environmental change and their human health dimensions. The challenges of addressing global environmental problems from a public policy and communications standpoint will also be explored. A multi-disciplinary faculty will provide an integrated assessment of these issues. The course will be open to all students at Harvard University, but preference will be given to students from HSPH, HMS, and HKS, as well as to Environmental Science Public Policy majors in the Faculty of Arts and Sciences.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard School of Public Health
Catalog Number:
EH278-01
Research Areas:
• Climate
• Human Health
EH279: Radiation Environment: Its Identification, Evaluation & Control
Starting with the fundamentals of radiation protection, this course then treats in-depth selected topics in occupational and environmental radiation protection (e.g., risk assessment of exposures to diagnostic and therapeutic x rays; use of lung and metabolic models in evaluation of the hazard from inhalation and ingestion of radioactive chemicals; hazard from indoor radon; radiological assessments regarding nuclear power, war, and radiological terrorism; hazards from microwaves, cellular phones and other sources of non-ionizing radiation; case studies of radiation accidents; management of university and hospital radiation programs). The course has been developed with the needs of students enrolled in environmental science and engineering, occupational health and the MPH program in mind.
Professor:
Edward Maher
Season:
Fall
Days:
M
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH279-01
Research Areas:
• Human Health
EH279: Radiation Environment: Its Identification, Evaluation & Control
Starting with the fundamentals of radiation protection, this course then treats in-depth selected topics in occupational and environmental radiation protection (e.g., risk assessment of exposures to diagnostic and therapeutic x rays; use of lung and metabolic models in evaluation of the hazard from inhalation and ingestion of radioactive chemicals; hazard from indoor radon; radiological assessments regarding nuclear power, war, and radiological terrorism; hazards from microwaves, cellular phones and other sources of non-ionizing radiation; case studies of radiation accidents; management of university and hospital radiation programs). The course has been developed with the needs of students enrolled in environmental science and engineering, occupational health and the MPH program in mind.

Professor:
Edward Maher
Season:
Fall
Days:
M
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH279-01
Research Areas:
• Human Health
EH297: Atmospheric Environment Seminars
This course offers a comprehensive overview of gaseous and particulate air pollutants. It will emphasize pollutant sources, physical and chemical properties, sampling and analysis, chemical transformation, atmospheric transport, fate, and potential for adverse health and environmental impacts. It will examine regulatory efforts to protect environmental health and emission control technologies for mobile and stationary sources, Lectures will present case studies on air pollution studies in US and other courses. Students will also learn to apply positive matrix factorization (PMF) to air pollution data and how to model pollutant dispersion using the AERMOD modeling system. In addition to mid-term and final examinations, the class includes several homework assignments and computer laboratories.
Professor:
Petros Koutrakis
Professor:
Steven Hanna
Nicholas Ashford
Season:
Spring
Days:
W
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH297-01
Research Areas:
• Climate
• Human Health
EH297: Atmospheric Environment Seminars
This course offers a comprehensive overview of gaseous and particulate air pollutants. It will emphasize pollutant sources, physical and chemical properties, sampling and analysis, chemical transformation, atmospheric transport, fate, and potential for adverse health and environmental impacts. It will examine regulatory efforts to protect environmental health and emission control technologies for mobile and stationary sources, Lectures will present case studies on air pollution studies in US and other courses. Students will also learn to apply positive matrix factorization (PMF) to air pollution data and how to model pollutant dispersion using the AERMOD modeling system. In addition to mid-term and final examinations, the class includes several homework assignments and computer laboratories.
Professor:

Petros Koutrakis
Professor:
Steven Hanna
Nicholas Ashford
Season:
Spring
Days:
W
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH297-01
Research Areas:
• Climate
• Human Health
EH297: Atmospheric Environment Seminars
This course offers a comprehensive overview of gaseous and particulate air pollutants. It will emphasize pollutant sources, physical and chemical properties, sampling and analysis, chemical transformation, atmospheric transport, fate, and potential for adverse health and environmental impacts. It will examine regulatory efforts to protect environmental health and emission control technologies for mobile and stationary sources, Lectures will present case studies on air pollution studies in US and other courses. Students will also learn to apply positive matrix factorization (PMF) to air pollution data and how to model pollutant dispersion using the AERMOD modeling system. In addition to mid-term and final examinations, the class includes several homework assignments and computer laboratories.
Professor:
Petros Koutrakis
Professor:
Steven Hanna
Nicholas Ashford
Season:
Spring
Days:
W
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH297-01
Research Areas:
• Climate
• Human Health
EH298: Environmental Epigenetics
Epigenetics is a fast growing field, with increasing applicability in environmental and epidemiology studies, focusing on the alterations in chromatin structure that can stably and heritably influence gene expression. Epigenetic changes can be as profound as those exerted by mutation, but, unlike mutations, are reversible and responsive to environmental influences. The course will focus on epigenetic

mechanisms and laboratory methods for DNA methylamine, his tone modifications, small non-coding RNAs, and epigenomics. Ongoing experimental, and epidemiology studies (cohort, case-control, cross-sectional and repeated measurement studies) will be presented to introduce the students to the epigenetic effects in prenatal/early and adult life of environmental factors, including air pollution, metals, pesticides, benzene, PCBs, persistent organic pollutants, and diet. The course will enable them to understand and apply epigenetic methods in multiple areas, including cardiovascular and respiratory disease, aging, reproductive health, inflammation/immunity, and cancer.

Professor:

Andrea Baccarelli

Season:

Fall

Days:

T

Th

Time:

1:30-3:20

School:

• Harvard School of Public Health

Catalog Number:

EH298-01

Research Areas:

• Human Health

EH298: Environmental Epigenetics

Epigenetics is a fast growing field, with increasing applicability in environmental and epidemiology studies, focusing on the alterations in chromatin structure that can stably and heritably influence gene expression. Epigenetic changes can be as profound as those exerted by mutation, but, unlike mutations, are reversible and responsive to environmental influences. The course will focus on epigenetic mechanisms and laboratory methods for DNA methylamine, his tone modifications, small non-coding RNAs, and epigenomics. Ongoing experimental, and epidemiology studies (cohort, case-control, cross-sectional and repeated measurement studies) will be presented to introduce the students to the epigenetic effects in prenatal/early and adult life of environmental factors, including air pollution, metals, pesticides, benzene, PCBs, persistent organic pollutants, and diet. The course will enable them to understand and apply epigenetic methods in multiple areas, including cardiovascular and respiratory disease, aging, reproductive health, inflammation/immunity, and cancer.

Professor:

Andrea Baccarelli

Season:

Fall

Days:

T

Th

Time:

1:30-3:20

School:

• Harvard School of Public Health

Catalog Number:

EH298-01

Research Areas:

• Human Health

EH507: Environmental Exposure, Epidemiology, and Risk

The practicum is designed to allow Exposure, Epidemiology, and Risk (EER) Program students to integrate what they have learned and to

apply this knowledge in the evaluation of a problem of importance. Each student must design and conduct an independent analysis of an environmental problem. Student projects must demonstrate analytical sophistication and critical interpretation of relevant science in support of decision making. Each student must prepare a written report and make an oral presentation of results to the EER faculty.
Professor:
Francine Laden
Professor:
Jamie Hart
Robert Herrick
Season:
Fall
Days:
F
Time:
9:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH507-01
Research Areas:
• Human Health
EH507: Environmental Exposure, Epidemiology, and Risk
The practicum is designed to allow Exposure, Epidemiology, and Risk (EER) Program students to integrate what they have learned and to apply this knowledge in the evaluation of a problem of importance. Each student must design and conduct an independent analysis of an environmental problem. Student projects must demonstrate analytical sophistication and critical interpretation of relevant science in support of decision making. Each student must prepare a written report and make an oral presentation of results to the EER faculty.
Professor:
Francine Laden
Professor:
Jamie Hart
Robert Herrick
Season:
Fall
Days:
F
Time:
9:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH507-01
Research Areas:
• Human Health
EH510: Fundamentals of Human Environmental Exposures Assessment
This course is designed to provide the tools and foundations necessary to understand the fate and transport of environmental contaminants in various environmental media and to estimate their impact on human exposure. The course will consider human exposure assessment in the context of risk assessment. Physical-chemical properties of contaminants and environmental media will be considered as they relate to developing basic models of human exposure. Calculus and chemistry required; course required for all EER Program students.
Professor:

Chensheng (Alex) Lu
Professor:
David Macintosh
Season:
Fall
Days:
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH510-01
Research Areas:
• Human Health
EH510: Fundamentals of Human Environmental Exposures Assessment
This course is designed to provide the tools and foundations necessary to understand the fate and transport of environmental contaminants in various environmental media and to estimate their impact on human exposure. The course will consider human exposure assessment in the context of risk assessment. Physical-chemical properties of contaminants and environmental media will be considered as they relate to developing basic models of human exposure. Calculus and chemistry required; course required for all EER Program students.
Professor:
Chensheng (Alex) Lu
Professor:
David Macintosh
Season:
Fall
Days:
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
EH510-01
Research Areas:
• Human Health
EH521: Environmental Cardiology
The course will assess the impact of the environment on the onset and exacerbation of cardiovascular diseases. Environmental exposures that have been implicated to impact cardiovascular disease are predominantly air pollution, second hand smoke, noise, and heat. The course will present teaching examples showing the study designs applied in environmental epidemiology focusing on cardiovascular disease. Short-term health effects as well as health effects of continuous exposure over decades on the cardiovascular system by these environmental exposures will be demonstrated. The course will explore the evidence for the biological plausibility of the observed health effects and will highlight recent developments in this area concerning gene-environment interactions.
Professor:
Douglas Dockery
Professor:
Annette Peters
Season:

Fall
Days:
T
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH521-01
Research Areas:
• Human Health
EH521: Environmental Cardiology
The course will assess the impact of the environment on the onset and exacerbation of cardiovascular diseases. Environmental exposures that have been implicated to impact cardiovascular disease are predominantly air pollution, second hand smoke, noise, and heat. The course will present teaching examples showing the study designs applied in environmental epidemiology focusing on cardiovascular disease. Short-term health effects as well as health effects of continuous exposure over decades on the cardiovascular system by these environmental exposures will be demonstrated. The course will explore the evidence for the biological plausibility of the observed health effects and will highlight recent developments in this area concerning gene-environment interactions.
Professor:
Douglas Dockery
Professor:
Annette Peters
Season:
Fall
Days:
T
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
EH521-01
Research Areas:
• Human Health
EH522: Indoor Environmental Quality and Health
This course aims to introduce students to the concepts necessary for analyzing the indoor environments and help them to understand and address indoor environmental quality problems in the modern built environments and the link to health, comfort and productivity of the occupants. Emphasis is placed on understanding the nature of indoor air quality; indoor air pollutants, including their sources and health effects; generation and transport of pollutants; modeling of IAQ in buildings; modern building systems including Heating Ventilation and Air conditioning systems as well as air cleaning systems; IEQ regulations, guidelines and building standards; and procedures for assessing indoor air quality issues.
Professor:
John Spengler
Philip Demokritou
Season:
Fall
Time:
8:30-10:20

School:
• Harvard School of Public Health
Catalog Number:
EH522-01
Research Areas:
• Human Health
EH522: Indoor Environmental Quality and Health
This course aims to introduce students to the concepts necessary for analyzing the indoor environments and help them to understand and address indoor environmental quality problems in the modern built environments and the link to health, comfort and productivity of the occupants. Emphasis is placed on understanding the nature of indoor air quality; indoor air pollutants, including their sources and health effects; generation and transport of pollutants; modeling of IAQ in buildings; modern building systems including Heating Ventilation and Air conditioning systems as well as air cleaning systems; IEQ regulations, guidelines and building standards; and procedures for assessing indoor air quality issues.
Professor:
John Spengler
Philip Demokritou
Season:
Fall
Time:
8:30-10:20
School:
• Harvard School of Public Health
Catalog Number:
EH522-01
Research Areas:
• Human Health
Engineering Sciences 103. Spatial Analysis of Environmental and Social Systems
Prerequisite: Applied Mathematics 21 or equivalent.
Introduces the fundamental statistical and mapping tools needed for analysis of environmental systems. Topics will be linked by environmental and social themes and will include GIS concepts; data models; spatial statistics; density mapping; buffer zone analysis; surface estimation; map algebra; suitability modeling. Students will acquire technical skills in both mapping and spatial analysis. Software packages used will include ArcGis. There will be guest lectures by researchers and practitioners who use GIS for spatial analysis.

Professor:
S. Srinivasan
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
9277
Subject Area:

Engineering Sciences
Research Areas:
• Social Sciences
Engineering Sciences 103. Spatial Analysis of Environmental and Social Systems
Prerequisite: Applied Mathematics 21 or equivalent.
Introduces the fundamental statistical and mapping tools needed for analysis of environmental systems. Topics will be linked by environmental and social themes and will include GIS concepts; data models; spatial statistics; density mapping; buffer zone analysis; surface estimation; map algebra; suitability modeling. Students will acquire technical skills in both mapping and spatial analysis. Software packages used will include ArcGis. There will be guest lectures by researchers and practitioners who use GIS for spatial analysis.

Professor:
S. Srinivasan
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
9277
Subject Area:
Engineering Sciences
Research Areas:
• Social Sciences
Engineering Sciences 133. Atmospheric Chemistry
Physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Construction of atmospheric composition models. Atmospheric transport. Nitrogen, oxygen, and carbon cycles. Climate forcing by greenhouse gases and aerosols. Stratospheric ozone. Oxidizing power of the atmosphere. Surface air pollution: aerosols and ozone. Deposition to ecosystems: acid rain, nitrogen, mercury.
Prerequisite(s)
Physical Sciences 1, 2, Mathematics 1b; or equivalents.
Notes
This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe. ES 133 is also offered as EPS 133. Students may not take both EPS 133 and ES 133 for credit.
Professor:
Steven Wofsy
Professor:
Season:
Spring
Days:
T
Th
Time:
11:30-1:00

School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
38967
Subject Area:
Engineering Sciences
Research Areas:
• Climate
Engineering Sciences 133. Atmospheric Chemistry
Physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Construction of atmospheric composition models. Atmospheric transport. Nitrogen, oxygen, and carbon cycles. Climate forcing by greenhouse gases and aerosols. Stratospheric ozone. Oxidizing power of the atmosphere. Surface air pollution: aerosols and ozone. Deposition to ecosystems: acid rain, nitrogen, mercury.
Prerequisite(s)
Physical Sciences 1, 2, Mathematics 1b; or equivalents.
Notes
This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe. ES 133 is also offered as EPS 133. Students may not take both EPS 133 and ES 133 for credit.
Professor:
Steven Wofsy
Professor:
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
38967
Subject Area:
Engineering Sciences
Research Areas:
• Climate
Engineering Sciences 133. Atmospheric Chemistry
Physical and chemical processes determining the composition of the atmosphere and its implications for climate, ecosystems, and human welfare. Construction of atmospheric composition models. Atmospheric transport. Nitrogen, oxygen, and carbon cycles. Climate forcing by greenhouse gases and aerosols. Stratospheric ozone. Oxidizing power of the atmosphere. Surface air pollution: aerosols and ozone. Deposition to ecosystems: acid rain, nitrogen, mercury.
Prerequisite(s)
Physical Sciences 1, 2, Mathematics 1b; or equivalents.
Notes
This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe. ES 133 is also offered as EPS 133. Students may not take both EPS 133 and ES 133 for credit.

Professor:
Steven Wofsy
Professor:
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
38967
Subject Area:
Engineering Sciences
Research Areas:
• Climate
Engineering Sciences 163. Pollution Control in Aquatic Ecosystems
This course is focused on aspects of environmental engineering related to the fate, transport, and control of pollution in aquatic ecosystems. The course will cover human impacts to water resources: the sources and ecological impacts of environmental contaminants; quantitative models of the fate and transport of pollutants in natural aquatic ecosystems; best management practices for the prevention and control of pollution; and sustainable natural treatment systems for water quality improvement.
Prerequisite: Applied Mathematics 21b (or equivalent); Engineering Sciences 6 (or equivalent)
Professor:
Patrick Ulrich
Season:
Fall
Days:
M
W
F
Time:
10:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
72571
Subject Area:
Engineering Sciences
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
Engineering Sciences 163. Pollution Control in Aquatic Ecosystems
This course is focused on aspects of environmental engineering related to the fate, transport, and control of pollution in aquatic ecosystems. The course will cover human impacts to water resources: the sources and ecological impacts of environmental contaminants; quantitative models of the fate and transport of pollutants in natural aquatic ecosystems; best management practices for the prevention

and control of pollution; and sustainable natural treatment systems for water quality improvement.
Prerequisite: Applied Mathematics 21b (or equivalent); Engineering Sciences 6 (or equivalent)
Professor:
Patrick Ulrich
Season:
Fall
Days:
M
W
F
Time:
10:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
72571
Subject Area:
Engineering Sciences
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
Engineering Sciences 163. Pollution Control in Aquatic Ecosystems
This course is focused on aspects of environmental engineering related to the fate, transport, and control of pollution in aquatic ecosystems. The course will cover human impacts to water resources: the sources and ecological impacts of environmental contaminants; quantitative models of the fate and transport of pollutants in natural aquatic ecosystems; best management practices for the prevention and control of pollution; and sustainable natural treatment systems for water quality improvement.
Prerequisite: Applied Mathematics 21b (or equivalent); Engineering Sciences 6 (or equivalent)
Professor:
Patrick Ulrich
Season:
Fall
Days:
M
W
F
Time:
10:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
72571
Subject Area:
Engineering Sciences
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
Engineering Sciences 164. Environmental Chemistry
Basic concepts, principles, and applications of environmental chemistry for students in Earth and environmental sciences. We will

investigate a variety of environmental chemistry topics relevant for soil environmental systems, including soil mineralogy, water chemistry, redox reactions, precipitation/dissolution, and ion sorption. The principal goal is to explore and apply the fundamental chemical principles to understand Earth processes and solve complex environmental problems.
Note: Cannot be taken for credit by students who have already taken ENG-SCI 264.
Prerequisite: Physical Sciences 1 or permission of the instructor.
Professor:
Karena McKinney
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• School of Engineering & Applied Sciences
Catalog Number:
4099
Subject Area:
Earth and Planetary Sciences
Engineering Sciences
Research Areas:
• Climate
Engineering Sciences 164. Environmental Chemistry
Basic concepts, principles, and applications of environmental chemistry for students in Earth and environmental sciences. We will investigate a variety of environmental chemistry topics relevant for soil environmental systems, including soil mineralogy, water chemistry, redox reactions, precipitation/dissolution, and ion sorption. The principal goal is to explore and apply the fundamental chemical principles to understand Earth processes and solve complex environmental problems.
Note: Cannot be taken for credit by students who have already taken ENG-SCI 264.
Prerequisite: Physical Sciences 1 or permission of the instructor.
Professor:
Karena McKinney
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• School of Engineering & Applied Sciences
Catalog Number:
4099
Subject Area:
Earth and Planetary Sciences
Engineering Sciences
Research Areas:
• Climate

Engineering Sciences 165. Water Engineering
Introduces the fundamentals of water biology, chemistry, physics and transport processes needed to understand water quality and water purification technologies. Practical instruction in basic water analyses concluding with a final water treatment project in place of exam. Prerequisite: Physical Sciences 1 or Physical Sciences 10 or equivalent and Engineering Sciences 6 or equivalent or with permission of instructor.
Professor:
Chad D. Vecitis
Professor:
Anas Chalah
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
4274
Subject Area:
Engineering Sciences
Research Areas:
• Climate
Engineering Sciences 165. Water Engineering
Introduces the fundamentals of water biology, chemistry, physics and transport processes needed to understand water quality and water purification technologies. Practical instruction in basic water analyses concluding with a final water treatment project in place of exam. Prerequisite: Physical Sciences 1 or Physical Sciences 10 or equivalent and Engineering Sciences 6 or equivalent or with permission of instructor.
Professor:
Chad D. Vecitis
Professor:
Anas Chalah
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
4274
Subject Area:
Engineering Sciences
Research Areas:
• Climate

Engineering Sciences 173. Introduction to Electronic and Photonic Devices
This course will focus on physical principles underlying semiconductor devices: electrons and holes in semiconductors , energies and bandgaps, transport properties of electrons and holes, p-n junctions, transistors, light emitting diodes, lasers, solar cells and thermoelectric devices.
Prerequisite: Physics 11a and b, or Physics 15a and b or equivalent (mechanics; electromagnetism); undergraduate level quantum mechanics highly useful, but not required.
Professor:
Evelyn Hu
Christopher Lombardo
Season:
Spring
Days:
T
Th
Time:
1:00-2:30
School:
• School of Engineering & Applied Sciences
Catalog Number:
3490
Subject Area:
Engineering Sciences
Research Areas:
• Energy
Engineering Sciences 173. Introduction to Electronic and Photonic Devices
This course will focus on physical principles underlying semiconductor devices: electrons and holes in semiconductors , energies and bandgaps, transport properties of electrons and holes, p-n junctions, transistors, light emitting diodes, lasers, solar cells and thermoelectric devices.
Prerequisite: Physics 11a and b, or Physics 15a and b or equivalent (mechanics; electromagnetism); undergraduate level quantum mechanics highly useful, but not required.
Professor:
Evelyn Hu
Christopher Lombardo
Season:
Spring
Days:
T
Th
Time:
1:00-2:30
School:
• School of Engineering & Applied Sciences
Catalog Number:
3490
Subject Area:
Engineering Sciences
Research Areas:
• Energy

Engineering Sciences 268. Chemical Kinetics
Time rate of change of chemical species in environmental systems. Measure rate constants. Linear free energy relationships and structural contributions to estimate unknown rate constants. Formulating a coupled chemical system. Numerical analysis of complex systems.
Note: Offered in alternate years.
Professor:
Scot Martin
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
8711
Subject Area:
Engineering Sciences
Research Areas:
• Energy
Engineering Sciences 268. Chemical Kinetics
Time rate of change of chemical species in environmental systems. Measure rate constants. Linear free energy relationships and structural contributions to estimate unknown rate constants. Formulating a coupled chemical system. Numerical analysis of complex systems.
Note: Offered in alternate years.
Professor:
Scot Martin
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• School of Engineering & Applied Sciences
Catalog Number:
8711
Subject Area:
Engineering Sciences
Research Areas:
• Energy
Engineering Sciences 6. Environmental Science and Technology
An introduction to the role of technology in environmental sciences with an emphasis on solving problems concerning human use and control of theenvironment, with foci on energy, technology, air & water pollution, and water quality. For each topic, the basic scientific principles underlying engineering control are emphasized. The course includes several field trips.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe or the Core area requirement for Science B.

Prerequisite: The course presumes basic knowledge in chemistry, physics, andmathematics at the high school level.
Professor:
Scot Martin
Professor:
Patrick Ulrich
Season:
Spring
Days:
T
Th
Time:
1:00-2:30
School:
• School of Engineering & Applied Sciences
Catalog Number:
2969
Subject Area:
Core
Engineering Sciences
Research Areas:
• Energy
Engineering Sciences 6. Environmental Science and Technology
An introduction to the role of technology in environmental sciences with an emphasis on solving problems concerning human use and control of theenvironment, with foci on energy, technology, air & water pollution, and water quality. For each topic, the basic scientific principles underlying engineering control are emphasized. The course includes several field trips.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe or the Core area requirement for Science B.
Prerequisite: The course presumes basic knowledge in chemistry, physics, andmathematics at the high school level.
Professor:
Scot Martin
Professor:
Patrick Ulrich
Season:
Spring
Days:
T
Th
Time:
1:00-2:30
School:
• School of Engineering & Applied Sciences
Catalog Number:
2969
Subject Area:
Core
Engineering Sciences
Research Areas:
• Energy

Environmental Science and Public Policy 11. Sustainable Development
Explores contemporary understandings and practical implications of the idea of sustainable development. Investigates the meanings and measures that different groups have given to "sustainable development;" scientific understanding of the complex social-environmental systems we seek to develop sustainably; and lessons on how societies have avoided the "tragedy of the commons" while instituting practical action that advances sustainable development effectively and equitably. Employs case studies in development to meet needs for energy, food, water and health.
Note: This course, when taken for a letter grade, meets the General Education requirement for Societies of the World. This course will be limited to 30 students.
Professor:
William C. Clark
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
79625
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 11. Sustainable Development
Explores contemporary understandings and practical implications of the idea of sustainable development. Investigates the meanings and measures that different groups have given to "sustainable development;" scientific understanding of the complex social-environmental systems we seek to develop sustainably; and lessons on how societies have avoided the "tragedy of the commons" while instituting practical action that advances sustainable development effectively and equitably. Employs case studies in development to meet needs for energy, food, water and health.
Note: This course, when taken for a letter grade, meets the General Education requirement for Societies of the World. This course will be limited to 30 students.
Professor:
William C. Clark
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
79625
Subject Area:

Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 11. Sustainable Development
Explores contemporary understandings and practical implications of the idea of sustainable development. Investigates the meanings and measures that different groups have given to "sustainable development;" scientific understanding of the complex social-environmental systems we seek to develop sustainably; and lessons on how societies have avoided the "tragedy of the commons" while instituting practical action that advances sustainable development effectively and equitably. Employs case studies in development to meet needs for energy, food, water and health.
Note: This course, when taken for a letter grade, meets the General Education requirement for Societies of the World. This course will be limited to 30 students.
Professor:
William C. Clark
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
79625
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 78. Environmental Politics
An introduction to the history, organization, goals, and ideals of environmental protection in America. Examines the shift in emphasis from nature protection to pollution control to sustainability over the 20th century and develops critical tools to analyze changing conceptions of nature and the role of science in environmental policy formulation. Of central interest is the relationship between knowledge, uncertainty, and political or legal action. Theoretical approaches are combined with case studies of major episodes and controversies in environmental protection.
Professor:
Sheila Jasanoff
Season:
Fall
Days:
M
W
F
Time:
10:00
School:
• Faculty of Arts and Sciences

Catalog Number:
3613
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 78. Environmental Politics
An introduction to the history, organization, goals, and ideals of environmental protection in America. Examines the shift in emphasis from nature protection to pollution control to sustainability over the 20th century and develops critical tools to analyze changing conceptions of nature and the role of science in environmental policy formulation. Of central interest is the relationship between knowledge, uncertainty, and political or legal action. Theoretical approaches are combined with case studies of major episodes and controversies in environmental protection.
Professor:
Sheila Jasanoff
Season:
Fall
Days:
M
W
F
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
3613
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 78. Environmental Politics
An introduction to the history, organization, goals, and ideals of environmental protection in America. Examines the shift in emphasis from nature protection to pollution control to sustainability over the 20th century and develops critical tools to analyze changing conceptions of nature and the role of science in environmental policy formulation. Of central interest is the relationship between knowledge, uncertainty, and political or legal action. Theoretical approaches are combined with case studies of major episodes and controversies in environmental protection.
Professor:
Sheila Jasanoff
Season:
Fall
Days:
M
W
F
Time:
10:00

School:
• Faculty of Arts and Sciences
Catalog Number:
3613
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 90v. Economic Evaluation of Environmental Regulation
What level of environmental protection is best? Stronger regulations provide greater protection against the target harm, but generally at the cost of reduced economic consumption or increases in other environmental harms. What principles can be used to determine the 'right' level of protection, and how can regulations be evaluated? This course provides an introduction to environmental risk assessment and benefit-cost analysis of environmental regulation, incorporating theory and case studies.
Professor:
James K. Hammitt
Season:
Fall
Days:
T
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
74118
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 90v. Economic Evaluation of Environmental Regulation
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Professor:
James K. Hammitt
Season:
Fall
Days:
T
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
74118

Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 90v. Economic Evaluation of Environmental Regulation
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Professor:
James K. Hammitt
Season:
Fall
Days:
T
Time:
2:30-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
74118
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
• Social Sciences
Environmental Science and Public Policy 90x. Current Issues in U.S. Environmental Law
This course examines some of the main U.S. environmental laws, the methods of regulation and enforcement represented by those laws, and current controversies regarding their implementation and development. Each week's class will be divided between a discussion of key cases and regulations implementing a particular law and an in-depth examination of a case study involving the law under examination.
Professor:
Shaun Goho
Season:
Fall
Days:
W
Time:
6:30-9:00
School:
• Faculty of Arts and Sciences
Catalog Number:
82042
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
Environmental Science and Public Policy 90x. Current Issues in U.S. Environmental Law

This course examines some of the main U.S. environmental laws, the methods of regulation and enforcement represented by those laws, and current controversies regarding their implementation and development. Each week's class will be divided between a discussion of key cases and regulations implementing a particular law and an in-depth examination of a case study involving the law under examination.
Professor:
Shaun Goho
Season:
Fall
Days:
W
Time:
6:30-9:00
School:
• Faculty of Arts and Sciences
Catalog Number:
82042
Subject Area:
Environmental Science and Public Policy
Research Areas:
• Business, Law and Policy
ENVR E-101: Environmental Management I
This course surveys the scientific principles of environmental issues and environmental management practices, with attention to the health of both humans and the ecosystem. Fundamental and emerging topics related to air and water pollution, water use and management, aquatic ecosystems, energy and climate change, biodiversity, toxic substances in the environment, solid waste management, and regulatory strategies for risk assessment and environmental management are examined. A local aquatic field trip is planned on a weekend in the fall with alternatives provided for distance students. Other optional site visits are scheduled throughout the semester. Prerequisites: High school biology and chemistry.
Professor:
John Spengler
Joseph Allen
Professor:
G. Buckley
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
11925
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Human Health
ENVR E-101: Environmental Management I
This course surveys the scientific principles of environmental issues and environmental management practices, with attention to the health of both humans and the ecosystem. Fundamental and emerging topics related to air and water pollution, water use and

management, aquatic ecosystems, energy and climate change, biodiversity, toxic substances in the environment, solid waste management, and regulatory strategies for risk assessment and environmental management are examined. A local aquatic field trip is planned on a weekend in the fall with alternatives provided for distance students. Other optional site visits are scheduled throughout the semester. Prerequisites: High school biology and chemistry.
Professor:
John Spengler
Joseph Allen
Professor:
G. Buckley
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
11925
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Human Health
ENVR E-101: Environmental Management I
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Professor:
John Spengler
Joseph Allen
Professor:
G. Buckley
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
11925
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity

• Human Health
ENVR E-101: Environmental Management I
This course surveys the scientific principles of environmental issues and environmental management practices, with attention to the health of both humans and the ecosystem. Fundamental and emerging topics related to air and water pollution, water use and management, aquatic ecosystems, energy and climate change, biodiversity, toxic substances in the environment, solid waste management, and regulatory strategies for risk assessment and environmental management are examined. A local aquatic field trip is planned on a weekend in the fall with alternatives provided for distance students. Other optional site visits are scheduled throughout the semester.
Prerequisites: High school biology and chemistry.
Professor:
John Spengler
Joseph Allen
Professor:
G. Buckley
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
11925
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Human Health
ENVR E-102: Energy and the Environment
This course examines the relationship between energy and the environment in our global society. It analyzes the driving forces that influence the production and consumption of energy to evaluate their impacts on environmental quality, human health, and social equity. At the end of this course students are able to understand and assess the pros and cons of conventional and renewable energy systems, issues surrounding new transportation technologies, energy intensity of food production, effects of supply chain management and international commerce in energy security, energy management in buildings, and the mechanisms needed to evolve into sustainable energy operations in the green economy for the twenty-first century. Topics include natural gas, fracking, the concept of clean coal, carbon sequestration and storage projects, the rise of solar and wind power, biofuels production, hybrid and electric vehicles, sustainable transportation technologies, green buildings, and energy used in organic farming.
Prerequisites: High school biology and chemistry.
Professor:
Petros Koutrakis
Ramon Sanchez
Zachary D. Zevitas
Season:
Spring
Days:
T
Time:
5:30-7:30
School:

• Harvard Extension School
Catalog Number:
21783
Research Areas:
• Business, Law and Policy
• Energy
ENVR E-102: Energy and the Environment
This course examines the relationship between energy and the environment in our global society. It analyzes the driving forces that influence the production and consumption of energy to evaluate their impacts on environmental quality, human health, and social equity. At the end of this course students are able to understand and assess the pros and cons of conventional and renewable energy systems, issues surrounding new transportation technologies, energy intensity of food production, effects of supply chain management and international commerce in energy security, energy management in buildings, and the mechanisms needed to evolve into sustainable energy operations in the green economy for the twenty-first century. Topics include natural gas, fracking, the concept of clean coal, carbon sequestration and storage projects, the rise of solar and wind power, biofuels production, hybrid and electric vehicles, sustainable transportation technologies, green buildings, and energy used in organic farming.
Prerequisites: High school biology and chemistry.
Professor:
Petros Koutrakis
Ramon Sanchez
Zachary D. Zevitas
Season:
Spring
Days:
T
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
21783
Research Areas:
• Business, Law and Policy
• Energy
ENVR E-102: Energy and the Environment
This course examines the relationship between energy and the environment in our global society. It analyzes the driving forces that influence the production and consumption of energy to evaluate their impacts on environmental quality, human health, and social equity. At the end of this course students are able to understand and assess the pros and cons of conventional and renewable energy systems, issues surrounding new transportation technologies, energy intensity of food production, effects of supply chain management and international commerce in energy security, energy management in buildings, and the mechanisms needed to evolve into sustainable energy operations in the green economy for the twenty-first century. Topics include natural gas, fracking, the concept of clean coal, carbon sequestration and storage projects, the rise of solar and wind power, biofuels production, hybrid and electric vehicles, sustainable transportation technologies, green buildings, and energy used in organic farming.
Prerequisites: High school biology and chemistry.
Professor:
Petros Koutrakis
Ramon Sanchez
Zachary D. Zevitas
Season:

Spring
Days:
T
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
21783
Research Areas:
• Business, Law and Policy
• Energy
ENVR E-105: Strategies for Sustainability Management
The concept of sustainability is discussed along with how it is managed at the nexus of a local business, the local government, and the citizens in the community. Sustainability includes consideration of environmental stewardship, social well being, and economic prosperity. The course explores the use of management systems and performance frameworks to make sustainability part of what every person in any organization does every day. Cases are used to reinforce the concepts and develop the skills to enable students to use the knowledge imparted in the course.
Professor:
Robert Pojasek
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
21808
Research Areas:
• Business, Law and Policy
ENVR E-105: Strategies for Sustainability Management
The concept of sustainability is discussed along with how it is managed at the nexus of a local business, the local government, and the citizens in the community. Sustainability includes consideration of environmental stewardship, social well being, and economic prosperity. The course explores the use of management systems and performance frameworks to make sustainability part of what every person in any organization does every day. Cases are used to reinforce the concepts and develop the skills to enable students to use the knowledge imparted in the course.
Professor:
Robert Pojasek
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School

Catalog Number:
21808
Research Areas:
• Business, Law and Policy
ENVR E-110: Sustainable Ocean Environments
This course provides students with a "window to the underwater world" while taking them on a virtual tour of the world's oceans and their environments. Topics include coral reef ecology, marshes and bays, the open ocean, the deep sea, aquaculture, ocean research at sea, marine fouling organisms, ocean pollution, sustainability and management of oceanic resources, and a special presentation on seashells of the world. Students have the opportunity to participate in local ocean conferences and field trips to the New England Aquarium and Cape Cod National Seashore. Distance students can participate virtually or conduct independent local field trips.
Professor:
George Buckley
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
21784
Research Areas:
• Ecology and Biodiversity
ENVR E-110: Sustainable Ocean Environments
This course provides students with a "window to the underwater world" while taking them on a virtual tour of the world's oceans and their environments. Topics include coral reef ecology, marshes and bays, the open ocean, the deep sea, aquaculture, ocean research at sea, marine fouling organisms, ocean pollution, sustainability and management of oceanic resources, and a special presentation on seashells of the world. Students have the opportunity to participate in local ocean conferences and field trips to the New England Aquarium and Cape Cod National Seashore. Distance students can participate virtually or conduct independent local field trips.
Professor:
George Buckley
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
21784
Research Areas:
• Ecology and Biodiversity
ENVR E-116: Measure, Report, Reduce: Practice Methods for Implementing Greenhouse Gas Reduction
A new field of greenhouse gas emissions management has emerged, which specializes in helping institutions and corporations identify and mitigate their contributions to climate change. This course reviews the tools and strategies necessary to set and achieve a carbon reduction goal.

Professor:
Richard Goode
Marlon Banta
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23508
Research Areas:
• Business, Law and Policy
• Climate
• Energy
ENVR E-116: Measure, Report, Reduce: Practice Methods for Implementing Greenhouse Gas Reduction
A new field of greenhouse gas emissions management has emerged, which specializes in helping institutions and corporations identify and mitigate their contributions to climate change. This course reviews the tools and strategies necessary to set and achieve a carbon reduction goal.
Professor:
Richard Goode
Marlon Banta
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23508
Research Areas:
• Business, Law and Policy
• Climate
• Energy
ENVR E-116: Measure, Report, Reduce: Practice Methods for Implementing Greenhouse Gas Reduction
A new field of greenhouse gas emissions management has emerged, which specializes in helping institutions and corporations identify and mitigate their contributions to climate change. This course reviews the tools and strategies necessary to set and achieve a carbon reduction goal.
Professor:
Richard Goode
Marlon Banta
Season:
Spring
Days:

M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23508
Research Areas:
• Business, Law and Policy
• Climate
• Energy
ENVR E-116: Measure, Report, Reduce: Practice Methods for Implementing Greenhouse Gas Reduction
A new field of greenhouse gas emissions management has emerged, which specializes in helping institutions and corporations identify and mitigate their contributions to climate change. This course reviews the tools and strategies necessary to set and achieve a carbon reduction goal.
Professor:
Richard Goode
Marlon Banta
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23508
Research Areas:
• Business, Law and Policy
• Climate
• Energy
ENVR E-117: Hybrid: Catalyzing Change: Sustainability Leadership for the Twenty-First Century
We need an army of skilled change managers to navigate the complexity and urgency of our global environmental crisis. To inspire and enable people of all persuasions to engage in effective sustainability leadership, as part of an existing or new career path, this course enhances individual change agency skills as applied to a variety of organizational contexts (education, business, government, nonprofit, church, community). It explores what leadership for sustainability is, including the competencies, skills, knowledge, and strategies needed. The personal, organizational, and technical dimensions of effective change management are addressed. A variety of case studies and examples of sustainability in practice, including green building design, renewable energy, and environmental purchasing are explored. Harvard University is one of the primary case studies.
Professor:
John Spengler
Professor:
Leith Sharp
Season:
Fall
Days:
Th

Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13543
Research Areas:
• Business, Law and Policy
ENVR E-117: Hybrid: Catalyzing Change: Sustainability Leadership for the Twenty-First Century
We need an army of skilled change managers to navigate the complexity and urgency of our global environmental crisis. To inspire and enable people of all persuasions to engage in effective sustainability leadership, as part of an existing or new career path, this course enhances individual change agency skills as applied to a variety of organizational contexts (education, business, government, nonprofit, church, community). It explores what leadership for sustainability is, including the competencies, skills, knowledge, and strategies needed. The personal, organizational, and technical dimensions of effective change management are addressed. A variety of case studies and examples of sustainability in practice, including green building design, renewable energy, and environmental purchasing are explored. Harvard University is one of the primary case studies.
Professor:
John Spengler
Professor:
Leith Sharp
Season:
Fall
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13543
Research Areas:
• Business, Law and Policy
ENVR E-118: Environmental Management of International Tourism Development
This course lays out specific methodologies for managing tourism sustainably worldwide. The industry's business and supply chain models preface questions of management of air, water, waste water, and solid waste for hotels, tour operations, airlines, and cruise lines. Industry leaders make guest presentations to the class. Sustainable destination planning techniques are reviewed.
Professor:
Megan Epler Wood
Season:
Fall
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13556

Research Areas:
• Business, Law and Policy
ENVR E-118: Environmental Management of International Tourism Development
This course lays out specific methodologies for managing tourism sustainably worldwide. The industry's business and supply chain models preface questions of management of air, water, waste water, and solid waste for hotels, tour operations, airlines, and cruise lines. Industry leaders make guest presentations to the class. Sustainable destination planning techniques are reviewed.
Professor:
Megan Epler Wood
Season:
Fall
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13556
Research Areas:
• Business, Law and Policy
ENVR E-119: Introduction to Sustainable Buildings: Design and Construction
This is an introductory course that provides content focused on the design and construction of sustainable buildings. Students understand the overall sustainable design and construction process, including the use of the Leadership in Energy and Environmental Design (LEED) rating system. Students are prepared to take the LEED for Green Associate exam for LEED GA accreditation after completing this class. Topics include an overview of green building design and construction process; the LEED-NC rating system; integrated design and setting goals (charette); financial incentives and making the case for green buildings; a high-level overview of how buildings work; key considerations and strategies by building type for site/landscape, water, and materials; energy reduction opportunities by building type, including passive design; human wellbeing; construction best practices; construction waste plans; indoor air quality plans during construction; measurement and verification plans; commissioning; and knowledge management.
Professor:
John Spengler
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24265
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
• Energy
ENVR E-119: Introduction to Sustainable Buildings: Design and Construction
This is an introductory course that provides content focused on the design and construction of sustainable buildings. Students understand the overall sustainable design and construction process, including the use of the Leadership in Energy and Environmental Design (LEED)

rating system. Students are prepared to take the LEED for Green Associate exam for LEED GA accreditation after completing this class. Topics include an overview of green building design and construction process; the LEED-NC rating system; integrated design and setting goals (charette); financial incentives and making the case for green buildings; a high-level overview of how buildings work; key considerations and strategies by building type for site/landscape, water, and materials; energy reduction opportunities by building type, including passive design; human wellbeing; construction best practices; construction waste plans; indoor air quality plans during construction; measurement and verification plans; commissioning; and knowledge management.
Professor:
John Spengler
Season:
Spring
Days:
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Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24265
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
• Energy
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Professor:
John Spengler
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School:
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Professor:
John Spengler
Season:
Spring
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24265
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
• Energy
ENVR E-120: Environmental Ethics and Land Management
This course examines the ethical dilemmas faced by human cultures throughout history in their use of land and natural resources. Topics include the environmental ethics of game and wildlife management, natural resource use, water management, biological diversity, fisheries, ocean protection, and agricultural production. Emphasis is given to the different perceptions of the environment and the different strategies that cultures have employed to resolve ethical disputes over land management and resource use. The tensions between urban, suburban, agricultural, ranching, and mining communities over the management of federal land, water projects, national wildlife areas, national forests, and national parks receive particular emphasis. Special attention is devoted to the problem of suburban sprawl.
Professor:
Timothy Weiskel
Season:
Fall
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
11926
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
ENVR E-120: Environmental Ethics and Land Management
This course examines the ethical dilemmas faced by human cultures throughout history in their use of land and natural resources. Topics

include the environmental ethics of game and wildlife management, natural resource use, water management, biological diversity, fisheries, ocean protection, and agricultural production. Emphasis is given to the different perceptions of the environment and the different strategies that cultures have employed to resolve ethical disputes over land management and resource use. The tensions between urban, suburban, agricultural, ranching, and mining communities over the management of federal land, water projects, national wildlife areas, national forests, and national parks receive particular emphasis. Special attention is devoted to the problem of suburban sprawl.
Professor:
Timothy Weiskel
Season:
Fall
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
11926
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
ENVR E-120: Environmental Ethics and Land Management
This course examines the ethical dilemmas faced by human cultures throughout history in their use of land and natural resources. Topics include the environmental ethics of game and wildlife management, natural resource use, water management, biological diversity, fisheries, ocean protection, and agricultural production. Emphasis is given to the different perceptions of the environment and the different strategies that cultures have employed to resolve ethical disputes over land management and resource use. The tensions between urban, suburban, agricultural, ranching, and mining communities over the management of federal land, water projects, national wildlife areas, national forests, and national parks receive particular emphasis. Special attention is devoted to the problem of suburban sprawl.
Professor:
Timothy Weiskel
Season:
Fall
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
11926
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
ENVR E-129: From Farm to Fork: Why What You Eat Matters
Our day-to-day decisions surrounding the consumption of food can have important personal, local, and global consequences. In this course, we examine why what you eat matters through various lenses including nutrition, human health, environmental degradation, occupational health, sustainability, and climate change. Using an interdisciplinary framework, we explore the development of our modern food production and distribution system and how it affects our health, environment, and planet. The course covers such topics as food production systems, major food and nutrition problems, and sustainable solutions for health from local and global perspectives. The

course highlights recent research and trends while challenging students to think through their own personal food choices and how they have an impact on health and society. A major goal of the course is to expose individuals to cutting-edge scientific research on food-based topics, farm to fork, and help course participants identify accurate sources of information and develop tools for guiding everyday food choices.
Professor:
Gary Adamkiewicz
Professor:
P.K Newby
Season:
Fall
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13744
Research Areas:
• Climate
• Ecology and Biodiversity
• Human Health
ENVR E-129: From Farm to Fork: Why What You Eat Matters
Our day-to-day decisions surrounding the consumption of food can have important personal, local, and global consequences. In this course, we examine why what you eat matters through various lenses including nutrition, human health, environmental degradation, occupational health, sustainability, and climate change. Using an interdisciplinary framework, we explore the development of our modern food production and distribution system and how it affects our health, environment, and planet. The course covers such topics as food production systems, major food and nutrition problems, and sustainable solutions for health from local and global perspectives. The course highlights recent research and trends while challenging students to think through their own personal food choices and how they have an impact on health and society. A major goal of the course is to expose individuals to cutting-edge scientific research on food-based topics, farm to fork, and help course participants identify accurate sources of information and develop tools for guiding everyday food choices.
Professor:
Gary Adamkiewicz
Professor:
P.K Newby
Season:
Fall
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13744
Research Areas:
• Climate

• Ecology and Biodiversity
• Human Health
ENVR E-129: From Farm to Fork: Why What You Eat Matters
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Professor:
Gary Adamkiewicz
Professor:
P.K Newby
Season:
Fall
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W
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• Climate
• Ecology and Biodiversity
• Human Health
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Professor:
Gary Adamkiewicz
Professor:
P.K Newby
Season:
Fall
Days:
W

Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13744
Research Areas:
• Climate
• Ecology and Biodiversity
• Human Health
ENVR E-130: Global Climate Change: The Science, Social Impact, and Diplomacy of a World Environmental Crisis
This course introduces students to the science of climate change, drawing attention to the latest research and evolving pattern of scientific data on climate that has emerged in recent years. In addition, emphasis is given to analyzing the social changes and adaptations that human communities have already made and those they will most likely have to make as the Earth's climate continues to change in the coming years. Special attention is given to the diplomatic efforts that have been launched since the creation of the Framework Convention on Climate Change (FCCC) in 1992.
Professor:
Timonthy Weiskel
William Moomaw
Season:
Spring
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
22039
Research Areas:
• Business, Law and Policy
• Climate
• Social Sciences
ENVR E-130: Global Climate Change: The Science, Social Impact, and Diplomacy of a World Environmental Crisis
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Professor:
Timonthy Weiskel
William Moomaw
Season:
Spring
Days:
W
Time:
5:30-7:30

School:
• Harvard Extension School
Catalog Number:
22039
Research Areas:
• Business, Law and Policy
• Climate
• Social Sciences
ENVR E-130: Global Climate Change: The Science, Social Impact, and Diplomacy of a World Environmental Crisis
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Professor:
Timonthy Weiskel
William Moomaw
Season:
Spring
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
22039
Research Areas:
• Business, Law and Policy
• Climate
• Social Sciences
ENVR E-130: Global Climate Change: The Science, Social Impact, and Diplomacy of a World Environmental Crisis
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Professor:
Timonthy Weiskel
William Moomaw
Season:
Spring
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School

Catalog Number:
22039
Research Areas:
• Business, Law and Policy
• Climate
• Social Sciences
ENVR E-135: Corporate Sustainability Strategy
This course explores corporate sustainability from the perspective of large, multinational corporations. We focus on the management tools available to corporations and how they can drive sustainability into a company at all levels, providing a balance between environmental stewardship, social well-being, and economic prosperity. We explore how to prioritize various actions through stakeholder engagement, how to prepare and analyze a sustainability report, and we examine the perspective of the investment community and important governance issues. By focusing on the beverage industry as a case example we explore social concerns such as obesity and alcohol responsibility, and environmental concerns including water and raw materials in developing countries.
Professor:
Suzanne Farver
Matthew Gardner
Season:
Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13555
Research Areas:
• Business, Law and Policy
ENVR E-135: Corporate Sustainability Strategy
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Professor:
Suzanne Farver
Matthew Gardner
Season:
Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13555

Research Areas:
• Business, Law and Policy
ENVR E-137: Sustainable Manufacturing and Supply Chain Management Operations
This course provides a set of tools and skills to identify, evaluate, and improve the sustainability of supply chain operations. It enables students to understand core concepts of industrial and commercial activities so that they are able to design sustainable manufacturing and service operations. Students learn to define green warehousing and distribution activities, plan retrofits and capital investments in current and future productive operations to save energy, select green materials for new products, manage efficient new product introductions by designing sustainable factory operations, and learn how to use continuous improvement techniques and value stream mapping to reduce waste and environmental impacts while reducing costs.
Professor:
Ramon Sanchez
Season:
Fall
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14010
Research Areas:
• Business, Law and Policy
ENVR E-137: Sustainable Manufacturing and Supply Chain Management Operations
This course provides a set of tools and skills to identify, evaluate, and improve the sustainability of supply chain operations. It enables students to understand core concepts of industrial and commercial activities so that they are able to design sustainable manufacturing and service operations. Students learn to define green warehousing and distribution activities, plan retrofits and capital investments in current and future productive operations to save energy, select green materials for new products, manage efficient new product introductions by designing sustainable factory operations, and learn how to use continuous improvement techniques and value stream mapping to reduce waste and environmental impacts while reducing costs.
Professor:
Ramon Sanchez
Season:
Fall
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14010
Research Areas:
• Business, Law and Policy
ENVR E-138: Sustainable Finance and Investments
Financial decisions worldwide are increasingly influenced by the scarcity of resources, the search for profits through efficiency, and climate change. The Dow Jones has a sustainability index and the search for profitability through efficiency has transcended trend, becoming the new corporate norm. This course studies finance and sustainability as integrated subjects beginning with an introduction of

financial and investment principles and moving through financial analysis, financing, and valuation. The course covers diverse aspects of sustainable investments and offers tools for effective financial valuation and risk assessment.
Professor:
Carlos Alberto Vargas
Season:
Spring
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14266
Research Areas:
• Business, Law and Policy
ENVR E-138: Sustainable Finance and Investments
Financial decisions worldwide are increasingly influenced by the scarcity of resources, the search for profits through efficiency, and climate change. The Dow Jones has a sustainability index and the search for profitability through efficiency has transcended trend, becoming the new corporate norm. This course studies finance and sustainability as integrated subjects beginning with an introduction of financial and investment principles and moving through financial analysis, financing, and valuation. The course covers diverse aspects of sustainable investments and offers tools for effective financial valuation and risk assessment.
Professor:
Carlos Alberto Vargas
Season:
Spring
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14266
Research Areas:
• Business, Law and Policy
ENVR E-139: Natural Disasters in a Global Environment
This course is a transnational, global, and environmental history of natural and man-made disasters. Detailed case studies of past and present events are presented in a historical narrative, making use of the most recent scholarship. The course examines a range of disasters including volcanoes, earthquakes, floods, tsunami, fire, landslides, hurricanes, famines, pandemic diseases, meteorite impacts, and hurricanes. The lectures highlight the role of science in studying natural disasters and describe the mechanisms responsible for them, using a range of case studies. This course traces the transition of our understanding of disasters from religious and superstitious explanations to contemporary scientific accounts.
Professor:
Jennifer Cole
Season:
Spring
Days:

T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
E-139
Research Areas:
• Climate
• Social Sciences
ENVR E-139: Natural Disasters in a Global Environment
This course is a transnational, global, and environmental history of natural and man-made disasters. Detailed case studies of past and present events are presented in a historical narrative, making use of the most recent scholarship. The course examines a range of disasters including volcanoes, earthquakes, floods, tsunami, fire, landslides, hurricanes, famines, pandemic diseases, meteorite impacts, and hurricanes. The lectures highlight the role of science in studying natural disasters and describe the mechanisms responsible for them, using a range of case studies. This course traces the transition of our understanding of disasters from religious and superstitious explanations to contemporary scientific accounts.
Professor:
Jennifer Cole
Season:
Spring
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
E-139
Research Areas:
• Climate
• Social Sciences
ENVR E-139: Natural Disasters in a Global Environment
This course is a transnational, global, and environmental history of natural and man-made disasters. Detailed case studies of past and present events are presented in a historical narrative, making use of the most recent scholarship. The course examines a range of disasters including volcanoes, earthquakes, floods, tsunami, fire, landslides, hurricanes, famines, pandemic diseases, meteorite impacts, and hurricanes. The lectures highlight the role of science in studying natural disasters and describe the mechanisms responsible for them, using a range of case studies. This course traces the transition of our understanding of disasters from religious and superstitious explanations to contemporary scientific accounts.
Professor:
Jennifer Cole
Season:
Spring
Days:
T
Time:
7:40-9:40
School:

• Harvard Extension School
Catalog Number:
E-139
Research Areas:
• Climate
• Social Sciences
ENVR E-140: Fundamentals of Ecology
This course introduces basic concepts in the ecology of individual organisms, their populations, and the biological communities in which they live. Emphasis is on terrestrial plant and animal ecology. The historical, evolutionary, and ecological processes determining the distribution of ecosystems, habitats, and species are introduced. Evolutionary processes responsible for the adaptations of individuals are examined to understand the diversity of species and their features. Theories of competition, predation, disease, and mutualism help explain the functioning of biological communities. These fundamentals establish a basis for examining the challenges imposed by humans on the functioning of natural ecosystems. The sustainable harvesting and use of natural resources, the implications of human population growth and size, and the transformation of natural communities through human activities and policies are examined in this ecological context. The course features a weekend field trip and other activities.
Professor:
Mark Leighton
Season:
Fall
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
12779
Research Areas:
• Ecology and Biodiversity
ENVR E-140: Fundamentals of Ecology
This course introduces basic concepts in the ecology of individual organisms, their populations, and the biological communities in which they live. Emphasis is on terrestrial plant and animal ecology. The historical, evolutionary, and ecological processes determining the distribution of ecosystems, habitats, and species are introduced. Evolutionary processes responsible for the adaptations of individuals are examined to understand the diversity of species and their features. Theories of competition, predation, disease, and mutualism help explain the functioning of biological communities. These fundamentals establish a basis for examining the challenges imposed by humans on the functioning of natural ecosystems. The sustainable harvesting and use of natural resources, the implications of human population growth and size, and the transformation of natural communities through human activities and policies are examined in this ecological context. The course features a weekend field trip and other activities.
Professor:
Mark Leighton
Season:
Fall
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School

Catalog Number:
12779
Research Areas:
• Ecology and Biodiversity
ENVR E-143: Sustainability Challenges for Rural Landscapes—Evaluating American versus European Practices and Policies from Tuscany
This course explores historical and current practices and policies that could function to promote sustainable human and natural landscapes. It consists of weekly lectures and discussions during the semester that contrast American versus European approaches to sustaining rural landscapes of mixed land uses, including agriculture, forestry, other natural resource use, conservation, and tourism. The course focuses on sustainability issues common in rural landscapes, focusing on comparisons between New England and Europe. In both these regions, ecological and economic sustainability challenges in the rural landscape include the production of local food and wood products for niche markets, managing watersheds, conserving biodiversity, and other environmental services, such as carbon sequestration, and diversifying income streams with ecotourism. Optimizing this mix of functions while minimizing greenhouse gas emissions, other forms of pollution, and energy consumption addresses sustainability goals.

The centerpiece of the course is an intensive—and mandatory—twelve-day learning experience, April 26-May 9, in residence at Spannocchia, an historical Tuscan estate property near Siena. The educational mission of the Spannocchia Foundation is to promote sustainability in organic agriculture and animal husbandry, forestry, biodiversity conservation, ecotourism, and energy and waste management practices. Students work in small teams, conducting fieldwork on the 1,200 acres of the estate, evaluating models for these practices from ecological, economic, and policy perspectives, and debating creative ideas for sustainability futures in this inspirational setting with local experts. These field exercises and discussions at Spannocchia may be augmented with a day trip to other sustainability sites in Tuscany and an excursion on the weekend to nearby Siena. Students should not have other work or study commitments during this period.

The course involves some hiking and fieldwork on many days over uneven ground; because these are critical course activities, students must be physically able to participate. Although mild, sunny spring weather is common, unusually cold and rainy or hot days can occur, not unlike New England. Rooms in the Villa and Fattoria, where students stay, rely on passive heating and cooling, without air conditioning. This combination of indoor and outdoor conditions (for example, pollen and mold) may prove difficult for students with allergies. View the Spannocchia website for photos and descriptions of accommodations, programs, and the estate property. Students with documented disabilities should contact the disabilities services coordinator no later than two weeks before the course begins.

Costs: in addition to the course tuition, students are responsible for:
• 920 Euros (approximately $1,300 at the current exchange rate) paid to Spannocchia by November 15. This includes room and board, April 26-May 9.
• US health insurance that provides coverage outside the United States.
• Transportation to Florence and from Siena.
• The cost of passports and visas (if the latter is needed).
A bus will transport students from the Florence airport to Spannocchia on April 26 and from Spannocchia to Siena on May 9. (8 credits)
Prerequisite(s): Harvard Summer School course ENVR S-142/W, ENVR E-151, ENVR E-210, other relevant environmental courses, or permission of instructor. Familiarity with Excel spreadsheets and modeling skills such as cost-benefit analysis, life cycle analysis, ArcGIS, and energy or carbon auditing. Preference given to candidates in the Master of Liberal Arts in sustainability and environmental management program. Students must be 18 years old. Admission is based on an application, to Dr. Mark Leighton, due October 1. Applications are available September 15.
Professor:
Mark Leighton
Season:
Spring
Days:
T

Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24236
Research Areas:
• Architecture and Environmental Design
ENVR E-143: Sustainability Challenges for Rural Landscapes—Evaluating American versus European Practices and Policies from Tuscany
This course explores historical and current practices and policies that could function to promote sustainable human and natural landscapes. It consists of weekly lectures and discussions during the semester that contrast American versus European approaches to sustaining rural landscapes of mixed land uses, including agriculture, forestry, other natural resource use, conservation, and tourism. The course focuses on sustainability issues common in rural landscapes, focusing on comparisons between New England and Europe. In both these regions, ecological and economic sustainability challenges in the rural landscape include the production of local food and wood products for niche markets, managing watersheds, conserving biodiversity, and other environmental services, such as carbon sequestration, and diversifying income streams with ecotourism. Optimizing this mix of functions while minimizing greenhouse gas emissions, other forms of pollution, and energy consumption addresses sustainability goals.

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Professor:
Mark Leighton

Season:
Spring
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24236
Research Areas:
• Architecture and Environmental Design
ENVR E-147: International Environmental Governance, Policy, and Social Justice
This course examines both the policy decisions and social justice issues that drive human actions and responses to environmental challenges. We begin by exploring three foundational topics: environmental governance, the global commons, and natural resource valuation. Core concepts from these sessions will continue to arise as we progress into classes focused on particular sectors of environmental policy, such as climate change, sustainable development, energy, and conservation. Upon completion of the course, students are prepared to engage with issues from a wide range of environmental policy areas that touch upon a number of social justice dilemmas, and have further developed analysis, rhetoric, written expression, and negotiation skills that are essential to environmental policy and advocacy careers.
Professor:
Andrew Tirrell
Season:
Fall
Days:
T
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14553
Research Areas:
• Business, Law and Policy
ENVR E-147: International Environmental Governance, Policy, and Social Justice
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Professor:
Andrew Tirrell
Season:
Fall
Days:
T

Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14553
Research Areas:
• Business, Law and Policy
ENVR E-151: Life Cycle and Supply Chain Sustainability Assessment
The field of industrial ecology includes advanced tools and methods to assist practitioners seeking to redesign and realign industrial systems and activities to be more ecologically and socially sound. Central within the field of industrial ecology is life cycle assessment (LCA), which involves systems analysis of the full range of environmental impacts, product life cycles, and supply chains. More recently, social impacts are also being addressed in life cycles and supply chains, leading to the definition of life cycle sustainability assessment. This course enables participants to develop a hands-on, in-depth understanding of the frameworks, principles, tools, and applications of life cycle assessment. As part of the course, students learn to use and apply professional software tools and databases that address both social and environmental impacts in global supply chains. We also review the state of life cycle practice and current initiatives involving companies, governments, and NGOs. We ground the entire course on the goal of making human activities, from the personal to the global, truly sustainable.
Prerequisites: College math and biology.
Professor:
Gregory Norris
Season:
Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13749
Research Areas:
• Business, Law and Policy
• Social Sciences
ENVR E-151: Life Cycle and Supply Chain Sustainability Assessment
The field of industrial ecology includes advanced tools and methods to assist practitioners seeking to redesign and realign industrial systems and activities to be more ecologically and socially sound. Central within the field of industrial ecology is life cycle assessment (LCA), which involves systems analysis of the full range of environmental impacts, product life cycles, and supply chains. More recently, social impacts are also being addressed in life cycles and supply chains, leading to the definition of life cycle sustainability assessment. This course enables participants to develop a hands-on, in-depth understanding of the frameworks, principles, tools, and applications of life cycle assessment. As part of the course, students learn to use and apply professional software tools and databases that address both social and environmental impacts in global supply chains. We also review the state of life cycle practice and current initiatives involving companies, governments, and NGOs. We ground the entire course on the goal of making human activities, from the personal to the global, truly sustainable.
Prerequisites: College math and biology.
Professor:
Gregory Norris
Season:

Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13749
Research Areas:
• Business, Law and Policy
• Social Sciences
ENVR E-151: Life Cycle and Supply Chain Sustainability Assessment
The field of industrial ecology includes advanced tools and methods to assist practitioners seeking to redesign and realign industrial systems and activities to be more ecologically and socially sound. Central within the field of industrial ecology is life cycle assessment (LCA), which involves systems analysis of the full range of environmental impacts, product life cycles, and supply chains. More recently, social impacts are also being addressed in life cycles and supply chains, leading to the definition of life cycle sustainability assessment. This course enables participants to develop a hands-on, in-depth understanding of the frameworks, principles, tools, and applications of life cycle assessment. As part of the course, students learn to use and apply professional software tools and databases that address both social and environmental impacts in global supply chains. We also review the state of life cycle practice and current initiatives involving companies, governments, and NGOs. We ground the entire course on the goal of making human activities, from the personal to the global, truly sustainable.
Prerequisites: College math and biology.
Professor:
Gregory Norris
Season:
Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13749
Research Areas:
• Business, Law and Policy
• Social Sciences
ENVR E-154: Sustainable Product Design and the Innovation Ecosystem
This course is for anyone who would like to learn how to design and launch a new product with the lowest environmental footprint. Students acquire many tools and skills in the course: how to do market intelligence (technological benchmarking and reverse engineering), how to incorporate real sustainability into new products (and identify green washing), how to use structured tools to enhance creativity and innovation to conceive and develop new products, how to design and implement a new product introduction process, how to do and implement the design of experiments to select the most robust features for products, how to write and submit a patent application to decrease legal costs, how to protect copyrights and trademarks, how to fund intellectual property by using funds from business incubators and accelerators, how to select the right materials and processes to minimize the product's environmental impacts (using green chemistry principles, sustainable sourcing of components, and sustainable certification for raw materials to promote conservation), how to reduce energy use by new products, how to build and test prototypes in an inexpensive way, and how to reduce the

environmental impacts of packaging and transportation. Students also learn the basic components of an innovation ecosystem and how high technology hubs (Silicon Valley, Boston, New York) work.
Prerequisite(s): basic math at a high school level.
Professor:
Ramon Sanchez
Season:
Fall
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14518
Research Areas:
• Architecture and Environmental Design
ENVR E-154: Sustainable Product Design and the Innovation Ecosystem
This course is for anyone who would like to learn how to design and launch a new product with the lowest environmental footprint. Students acquire many tools and skills in the course: how to do market intelligence (technological benchmarking and reverse engineering), how to incorporate real sustainability into new products (and identify green washing), how to use structured tools to enhance creativity and innovation to conceive and develop new products, how to design and implement a new product introduction process, how to do and implement the design of experiments to select the most robust features for products, how to write and submit a patent application to decrease legal costs, how to protect copyrights and trademarks, how to fund intellectual property by using funds from business incubators and accelerators, how to select the right materials and processes to minimize the product's environmental impacts (using green chemistry principles, sustainable sourcing of components, and sustainable certification for raw materials to promote conservation), how to reduce energy use by new products, how to build and test prototypes in an inexpensive way, and how to reduce the environmental impacts of packaging and transportation. Students also learn the basic components of an innovation ecosystem and how high technology hubs (Silicon Valley, Boston, New York) work.
Prerequisite(s): basic math at a high school level.
Professor:
Ramon Sanchez
Season:
Fall
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14518
Research Areas:
• Architecture and Environmental Design
ENVR E-157: Sustainable Business and Technology
With the increased awareness of how business and economic activity impact our planet and societies, we are seeing a boom in entrepreneurial activity premised on social responsibility, environmental friendliness, energy efficiency, and other sustainability-related attributes. This course seeks to examine the trends in green business, and to identify which activities are based on enduring principles and

which are likely to be fleeting. Through conversations wtih local entrepreneurs, case studies, and lectures, this course provides students with an introduction to the principles of sustainable business, and the opportunity to look at a variety of new businesses, business models, and technologies that may play a role in an energy- and resource-constrained future.
Professor:
Matthew Gardner
Ramon Sanchez
Caitlin Powers
Season:
Spring
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23427
Research Areas:
• Business, Law and Policy
ENVR E-157: Sustainable Business and Technology
With the increased awareness of how business and economic activity impact our planet and societies, we are seeing a boom in entrepreneurial activity premised on social responsibility, environmental friendliness, energy efficiency, and other sustainability-related attributes. This course seeks to examine the trends in green business, and to identify which activities are based on enduring principles and which are likely to be fleeting. Through conversations wtih local entrepreneurs, case studies, and lectures, this course provides students with an introduction to the principles of sustainable business, and the opportunity to look at a variety of new businesses, business models, and technologies that may play a role in an energy- and resource-constrained future.
Professor:
Matthew Gardner
Ramon Sanchez
Caitlin Powers
Season:
Spring
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23427
Research Areas:
• Business, Law and Policy
ENVR E-158: Industrial Ecology: Concepts and Practice
Industrial ecology is an interdisciplinary field focused on the sustainable combination of business, environment, and technology. It shifts industrial processes from linear (open loop) systems, in which resources and capital investments move through the system to become waste, to a closed loop system where wastes become inputs for new processes. Industrial ecology views industrial systems as being integral to ecological systems, not separate from them. The goals of the course are as follows: to define and describe industrial ecology; to demonstrate the relationships among production, consumption, sustainability, and industrial ecology; to show how industrial ecology

serves as a framework for consideration of environmental and sustainability-related aspects of science and technology; and to introduce quantitative analytical methods and investigate their application to industrial ecology. The course provides an overview of theory, analytical methodology, and practical challenges in the field of industrial ecology. Emphasis is given to understanding how environmental assessment and improvements are carried out with support from systems analytical methods such as material flow analysis, risk analysis, life cycle analysis, energy analysis, cost benefit analysis, and eco-efficiency analysis.
Prerequisite: ENVR E-151, or the equivalent.
Professor:
Thomas P. Gloria
Season:
Spring
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23880
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
ENVR E-158: Industrial Ecology: Concepts and Practice
Industrial ecology is an interdisciplinary field focused on the sustainable combination of business, environment, and technology. It shifts industrial processes from linear (open loop) systems, in which resources and capital investments move through the system to become waste, to a closed loop system where wastes become inputs for new processes. Industrial ecology views industrial systems as being integral to ecological systems, not separate from them. The goals of the course are as follows: to define and describe industrial ecology; to demonstrate the relationships among production, consumption, sustainability, and industrial ecology; to show how industrial ecology serves as a framework for consideration of environmental and sustainability-related aspects of science and technology; and to introduce quantitative analytical methods and investigate their application to industrial ecology. The course provides an overview of theory, analytical methodology, and practical challenges in the field of industrial ecology. Emphasis is given to understanding how environmental assessment and improvements are carried out with support from systems analytical methods such as material flow analysis, risk analysis, life cycle analysis, energy analysis, cost benefit analysis, and eco-efficiency analysis.
Prerequisite: ENVR E-151, or the equivalent.
Professor:
Thomas P. Gloria
Season:
Spring
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23880
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity

ENVR E-158: Industrial Ecology: Concepts and Practice
Industrial ecology is an interdisciplinary field focused on the sustainable combination of business, environment, and technology. It shifts industrial processes from linear (open loop) systems, in which resources and capital investments move through the system to become waste, to a closed loop system where wastes become inputs for new processes. Industrial ecology views industrial systems as being integral to ecological systems, not separate from them. The goals of the course are as follows: to define and describe industrial ecology; to demonstrate the relationships among production, consumption, sustainability, and industrial ecology; to show how industrial ecology serves as a framework for consideration of environmental and sustainability-related aspects of science and technology; and to introduce quantitative analytical methods and investigate their application to industrial ecology. The course provides an overview of theory, analytical methodology, and practical challenges in the field of industrial ecology. Emphasis is given to understanding how environmental assessment and improvements are carried out with support from systems analytical methods such as material flow analysis, risk analysis, life cycle analysis, energy analysis, cost benefit analysis, and eco-efficiency analysis.
Prerequisite: ENVR E-151, or the equivalent.
Professor:
Thomas P. Gloria
Season:
Spring
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
23880
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
ENVR E-159: Environmental Toxicology and Risk Management
The course introduces students to the principles and methods used to determine whether a causal relationship exists between an agent and an adverse effect in humans and to independently carry out a risk assessment. Students develop an understanding of current approaches to risk management and risk communication.
Professor:
A. Wallace Hayes
Claire L. Kruger
Season:
Spring
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
23613
Research Areas:
• Human Health
ENVR E-159: Environmental Toxicology and Risk Management
The course introduces students to the principles and methods used to determine whether a causal relationship exists between an agent and

an adverse effect in humans and to independently carry out a risk assessment. Students develop an understanding of current approaches to risk management and risk communication.
Professor:
A. Wallace Hayes
Claire L. Kruger
Season:
Spring
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
23613
Research Areas:
• Human Health
ENVR E-162: US Environmental Law and Sustainability
This course provides an overview of the major environmental statutes and the common and constitutional laws that are relevant to environmental protection in the United States. Law is examined from the point of view of its effectiveness in developing healthy and sustainable human societies that also honor the inherent value of nature. Students examine how we can use law to develop a cleaner, safer, and more stable economy, and to protect natural beauty and the resources our descendants will need.
Professor:
Rick Reibstein
Season:
Fall
Days:
T
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13998
Research Areas:
• Business, Law and Policy
ENVR E-162: US Environmental Law and Sustainability
This course provides an overview of the major environmental statutes and the common and constitutional laws that are relevant to environmental protection in the United States. Law is examined from the point of view of its effectiveness in developing healthy and sustainable human societies that also honor the inherent value of nature. Students examine how we can use law to develop a cleaner, safer, and more stable economy, and to protect natural beauty and the resources our descendants will need.
Professor:
Rick Reibstein
Season:
Fall
Days:
T
Time:

5:30-7:30
School:
• Harvard Extension School
Catalog Number:
13998
Research Areas:
• Business, Law and Policy
ENVR E-163: Transportation, the Environment, and Health
This generation inherited transportation systems that have an impact on climate change and cause a number of negative health effects. We want students to understand the existing transportation systems and the environmental and health impact of each. From this knowledge, students can choose to use environmentally sound and healthy transportation systems and help in overhauling and making transportation systems more sustainable and healthy for everyone. We explore the history of bicycles, mass transit, and vehicles. We calculate METs (metabolic equivalent of task, or human energy expenditure) of different forms of transportation. Topics of discussion include the negative health effects of mobile-source air pollution, transportation-related job creation, and car-versus-bicycle parking and their related costs and benefits. All forms of transportation are measured by travel time, convenience, noise, number of fatalities, runoff caused, heat island effect, quality of life, and wildlife migration. The expectation is that with more information and awareness, decisions about new transportation infrastructures can be based on factors other than the inherited considerations of job creation, level of service (moving vehicles quickly), and crumbling infrastructure.
Professor:
Anne Christine Lusk
Mark Chase
Season:
Fall
Days:
Th
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
14196
Research Areas:
• Business, Law and Policy
• Human Health
ENVR E-163: Transportation, the Environment, and Health
This generation inherited transportation systems that have an impact on climate change and cause a number of negative health effects. We want students to understand the existing transportation systems and the environmental and health impact of each. From this knowledge, students can choose to use environmentally sound and healthy transportation systems and help in overhauling and making transportation systems more sustainable and healthy for everyone. We explore the history of bicycles, mass transit, and vehicles. We calculate METs (metabolic equivalent of task, or human energy expenditure) of different forms of transportation. Topics of discussion include the negative health effects of mobile-source air pollution, transportation-related job creation, and car-versus-bicycle parking and their related costs and benefits. All forms of transportation are measured by travel time, convenience, noise, number of fatalities, runoff caused, heat island effect, quality of life, and wildlife migration. The expectation is that with more information and awareness, decisions about new transportation infrastructures can be based on factors other than the inherited considerations of job creation, level of service (moving vehicles quickly), and crumbling infrastructure.
Professor:
Anne Christine Lusk
Mark Chase

Season:
Fall
Days:
Th
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
14196
Research Areas:
• Business, Law and Policy
• Human Health
ENVR E-163: Transportation, the Environment, and Health
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Professor:
Anne Christine Lusk
Mark Chase
Season:
Fall
Days:
Th
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
14196
Research Areas:
• Business, Law and Policy
• Human Health
ENVR E-165: Human Health and Global Environmental Change
This course explores the human health dimensions of global environmental change, such as climate change and the loss of biodiversity, and considers, in particular, their relevance to nutrition, the emergence and spread of infectious disease, and population displacement. Identifying solutions to these public health challenges is also considered. The recorded lectures are from the Harvard School of Public Health course Environmental Health 278-01, which meets March 24-May 16. Spring registration deadlines (January 26, February 3 for late registration) apply. The last day to withdraw for 100 percent tuition refund is March 30.
Prerequisite: Bachelor's degree or permission of the instructor.
Professor:

Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard Extension School
Catalog Number:
23703
Research Areas:
• Climate
• Human Health
ENVR E-165: Human Health and Global Environmental Change
This course explores the human health dimensions of global environmental change, such as climate change and the loss of biodiversity, and considers, in particular, their relevance to nutrition, the emergence and spread of infectious disease, and population displacement. Identifying solutions to these public health challenges is also considered. The recorded lectures are from the Harvard School of Public Health course Environmental Health 278-01, which meets March 24-May 16. Spring registration deadlines (January 26, February 3 for late registration) apply. The last day to withdraw for 100 percent tuition refund is March 30.
Prerequisite: Bachelor's degree or permission of the instructor.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard Extension School
Catalog Number:
23703
Research Areas:
• Climate
• Human Health
ENVR E-165: Human Health and Global Environmental Change
This course explores the human health dimensions of global environmental change, such as climate change and the loss of biodiversity, and considers, in particular, their relevance to nutrition, the emergence and spread of infectious disease, and population displacement. Identifying solutions to these public health challenges is also considered. The recorded lectures are from the Harvard School of Public Health course Environmental Health 278-01, which meets March 24-May 16. Spring registration deadlines (January 26, February 3 for late registration) apply. The last day to withdraw for 100 percent tuition refund is March 30.
Prerequisite: Bachelor's degree or permission of the instructor.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard Extension School
Catalog Number:

23703
Research Areas:
• Climate
• Human Health
ENVR E-166: Water Resources Policy and Watershed Management
This course presents a comprehensive approach to water resources management by integrating environmental science (geology, soils, hydrology) and policy (planning and regulatory analysis). It is intended for both students with and without technical backgrounds. We utilize numerous case studies from the instructor's experience as a consultant to the US Environmental Protection Agency, state and local governments, industry, and nongovernmental organizations. To the extent possible, the course includes a field trip to visit actual project sites in the metro-Boston region. The course is organized into a series of technical/foundation classes, followed by several resource and issue-specific focused sessions, and completed with discussions about possible management strategies/techniques and adaptive management approaches. The course examines groundwater, lake, riverine, wetland, and coastal management issues at the local, state, tribal, regional, national, and international levels and relies heavily on practical case studies. We focus on an integrated water management approach that links drinking water, wastewater, and stormwater management—seeking opportunities to keep water local and for re-use, balancing hydrologic budgets and minimizing costs in the face of climate change. A broad range of water resource management strategies is examined including structural/nonstructural, regulatory/non-regulatory, and prevention/restoration approaches. Smart growth and low impact development techniques are presented as effective growth management and climate adaptation techniques. Incentive-based management strategies are presented to modify behaviors and to optimize public participation. Green infrastructure is presented as an innovative and alternative approach to conventional grey technologies and includes shellfish aquaculture, bioretention, reforestation of riparian buffers, ecotoilets, and wetlands restoration.
Professor:
Scott Horsley
Season:
Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
14545
Research Areas:
• Business, Law and Policy
ENVR E-166: Water Resources Policy and Watershed Management
This course presents a comprehensive approach to water resources management by integrating environmental science (geology, soils, hydrology) and policy (planning and regulatory analysis). It is intended for both students with and without technical backgrounds. We utilize numerous case studies from the instructor's experience as a consultant to the US Environmental Protection Agency, state and local governments, industry, and nongovernmental organizations. To the extent possible, the course includes a field trip to visit actual project sites in the metro-Boston region. The course is organized into a series of technical/foundation classes, followed by several resource and issue-specific focused sessions, and completed with discussions about possible management strategies/techniques and adaptive management approaches. The course examines groundwater, lake, riverine, wetland, and coastal management issues at the local, state, tribal, regional, national, and international levels and relies heavily on practical case studies. We focus on an integrated water management approach that links drinking water, wastewater, and stormwater management—seeking opportunities to keep water local and for re-use, balancing hydrologic budgets and minimizing costs in the face of climate change. A broad range of water resource management strategies is examined including structural/nonstructural, regulatory/non-regulatory, and prevention/restoration approaches. Smart growth and low impact development techniques are presented as effective growth management and climate adaptation techniques. Incentive-based management strategies are presented to modify behaviors and to optimize public participation. Green infrastructure is

presented as an innovative and alternative approach to conventional grey technologies and includes shellfish aquaculture, bioretention, reforestation of riparian buffers, ecotoilets, and wetlands restoration.
Professor:
Scott Horsley
Season:
Fall
Days:
M
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
14545
Research Areas:
• Business, Law and Policy
ENVR E-169: Introduction to China's Energy and Environmental Challenges
China is now the world's second largest economy, the world's largest consumer of coal, the second largest consumer of oil, and the world's largest emitter of CO2. Coal accounted for 69 percent of total primary energy in China in 2011 followed by petroleum (18 percent), hydropower (6 percent), and natural gas (4 percent) with minor contributions from nuclear, solar, and wind. Rapid economic growth over the past three decades in China relied heavily on coal, not pointing the way to a sustainable model for future development. According to the annual statistical report by British Petroleum (BP), if production of coal in China were to grow at an annual rate of 3.5 percent as projected by BP for the 2010-2020 time period, China could run out of domestic supplies of coal by as early as 2032. In addition, combustion of coal in China contributes to a variety of air pollutants (SO2, NOx, and particulates), posing serious risks for public health. Understanding China's energy and environmental challenges requires knowledge of the complex web relating public policy, economic growth, energy use, local air quality, and the global climate system. This course provides a cross-disciplinary perspective on the development of the Chinese economy with emphasis on the energy sector, including analysis of related environmental problems. Energy options available for China's future are discussed, including opportunities for clean-coal technology, nuclear, wind, solar, hydro, and biofuels. The course discusses trade-offs implicit in these choices with respect to reconciling competing goals for environmental protection and economic development. The overall objective of the course is to explore options for sustainable development for the Chinese society and economy through 2050.
Prerequisite(s): a background in high school algebra and trigonometry.
Professor:
Xi Lu
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14535
Research Areas:
• Business, Law and Policy
• Energy
ENVR E-169: Introduction to China's Energy and Environmental Challenges

China is now the world's second largest economy, the world's largest consumer of coal, the second largest consumer of oil, and the world's largest emitter of CO2. Coal accounted for 69 percent of total primary energy in China in 2011 followed by petroleum (18 percent), hydropower (6 percent), and natural gas (4 percent) with minor contributions from nuclear, solar, and wind. Rapid economic growth over the past three decades in China relied heavily on coal, not pointing the way to a sustainable model for future development. According to the annual statistical report by British Petroleum (BP), if production of coal in China were to grow at an annual rate of 3.5 percent as projected by BP for the 2010-2020 time period, China could run out of domestic supplies of coal by as early as 2032. In addition, combustion of coal in China contributes to a variety of air pollutants (SO2, NOx, and particulates), posing serious risks for public health. Understanding China's energy and environmental challenges requires knowledge of the complex web relating public policy, economic growth, energy use, local air quality, and the global climate system. This course provides a cross-disciplinary perspective on the development of the Chinese economy with emphasis on the energy sector, including analysis of related environmental problems. Energy options available for China's future are discussed, including opportunities for clean-coal technology, nuclear, wind, solar, hydro, and biofuels. The course discusses trade-offs implicit in these choices with respect to reconciling competing goals for environmental protection and economic development. The overall objective of the course is to explore options for sustainable development for the Chinese society and economy through 2050.
Prerequisite(s): a background in high school algebra and trigonometry.
Professor:
Xi Lu
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14535
Research Areas:
• Business, Law and Policy
• Energy
ENVR E-169: Introduction to China's Energy and Environmental Challenges
China is now the world's second largest economy, the world's largest consumer of coal, the second largest consumer of oil, and the world's largest emitter of CO2. Coal accounted for 69 percent of total primary energy in China in 2011 followed by petroleum (18 percent), hydropower (6 percent), and natural gas (4 percent) with minor contributions from nuclear, solar, and wind. Rapid economic growth over the past three decades in China relied heavily on coal, not pointing the way to a sustainable model for future development. According to the annual statistical report by British Petroleum (BP), if production of coal in China were to grow at an annual rate of 3.5 percent as projected by BP for the 2010-2020 time period, China could run out of domestic supplies of coal by as early as 2032. In addition, combustion of coal in China contributes to a variety of air pollutants (SO2, NOx, and particulates), posing serious risks for public health. Understanding China's energy and environmental challenges requires knowledge of the complex web relating public policy, economic growth, energy use, local air quality, and the global climate system. This course provides a cross-disciplinary perspective on the development of the Chinese economy with emphasis on the energy sector, including analysis of related environmental problems. Energy options available for China's future are discussed, including opportunities for clean-coal technology, nuclear, wind, solar, hydro, and biofuels. The course discusses trade-offs implicit in these choices with respect to reconciling competing goals for environmental protection and economic development. The overall objective of the course is to explore options for sustainable development for the Chinese society and economy through 2050.
Prerequisite(s): a background in high school algebra and trigonometry.
Professor:
Xi Lu

Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14535
Research Areas:
• Business, Law and Policy
• Energy
ENVR E-170: Evaluation Methods for Development Programs
Development programs and projects are often viewed too narrowly in terms of their impacts on the environment or marginal social groups, or not evaluated at all. This course uses multi-faceted analysis to improve the successful design and implementation of programs in pursuit of sustained economic growth, environmental protection, and social protection of under-served groups. Impact assessment covers four approaches: environmental impact assessment (EIA), health impact assessment (HIA), social impact assessment (SIA), and economic evaluation. EIA considers changes in the natural resource base, interactions between population and the environment, and the formal review process under the National Environmental Policy Act (NEPA) and comparable systems in other countries. SIA, along with HIA, addresses the causes and impacts of harm and focuses the assessment on the least protected populations and on mitigation programs. Economic evaluation addresses economic valuation of environmental resources, establishes efficient levels of pollution abatement, and recommends pricing tools and fiscal remedies for those disproportionately harmed by industrial practices. Prerequisite: social science background; some ecology or health knowledge helpful.
Professor:
Joseph Michael Hunt
Season:
Spring
Days:
T
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24309
Research Areas:
• Business, Law and Policy
ENVR E-170: Evaluation Methods for Development Programs
Development programs and projects are often viewed too narrowly in terms of their impacts on the environment or marginal social groups, or not evaluated at all. This course uses multi-faceted analysis to improve the successful design and implementation of programs in pursuit of sustained economic growth, environmental protection, and social protection of under-served groups. Impact assessment covers four approaches: environmental impact assessment (EIA), health impact assessment (HIA), social impact assessment (SIA), and economic evaluation. EIA considers changes in the natural resource base, interactions between population and the environment, and the formal review process under the National Environmental Policy Act (NEPA) and comparable systems in other countries. SIA, along with HIA, addresses the causes and impacts of harm and focuses the assessment on the least protected populations and on mitigation programs. Economic evaluation addresses economic valuation of environmental resources, establishes efficient levels of pollution abatement, and recommends pricing tools and fiscal remedies for those disproportionately harmed by industrial practices. Prerequisite: social science

background; some ecology or health knowledge helpful.
Professor:
Joseph Michael Hunt
Season:
Spring
Days:
T
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24309
Research Areas:
• Business, Law and Policy
ENVR E-172: Technology, Globalization, and Sustainable Development
Sustainable development includes not only a healthy economic base, but also a sound environment, stable and rewarding employment, adequate purchasing power, distributional equity, national self-reliance, and maintenance of cultural integrity. This course explores the many dimensions of sustainability and their relationship to economic growth, and the use of national, multinational, and international political, legal, and economic mechanisms—including environmental and trade law, and economic incentives—to further sustainable development. The inter-relationship of global economic/financial changes, employment, and working conditions; the environment in the context of theories of development, trade, and employment; and the importance of networks and organizational learning are examined. Mechanisms for resolving the apparent conflicts between development, environment, and employment are explored.
Professor:
Nicholas Ashford
Season:
Spring
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24281
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
ENVR E-172: Technology, Globalization, and Sustainable Development
Sustainable development includes not only a healthy economic base, but also a sound environment, stable and rewarding employment, adequate purchasing power, distributional equity, national self-reliance, and maintenance of cultural integrity. This course explores the many dimensions of sustainability and their relationship to economic growth, and the use of national, multinational, and international political, legal, and economic mechanisms—including environmental and trade law, and economic incentives—to further sustainable development. The inter-relationship of global economic/financial changes, employment, and working conditions; the environment in the context of theories of development, trade, and employment; and the importance of networks and organizational learning are examined. Mechanisms for resolving the apparent conflicts between development, environment, and employment are explored.
Professor:
Nicholas Ashford

Season:
Spring
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24281
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
ENVR E-172: Technology, Globalization, and Sustainable Development
Sustainable development includes not only a healthy economic base, but also a sound environment, stable and rewarding employment, adequate purchasing power, distributional equity, national self-reliance, and maintenance of cultural integrity. This course explores the many dimensions of sustainability and their relationship to economic growth, and the use of national, multinational, and international political, legal, and economic mechanisms—including environmental and trade law, and economic incentives—to further sustainable development. The inter-relationship of global economic/financial changes, employment, and working conditions; the environment in the context of theories of development, trade, and employment; and the importance of networks and organizational learning are examined. Mechanisms for resolving the apparent conflicts between development, environment, and employment are explored.
Professor:
Nicholas Ashford
Season:
Spring
Days:
W
Time:
5:30-7:30
School:
• Harvard Extension School
Catalog Number:
24281
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
ENVR E-175: International Development of Sustainable Economies
This course provides professional tools to develop sustainable economies in developing countries focusing on agriculture, fisheries, forestry, and tourism. Students acquire baseline evaluation skills for statistically based reporting. These include economic valuation, value chain, and cost benefit analysis, while integrating ecological objectives. The course develops the capacity to objectively assess the needs of local stakeholders, women, vulnerable populations, and indigenous peoples using situation analyses and monitoring and evaluation techniques, with benchmarking of results. Once students demonstrate capacity to perform baseline analysis, the course offers them the latest methods for sustainable supply chain management in fair trade, certified or sustainable commodities, products, and services. They examine current case studies of leading corporations in aquaculture, coffee, forestry, tourism, and other agricultural commodities. Students develop procurement strategies that focus on enhancing local capacity to produce sustainable commodities or products and services. These strategies include managing environmental impacts, generating positive biodiversity conservation outcomes, and creating opportunity for the bottom billion, including women and indigenous peoples. Students focus on generating new opportunities at the micro, small, and medium enterprise levels in least developed countries while conserving the environment and enhancing the well being

of the local population.
Prerequisite: ENVR E-210 recommended.
Professor:
Megan Epler Wood
Jennifer Clifford
Mark Leighton
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14468
Research Areas:
• Business, Law and Policy
ENVR E-175: International Development of Sustainable Economies
This course provides professional tools to develop sustainable economies in developing countries focusing on agriculture, fisheries, forestry, and tourism. Students acquire baseline evaluation skills for statistically based reporting. These include economic valuation, value chain, and cost benefit analysis, while integrating ecological objectives. The course develops the capacity to objectively assess the needs of local stakeholders, women, vulnerable populations, and indigenous peoples using situation analyses and monitoring and evaluation techniques, with benchmarking of results. Once students demonstrate capacity to perform baseline analysis, the course offers them the latest methods for sustainable supply chain management in fair trade, certified or sustainable commodities, products, and services. They examine current case studies of leading corporations in aquaculture, coffee, forestry, tourism, and other agricultural commodities. Students develop procurement strategies that focus on enhancing local capacity to produce sustainable commodities or products and services. These strategies include managing environmental impacts, generating positive biodiversity conservation outcomes, and creating opportunity for the bottom billion, including women and indigenous peoples. Students focus on generating new opportunities at the micro, small, and medium enterprise levels in least developed countries while conserving the environment and enhancing the well being of the local population.
Prerequisite: ENVR E-210 recommended.
Professor:
Megan Epler Wood
Jennifer Clifford
Mark Leighton
Season:
Fall
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
14468
Research Areas:
• Business, Law and Policy

ENVR E-210: Critical Analysis of Environmental Systems
Understanding the dynamics of complex ecological and environmental systems and designing policies to promote their sustainability is a formidable challenge. Both the practitioner and policy maker must be able to evaluate scientific research, recognizing fundamental pitfalls in research design and data interpretation. Moreover, most important environmental problems involve interactions among variables as dynamic systems, so forecasting the impacts of potential environmental changes or policy interventions is critical. To develop these skills, student conduct practical exercises illustrating a range of modeling techniques, including statistical analysis of ecological and environmental data, and systems dynamics modeling. Computer simulation modeling ranges across diverse issues in sustainability science, such as climate change, human population dynamics, population viability analysis of endangered species, and economic appraisal of projects that impact natural resources. The course also focuses on developing skills in scientific writing, critiquing primary research literature, and communicating about environmental science. Quantitative techniques are taught at an introductory level; some data analysis and simulation modeling is conducted using Excel spreadsheets. Prerequisites: a satisfactory score on the mandatory test of critical reading and writing skills; experience manipulating data and algebraic equations on spreadsheets is helpful.
Professor:
Mark Leighton
Season:
Spring
Fall
Days:
Th
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13757; 23614
Research Areas:
• Business, Law and Policy
ENVR E-210: Critical Analysis of Environmental Systems
Understanding the dynamics of complex ecological and environmental systems and designing policies to promote their sustainability is a formidable challenge. Both the practitioner and policy maker must be able to evaluate scientific research, recognizing fundamental pitfalls in research design and data interpretation. Moreover, most important environmental problems involve interactions among variables as dynamic systems, so forecasting the impacts of potential environmental changes or policy interventions is critical. To develop these skills, student conduct practical exercises illustrating a range of modeling techniques, including statistical analysis of ecological and environmental data, and systems dynamics modeling. Computer simulation modeling ranges across diverse issues in sustainability science, such as climate change, human population dynamics, population viability analysis of endangered species, and economic appraisal of projects that impact natural resources. The course also focuses on developing skills in scientific writing, critiquing primary research literature, and communicating about environmental science. Quantitative techniques are taught at an introductory level; some data analysis and simulation modeling is conducted using Excel spreadsheets. Prerequisites: a satisfactory score on the mandatory test of critical reading and writing skills; experience manipulating data and algebraic equations on spreadsheets is helpful.
Professor:
Mark Leighton
Season:
Spring
Fall
Days:
Th
Time:
7:40-9:40

School:
• Harvard Extension School
Catalog Number:
13757; 23614
Research Areas:
• Business, Law and Policy
ENVR E-599: Capstone Projects in Sustainability and Environmental Management
This course provides students with the preparation for and the opportunity to complete a capstone project related to their professional interests. Capstone projects could include an analysis of a community, industrial, or global environmental issue, or creation of an environmental curriculum or media product.
Prerequisite: Students must be in their final semester as candidates in the ALM in sustainability and environmental management program. They must have completed all the course work for the program, including completion of the analytical skills and ecology requirements; they must also earn a satisfactory score on the test of critical reading and writing skills. In addition, they should have already met with George Buckley to discuss their project concept. Students who do not meet these requirements are dropped from the course.
Professor:
G. Buckley
Season:
Fall
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13067
Research Areas:
• Business, Law and Policy
ENVR E-599: Capstone Projects in Sustainability and Environmental Management
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Prerequisite: Students must be in their final semester as candidates in the ALM in sustainability and environmental management program. They must have completed all the course work for the program, including completion of the analytical skills and ecology requirements; they must also earn a satisfactory score on the test of critical reading and writing skills. In addition, they should have already met with George Buckley to discuss their project concept. Students who do not meet these requirements are dropped from the course.
Professor:
G. Buckley
Season:
Fall
Days:
M
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
13067

Research Areas:
• Business, Law and Policy
ENVR E-599: Capstone Projects in Sustainability and Environmental Management
This course provides students with the preparation for and the opportunity to complete a capstone project related to their professional interests. Capstone projects could include an analysis of a community, industrial, or global environmental issue, or creation of an environmental curriculum or media product. Prerequisites: students must be in their final semester as candidates in the ALM in sustainability and environmental management program. They must have completed all the course work for the program, including completion of the analytical skills and ecology requirements; they must also earn a satisfactory score on the test of critical reading and writing skills. In addition, they should have already met with George Buckley to discuss their project concept. Students who do not meet these requirements are dropped from the course.
Professor:
George Buckley
Season:
Spring
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24009
Research Areas:
• Business, Law and Policy
ENVR E-599: Capstone Projects in Sustainability and Environmental Management
This course provides students with the preparation for and the opportunity to complete a capstone project related to their professional interests. Capstone projects could include an analysis of a community, industrial, or global environmental issue, or creation of an environmental curriculum or media product. Prerequisites: students must be in their final semester as candidates in the ALM in sustainability and environmental management program. They must have completed all the course work for the program, including completion of the analytical skills and ecology requirements; they must also earn a satisfactory score on the test of critical reading and writing skills. In addition, they should have already met with George Buckley to discuss their project concept. Students who do not meet these requirements are dropped from the course.
Professor:
George Buckley
Season:
Spring
Days:
W
Time:
7:40-9:40
School:
• Harvard Extension School
Catalog Number:
24009
Research Areas:
• Business, Law and Policy
Expos 20.264 / 20.265: Writing the Environment
How are we to make sense of the high-stakes debates about the environment today? In attempting to answer this question, this course

focusses on the rhetoric and not the science of environmentalism. We will look at what happens when the impressions of a naturalist or the findings of a scientist are put into language and communicated to a wider public. As we examine a range of works including Thoreau's Walden, Carson's Silent Spring, and documentary movies, we will ask how each work presents nature to the reader through the medium of language, how each attempts to persuade the reader, and each draws upon sources as varied as literary romanticism and science.
Professor:
Instructor Martin Greenup
Season:
Spring
Days:
M
W
Time:
10:00-11:00 / 11:00 - 12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
21922 / 80854
Research Areas:
• Arts and Humanities
Expos 20.264 / 20.265: Writing the Environment
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Professor:
Instructor Martin Greenup
Season:
Spring
Days:
M
W
Time:
10:00-11:00 / 11:00 - 12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
21922 / 80854
Research Areas:
• Arts and Humanities
French 271. Legacies of Poststructuralism: The Environment in French Theory
Focuses on how the environment is inscribed in works drawing on concepts from poststructuralist theories. Texts by Guattari, Latour, Nancy, Balibar, Ranciere, Stengers, Haraway, Heise, and others. Students are encouraged to pair their readings with fictional texts and other media.
Professor:
Verena Conley

Season:
Fall
Days:
T
Time:
1:00-3:00pm
School:
• Faculty of Arts and Sciences
Catalog Number:
8448
Subject Area:
Romance Languages and Literatures
Research Areas:
• Arts and Humanities
French 271. Legacies of Poststructuralism: The Environment in French Theory
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Professor:
Verena Conley
Season:
Fall
Days:
T
Time:
1:00-3:00pm
School:
• Faculty of Arts and Sciences
Catalog Number:
8448
Subject Area:
Romance Languages and Literatures
Research Areas:
• Arts and Humanities
Freshman Seminar 39j. Dirty and Dangerous: Environmental Problems and Problem Environments in US History
"Dirty and Dangerous" explores the relationship between people and the material world by focusing on the "dark side" of natural and human-made environments. How have people in the US perceived and experienced dangers associated with climate, landscape, toxins, disease, and the built environment? Focusing on the late 19th century until today, the course is organized around three types of environment: wilderness, homes, and workplace. We will draw on a range of sources, including poetry, fiction, films, activist writing, historical scholarship, and a "Toxic Tour" of Boston, examining dangers, fears and anxieties about these various environments in their historical context.
Professor:
Susanna Bohme
Season:
Fall
Days:
Th
Time:

3:00-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
35345
Research Areas:
• Arts and Humanities
• Social Sciences
Freshman Seminar 39j. Dirty and Dangerous: Environmental Problems and Problem Environments in US History
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Professor:
Susanna Bohme
Season:
Fall
Days:
Th
Time:
3:00-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
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Research Areas:
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Professor:
Susanna Bohme
Season:
Fall
Days:
Th
Time:
3:00-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:

35345
Research Areas:
• Arts and Humanities
• Social Sciences
Freshman Seminar 41q. Boston Green
Boston is full of green spaces such as the Emerald Necklace, bike trails, and smaller pieces of greenery that make ordinary spaces feel more special. Focusing on Boston and surrounding areas, this Freshman Seminar will explore the ideas behind making cities "green" in the first place. Since the 19th century, landscape architects, planners, government officials, and the public alike differed over where such spaces should be built, who should enjoy them, and what naturalistic ideas these areas were supposed to convey. More generally, the course will provide students with an introduction to the application of environmental thought to planning.
Professor:
Jeanne Haffner
Season:
Spring
Days:
Time:
TBD
School:
• Faculty of Arts and Sciences
Catalog Number:
97677
Research Areas:
• Architecture and Environmental Design
Freshman Seminar 41q. Boston Green
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Professor:
Jeanne Haffner
Season:
Spring
Days:
Time:
TBD
School:
• Faculty of Arts and Sciences
Catalog Number:
97677
Research Areas:
• Architecture and Environmental Design
GHP272: Foundations of Global Health and Population
This course is required for all incoming master of science students in GHP. It is intended as a broad survey of the main facts, issues, perspectives, methods, results, and conclusions in the areas of global population and health. The course is organized into three blocks. The first block deals with theory, methods, and evidence related to the state of global health and population and reviews salient population and health issues, both past and present. The focus is on patterns and trends in morbidity, mortality, fertility, and reproductive health, as well as the size, structure, and growth of population. Environmental concerns linked to health and population are also

addressed. The second block deals with the economic, social, legal, political, and ecological context in which global health and population issues arise and must be addressed. This block introduces economic, political, and rights-based perspectives on the place of health in the process of international development. The third block covers approaches to the design and implementation of policies and programs to address health and population problems. Medical interventions, non-medical health interventions, and non-health interventions will all be considered.
Note: Space guaranteed for all SM students in the department of Global Health and Population and twenty MPH-GH students; others on a first-come basis.
Professor:
Joel Lamstein
Wafaei Fawzi
Rifat Atun
Season:
Fall
Days:
M
W
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
GHP272-01
Research Areas:
• Human Health
• Social Sciences
GHP272: Foundations of Global Health and Population
This course is required for all incoming master of science students in GHP. It is intended as a broad survey of the main facts, issues, perspectives, methods, results, and conclusions in the areas of global population and health. The course is organized into three blocks. The first block deals with theory, methods, and evidence related to the state of global health and population and reviews salient population and health issues, both past and present. The focus is on patterns and trends in morbidity, mortality, fertility, and reproductive health, as well as the size, structure, and growth of population. Environmental concerns linked to health and population are also addressed. The second block deals with the economic, social, legal, political, and ecological context in which global health and population issues arise and must be addressed. This block introduces economic, political, and rights-based perspectives on the place of health in the process of international development. The third block covers approaches to the design and implementation of policies and programs to address health and population problems. Medical interventions, non-medical health interventions, and non-health interventions will all be considered.
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Professor:
Joel Lamstein
Wafaei Fawzi
Rifat Atun
Season:
Fall
Days:
M
W

F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
GHP272-01
Research Areas:
• Human Health
• Social Sciences
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Professor:
Joel Lamstein
Wafaei Fawzi
Rifat Atun
Season:
Fall
Days:
M
W
F
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
GHP272-01
Research Areas:
• Human Health
• Social Sciences
GHP520: The Ecology of Health in Development
This course is a sequel to Human Ecology, GHP 253-fall II. It will be run as a semi-seminar course with about 1/3 lecture, 2/3 student-led discussions and reports. Themes: The Eco-social Distress Syndrome, a multidimensional imbalance between our species and the rest of nature against the background of the conflicting demands for a rising and equitable standard of living for all and the constraints of sustainability. In order to span a wide range of alternatives situations, the course will be organized around selected geographic areas (the Lake Victoria basin, Thailand or the Philippines, Central America and the Caribbean), habitats (tropical forests, semi-arid savannas,

coastlines, cities), health problems (malnutrition, malaria, cholera, emerging viruses) and development strategies for resource use, agricultural development, national science strategy (neo-liberal, nationalist, socialist) with an emphasis on the less familiar approaches, and international efforts to reconcile development with ecology.
Professor:
Richard Levins
Season:
Spring
Days:
T
Th
Time:
8:30-10:20
School:
• Harvard School of Public Health
Catalog Number:
GHP520-01
Research Areas:
• Ecology and Biodiversity
• Human Health
GHP520: The Ecology of Health in Development
This course is a sequel to Human Ecology, GHP 253-fall II. It will be run as a semi-seminar course with about 1/3 lecture, 2/3 student-led discussions and reports. Themes: The Eco-social Distress Syndrome, a multidimensional imbalance between our species and the rest of nature against the background of the conflicting demands for a rising and equitable standard of living for all and the constraints of sustainability. In order to span a wide range of alternatives situations, the course will be organized around selected geographic areas (the Lake Victoria basin, Thailand or the Philippines, Central America and the Caribbean), habitats (tropical forests, semi-arid savannas, coastlines, cities), health problems (malnutrition, malaria, cholera, emerging viruses) and development strategies for resource use, agricultural development, national science strategy (neo-liberal, nationalist, socialist) with an emphasis on the less familiar approaches, and international efforts to reconcile development with ecology.
Professor:
Richard Levins
Season:
Spring
Days:
T
Th
Time:
8:30-10:20
School:
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Catalog Number:
GHP520-01
Research Areas:
• Ecology and Biodiversity
• Human Health
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sustainability. In order to span a wide range of alternatives situations, the course will be organized around selected geographic areas (the Lake Victoria basin, Thailand or the Philippines, Central America and the Caribbean), habitats (tropical forests, semi-arid savannas, coastlines, cities), health problems (malnutrition, malaria, cholera, emerging viruses) and development strategies for resource use, agricultural development, national science strategy (neo-liberal, nationalist, socialist) with an emphasis on the less familiar approaches, and international efforts to reconcile development with ecology.
Professor:
Richard Levins
Season:
Spring
Days:
T
Th
Time:
8:30-10:20
School:
• Harvard School of Public Health
Catalog Number:
GHP520-01
Research Areas:
• Ecology and Biodiversity
• Human Health
Government 1016. Spatial Models for Environmental Policy
Introduces the fundamental statistical and mapping tools needed for analysis of environmental and social policy. Topics are linked by environmental and social themes and include spatial statistics; surface estimation; raster algebra; suitability modeling and remote sensing. Students acquire technical skills in both mapping and spatial models. Software packages used include STARS - Space-Time Analysis of Regional Systems, GeoVISTA, ArcGIS, Geoda and MULTISPEC.
Prerequisite: Some prior experience with GIS and knowledge of basic statistics.
Professor:
S. Srinivasan
Season:
Spring
Days:
W
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
0737
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Social Sciences
Government 1016. Spatial Models for Environmental Policy
Introduces the fundamental statistical and mapping tools needed for analysis of environmental and social policy. Topics are linked by environmental and social themes and include spatial statistics; surface estimation; raster algebra; suitability modeling and remote sensing. Students acquire technical skills in both mapping and spatial models. Software packages used include STARS - Space-Time Analysis of

Regional Systems, GeoVISTA, ArcGIS, Geoda and MULTISPEC.
Prerequisite: Some prior experience with GIS and knowledge of basic statistics.
Professor:
S. Srinivasan
Season:
Spring
Days:
W
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
0737
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Social Sciences
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Prerequisite: Some prior experience with GIS and knowledge of basic statistics.
Professor:
S. Srinivasan
Season:
Spring
Days:
W
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
0737
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Social Sciences
Government 94ym. The Politics of Climate Change
This course examines the political challenges posed by global warming from both an empirical and a normative perspective. Drawing on a broad array of readings, we investigate why the global community has done so little to combat climate change; what kinds of domestic and international institutions we need to coordinate our response to global warming; whether we should prioritize mitigation or adaptation; and what a just response to climate change might look like.
Professor:

Cheryl Welch
Season:
Spring
Days:
W
Time:
4:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
76287
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Social Sciences
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Professor:
Cheryl Welch
Season:
Spring
Days:
W
Time:
4:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
76287
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Social Sciences
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This course examines the political challenges posed by global warming from both an empirical and a normative perspective. Drawing on a broad array of readings, we investigate why the global community has done so little to combat climate change; what kinds of domestic and international institutions we need to coordinate our response to global warming; whether we should prioritize mitigation or adaptation; and what a just response to climate change might look like.
Professor:
Cheryl Welch
Season:
Spring
Days:

W
Time:
4:00-6:00
School:
• Faculty of Arts and Sciences
Catalog Number:
76287
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Social Sciences
GOVT E-1511: The Changing Geopolitics of Energy
Consistent access to cheap energy resources has been the defining factor of economic success and development. Securing access and an affordable price has driven and continues to drive global competition among the greatest energy consuming powers while energy producers, on the other hand, attempt to leverage their energy power to achieve political aims. This course examines international relations from the perspective of competition and at times cooperation for access and distribution of energy resources around the globe. During the course of the semester we examine topics such as the politics of Middle Eastern energy supplies and US dependence on the Middle East, the competition for the Caspian and Central Asian energy resources, Chinese energy presence in Africa, Latin American energy markets and competition, and European and North American energy markets. We also dedicate time to the discussion of new energy market innovations beginning to fundamentally challenge the traditional oil and gas contracts, such as the mining of unconventional oil and gas, gas liquefaction and its effects on market structure and price, and the environmental effects of new types of energy mining techniques.
Professor:
Nadiya Kravets
Season:
Spring
Days:
T
Time:
5:30-7:30
Catalog Number:
24275
Research Areas:
• Energy
HBS 1105: Energy
The course will benefit students who intend to participate, as managers, capital providers, or consultants, in companies involved in supplying energy services to households, firms, and other customers. It will also benefit students who may work for firms in energy-intensive or energy-related industries, including transportation companies, vehicle manufacturers, and suppliers to producers of oil, gas, and electricity. More broadly, students interested in questions of international political economy and in the economics of strategic competition will benefit from the course.
Educational Objectives
Without the heat, light, and mobility provided by suppliers of energy, firms, governments, and individuals could not function. Energy prices are often highly volatile, and energy firms are subject to pervasive government intervention, especially when the energy value chain crosses international borders. In the course, we try to understand the (interrelated) reasons for price volatility and government intervention, and the strategic implications of each.
We will examine both the supply side and the demand side of energy markets, with an emphasis on supply: of transportation fuels, and of electricity and electricity inputs (gas, coal, nuclear, hydro, wind). We will include entrenched incumbents, new entrants, and would-be

disruptors. Geographic coverage will be global, with half the cases set outside the US.
Two technical aspects of the energy business - the high sunk costs of hydrocarbon and nuclear, and the fact that electricity cannot (yet) be economically stored on a large scale - create unique contracting problems for energy businesses. Public and private players have in turn created institutions to solve the unique problems created by the fundamental economics of the industry, but those institutions shape the strategies available to later entrants.
The course applies ideas on industry structure, competitive positioning, competitive dynamics, and corporate strategy from the basic Strategy course. It applies ideas from BGIE on the rationales for government intervention, the political factors that influence policymakers, and the ways in which firms manage risk.
Students will leave the course with a broad exposure to the kinds of strategic and risk management problems that confront firms in the energy industries, a set of analytic approaches to make sense of those problems, and an enhanced ability to devise and implement strategies that take economic and political considerations into account.
Professor:
Forest Reinhardt
Richard Vietor
Professor:
Season:
Winter
Days:
School:
• Harvard Business School
Catalog Number:
1105
Research Areas:
• Business, Law and Policy
• Energy
HBS 1105: Energy
The course will benefit students who intend to participate, as managers, capital providers, or consultants, in companies involved in supplying energy services to households, firms, and other customers. It will also benefit students who may work for firms in energy-intensive or energy-related industries, including transportation companies, vehicle manufacturers, and suppliers to producers of oil, gas, and electricity. More broadly, students interested in questions of international political economy and in the economics of strategic competition will benefit from the course.
Educational Objectives
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strategies that take economic and political considerations into account.
Professor:
Forest Reinhardt
Richard Vietor
Professor:
Season:
Winter
Days:
School:
• Harvard Business School
Catalog Number:
1105
Research Areas:
• Business, Law and Policy
• Energy
HBS 1105: Energy
The course will benefit students who intend to participate, as managers, capital providers, or consultants, in companies involved in supplying energy services to households, firms, and other customers. It will also benefit students who may work for firms in energy-intensive or energy-related industries, including transportation companies, vehicle manufacturers, and suppliers to producers of oil, gas, and electricity. More broadly, students interested in questions of international political economy and in the economics of strategic competition will benefit from the course.
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Two technical aspects of the energy business - the high sunk costs of hydrocarbon and nuclear, and the fact that electricity cannot (yet) be economically stored on a large scale - create unique contracting problems for energy businesses. Public and private players have in turn created institutions to solve the unique problems created by the fundamental economics of the industry, but those institutions shape the strategies available to later entrants.
The course applies ideas on industry structure, competitive positioning, competitive dynamics, and corporate strategy from the basic Strategy course. It applies ideas from BGIE on the rationales for government intervention, the political factors that influence policymakers, and the ways in which firms manage risk.
Students will leave the course with a broad exposure to the kinds of strategic and risk management problems that confront firms in the energy industries, a set of analytic approaches to make sense of those problems, and an enhanced ability to devise and implement strategies that take economic and political considerations into account.
Professor:
Forest Reinhardt
Richard Vietor
Professor:
Season:
Winter
Days:
School:
• Harvard Business School

Catalog Number:
1105
Research Areas:
• Business, Law and Policy
• Energy
HDS 2798: Introduction to Religion and Ecology
This course will explore the intersection between religious traditions and ecological activism, with special attention to current conversations about "ethical eating." We will consider both the resources that religious traditions provide to ecological activists and the ways these activists have challenges aspects of traditional religion. The course will also function as a general introduction to the multiple ways of knowing that comprise the scholarly study of religion, with attention to scriptural interpretation, history, ethnography, theology, ethics, and comparative studies. Note: Course has additional hour to be arranged. Offered jointly with the Faculty of Arts and Sciences as Religion 1046.
Professor:
Daniel McKanan
Professor:
Season:
Spring
Days:
M
W
Time:
10:00-11:00
School:
• Harvard Divinity School
Catalog Number:
HDS 2798
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
HDS 2798: Introduction to Religion and Ecology
This course will explore the intersection between religious traditions and ecological activism, with special attention to current conversations about "ethical eating." We will consider both the resources that religious traditions provide to ecological activists and the ways these activists have challenges aspects of traditional religion. The course will also function as a general introduction to the multiple ways of knowing that comprise the scholarly study of religion, with attention to scriptural interpretation, history, ethnography, theology, ethics, and comparative studies. Note: Course has additional hour to be arranged. Offered jointly with the Faculty of Arts and Sciences as Religion 1046.
Professor:
Daniel McKanan
Professor:
Season:
Spring
Days:
M
W
Time:
10:00-11:00
School:
• Harvard Divinity School

Catalog Number:
HDS 2798
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
HDS 2798: Introduction to Religion and Ecology
This course will explore the intersection between religious traditions and ecological activism, with special attention to current conversations about "ethical eating." We will consider both the resources that religious traditions provide to ecological activists and the ways these activists have challenges aspects of traditional religion. The course will also function as a general introduction to the multiple ways of knowing that comprise the scholarly study of religion, with attention to scriptural interpretation, history, ethnography, theology, ethics, and comparative studies. Note: Course has additional hour to be arranged. Offered jointly with the Faculty of Arts and Sciences as Religion 1046.
Professor:
Daniel McKanan
Professor:
Season:
Spring
Days:
M
W
Time:
10:00-11:00
School:
• Harvard Divinity School
Catalog Number:
HDS 2798
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
HIS 4105: Studies of the Built North American Environment: 1580 to the Present
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0410500
Research Areas:
• Architecture and Environmental Design

• Arts and Humanities
• Social Sciences
HIS 4105: Studies of the Built North American Environment: 1580 to the Present
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0410500
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Social Sciences
HIS 4105: Studies of the Built North American Environment: 1580 to the Present
North America as an evolving visual environment is analyzed as a systems concatenation involving such constituent elements as farms, small towns, shopping malls, highways, suburbs, and as depicted in fiction, poetry, cartography, television, cinema, and advertising and cybernetic simulation.
Professor:
John Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0410500
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Social Sciences
HIS 4105: Studies of the Built North American Environment: 1580 to the Present
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Professor:
John Stilgoe
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0410500
Research Areas:
• Architecture and Environmental Design
• Arts and Humanities
• Social Sciences
History 2258. Histories of the Future
The seminar will consider how individual people and groups in the past thought about and planned for the future. Specific topics can include the history of: insurance; speculation; engineering and unintended environmental consequences; climate change; population growth (or decline) and social planning; education and "disruption." Our object will be to design an undergraduate course that encourages students to look critically at how we think we can plan for the future in the present.
Professor:
Alison Frank Johnson
Professor:
Season:
Fall
Days:
W
Time:
10:00-12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
52767
Subject Area:
History
Research Areas:
• Social Sciences
History 2258. Histories of the Future
The seminar will consider how individual people and groups in the past thought about and planned for the future. Specific topics can include the history of: insurance; speculation; engineering and unintended environmental consequences; climate change; population growth (or decline) and social planning; education and "disruption." Our object will be to design an undergraduate course that encourages students to look critically at how we think we can plan for the future in the present.
Professor:
Alison Frank Johnson
Professor:
Season:

Fall
Days:
W
Time:
10:00-12:00
School:
• Faculty of Arts and Sciences
Catalog Number:
52767
Subject Area:
History
Research Areas:
• Social Sciences
History of Science 132v. History of the Earth and the Environment
This course examines our changing view of the Earth and the environment from the 19th century to the present, highlighting the interrelatedness of science, society, and culture. Our changing understanding of the Earth - as our home planet has become older, more dynamic, and more vulnerable to human activity - has accompanied changes in our relationship to Earth's environment, the nature of global problems, their causes, their impacts, and our ability to mediate them. These changes have led to some very heated and persistent political debates. Topics include the age of the earth, plate tectonics, planetary science, environmentalism, pesticides, and climate change.
Professor:
Matthew Shindell
Season:
Spring
Days:
T
Th
Time:
10:00-11:00
School:
• Faculty of Arts and Sciences
Catalog Number:
51253
Subject Area:
History of Science
Research Areas:
• Social Sciences
History of Science 132v. History of the Earth and the Environment
This course examines our changing view of the Earth and the environment from the 19th century to the present, highlighting the interrelatedness of science, society, and culture. Our changing understanding of the Earth - as our home planet has become older, more dynamic, and more vulnerable to human activity - has accompanied changes in our relationship to Earth's environment, the nature of global problems, their causes, their impacts, and our ability to mediate them. These changes have led to some very heated and persistent political debates. Topics include the age of the earth, plate tectonics, planetary science, environmentalism, pesticides, and climate change.
Professor:
Matthew Shindell
Season:
Spring
Days:
T

Th
Time:
10:00-11:00
School:
• Faculty of Arts and Sciences
Catalog Number:
51253
Subject Area:
History of Science
Research Areas:
• Social Sciences
History of Science 197. Nature, Environment, and the Understanding of Space
Investigations of the natural world have focused on different concepts at different historical moments. In America, for instance, the notion of "wilderness" was most prevalent in the late-nineteenth century; that of "environment" became central in the twentieth; and, from the postwar era to the present, analyses of the inextricability of spatial form and social organization have dominated scholarship and social activism alike. The aim of this seminar is to examine these shifts, exploring how they were employed within particular historical contexts, and to assess their implications for the past, present, and future of environmental movements in Europe and America.
Professor:
Jeanne Marie Haffner
Season:
Spring
Days:
Th
Time:
2:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
69934
Subject Area:
History of Science
Research Areas:
• Ecology and Biodiversity
• Social Sciences
History of Science 197. Nature, Environment, and the Understanding of Space
Investigations of the natural world have focused on different concepts at different historical moments. In America, for instance, the notion of "wilderness" was most prevalent in the late-nineteenth century; that of "environment" became central in the twentieth; and, from the postwar era to the present, analyses of the inextricability of spatial form and social organization have dominated scholarship and social activism alike. The aim of this seminar is to examine these shifts, exploring how they were employed within particular historical contexts, and to assess their implications for the past, present, and future of environmental movements in Europe and America.
Professor:
Jeanne Marie Haffner
Season:
Spring
Days:
Th
Time:
2:00-4:00

School:
• Faculty of Arts and Sciences
Catalog Number:
69934
Subject Area:
History of Science
Research Areas:
• Ecology and Biodiversity
• Social Sciences
History of Science 197. Nature, Environment, and the Understanding of Space
Investigations of the natural world have focused on different concepts at different historical moments. In America, for instance, the notion of "wilderness" was most prevalent in the late-nineteenth century; that of "environment" became central in the twentieth; and, from the postwar era to the present, analyses of the inextricability of spatial form and social organization have dominated scholarship and social activism alike. The aim of this seminar is to examine these shifts, exploring how they were employed within particular historical contexts, and to assess their implications for the past, present, and future of environmental movements in Europe and America.
Professor:
Jeanne Marie Haffner
Season:
Spring
Days:
Th
Time:
2:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
69934
Subject Area:
History of Science
Research Areas:
• Ecology and Biodiversity
• Social Sciences
HO703: Human Health and Global Environmental Change
Human activity is changing the atmosphere and altering terrestrial and marine ecosystems on a global scale for the first time in history. Evidence is mounting that these changes may already be having serious effects on human health, and there is growing concern that in coming decades the effects could be catastrophic. This course was developed because the practice of medicine in this century will demand an understanding of the relationship between human health and the global environment. It will provide an overview of climate change and biodiversity loss, two key examples of global environmental change, and of the potential consequences of these changes for human health. The course will be open to all students at Harvard University, but enrollment is limited and preference will be given to students from Harvard Medical School, the Harvard School of Public Health, the Kennedy School of Government, and to undergraduate Environmental Science Public Policy majors.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:

• Harvard Medical School
Catalog Number:
HO703
Research Areas:
• Climate
• Human Health
HO703: Human Health and Global Environmental Change
Human activity is changing the atmosphere and altering terrestrial and marine ecosystems on a global scale for the first time in history. Evidence is mounting that these changes may already be having serious effects on human health, and there is growing concern that in coming decades the effects could be catastrophic. This course was developed because the practice of medicine in this century will demand an understanding of the relationship between human health and the global environment. It will provide an overview of climate change and biodiversity loss, two key examples of global environmental change, and of the potential consequences of these changes for human health. The course will be open to all students at Harvard University, but enrollment is limited and preference will be given to students from Harvard Medical School, the Harvard School of Public Health, the Kennedy School of Government, and to undergraduate Environmental Science Public Policy majors.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard Medical School
Catalog Number:
HO703
Research Areas:
• Climate
• Human Health
HO703: Human Health and Global Environmental Change
Human activity is changing the atmosphere and altering terrestrial and marine ecosystems on a global scale for the first time in history. Evidence is mounting that these changes may already be having serious effects on human health, and there is growing concern that in coming decades the effects could be catastrophic. This course was developed because the practice of medicine in this century will demand an understanding of the relationship between human health and the global environment. It will provide an overview of climate change and biodiversity loss, two key examples of global environmental change, and of the potential consequences of these changes for human health. The course will be open to all students at Harvard University, but enrollment is limited and preference will be given to students from Harvard Medical School, the Harvard School of Public Health, the Kennedy School of Government, and to undergraduate Environmental Science Public Policy majors.
Professor:
Aaron Bernstein
Season:
Spring
Time:
TBD
School:
• Harvard Medical School
Catalog Number:
HO703
Research Areas:

• Climate
• Human Health
ID 539: Built Environment, Human Energy Expenditure, and Public Health
At the completion of this course, students will have an understanding of different built environments and human energy expenditure in those environments. As two examples, parks provide mental and social benefits but many park users have low human energy expenditure (sports spectators, slow walkers, park bench sitters, etc.). In contrast to parks, bicyclists in bicycle environments have higher energy expenditure. During this course, measures such as Health Impact Assessments (HIA) and policies such as Complete Streets will be studied to assess whether high human energy expenditure was considered. Through the students¿ understanding of the built environment and human energy expenditure measures such as METs, students will understand the ways of translating information on obesity, physical activity, and health into practice effectively. The course is intended for undergraduate students, graduate students, and individuals interested in the design of the built environment. Those enrolled may be interested in environmental health, landscape architecture, park design, exercise physiology, public health, urban planning, government, engineering, METs, human energy expenditure measures, HIA, and walking and bicycling in all populations. The focus will be on creating urban forms with high human energy expenditure to lessen obesity, diabetes, stroke, Alzheimer¿s disease, and cancer. This course is intended to fully address health and obesity reduction through the built environment in more ways than only recommending that individuals engage in physical activity.
Course Activities: Discussion, lectures, guest lectures, writing 3 three page double-spaced papers that culminate in one final paper that is a collection of the 3 papers, a design charrette, and delivering short presentations. Materials include readings, websites, webcams, and video clips.
Professor:
Walter Willett
Professor:
Anne Lusk
Enrique Cifuentes
Jack Dennerlein
Season:
Spring
Days:
M
W
Time:
3:30-5:20
School:
• Harvard School of Public Health
Catalog Number:
ID 539
Research Areas:
• Architecture and Environmental Design
• Human Health
ID 539: Built Environment, Human Energy Expenditure, and Public Health
At the completion of this course, students will have an understanding of different built environments and human energy expenditure in those environments. As two examples, parks provide mental and social benefits but many park users have low human energy expenditure (sports spectators, slow walkers, park bench sitters, etc.). In contrast to parks, bicyclists in bicycle environments have higher energy expenditure. During this course, measures such as Health Impact Assessments (HIA) and policies such as Complete Streets will be studied to assess whether high human energy expenditure was considered. Through the students¿ understanding of the built environment and human energy expenditure measures such as METs, students will understand the ways of translating information on obesity, physical activity, and health into practice effectively. The course is intended for undergraduate students, graduate students, and individuals interested in the design of the built environment. Those enrolled may be interested in environmental health, landscape architecture, park design, exercise physiology, public health, urban planning, government, engineering, METs, human energy expenditure measures, HIA,

and walking and bicycling in all populations. The focus will be on creating urban forms with high human energy expenditure to lessen obesity, diabetes, stroke, Alzheimer¿s disease, and cancer. This course is intended to fully address health and obesity reduction through the built environment in more ways than only recommending that individuals engage in physical activity.
Course Activities: Discussion, lectures, guest lectures, writing 3 three page double-spaced papers that culminate in one final paper that is a collection of the 3 papers, a design charrette, and delivering short presentations. Materials include readings, websites, webcams, and video clips.
Professor:
Walter Willett
Professor:
Anne Lusk
Enrique Cifuentes
Jack Dennerlein
Season:
Spring
Days:
M
W
Time:
3:30-5:20
School:
• Harvard School of Public Health
Catalog Number:
ID 539
Research Areas:
• Architecture and Environmental Design
• Human Health
ID 539: Built Environment, Human Energy Expenditure, and Public Health
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Course Activities: Discussion, lectures, guest lectures, writing 3 three page double-spaced papers that culminate in one final paper that is a collection of the 3 papers, a design charrette, and delivering short presentations. Materials include readings, websites, webcams, and video clips.
Professor:
Walter Willett
Professor:
Anne Lusk
Enrique Cifuentes
Jack Dennerlein

Season:
Spring
Days:
M
W
Time:
3:30-5:20
School:
• Harvard School of Public Health
Catalog Number:
ID 539
Research Areas:
• Architecture and Environmental Design
• Human Health
ID215: Environmental and Occupational Epidemiology
This course examines application of epidemiologic methods to environmental and occupational health problems. Objectives are to review methods used in evaluating the health effects of physical and chemical agents in the environment, to review available evidence on the health effects of such exposures, and to consider policy questions raised by the scientific evidence. Topics include lectures on methodology, seminars on the review and criticism of current literature, and presentations by outside experts on specific environmental and occupational health issues of current interest.
Professor:
Francine Laden
Marc Weisskopf
Season:
Spring
Days:
W
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
ID215-01
Research Areas:
• Human Health
ID215: Environmental and Occupational Epidemiology
This course examines application of epidemiologic methods to environmental and occupational health problems. Objectives are to review methods used in evaluating the health effects of physical and chemical agents in the environment, to review available evidence on the health effects of such exposures, and to consider policy questions raised by the scientific evidence. Topics include lectures on methodology, seminars on the review and criticism of current literature, and presentations by outside experts on specific environmental and occupational health issues of current interest.
Professor:
Francine Laden
Marc Weisskopf
Season:
Spring
Days:
W

Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
ID215-01
Research Areas:
• Human Health
ID215: Environmental and Occupational Epidemiology
This course examines application of epidemiologic methods to environmental and occupational health problems. Objectives are to review methods used in evaluating the health effects of physical and chemical agents in the environment, to review available evidence on the health effects of such exposures, and to consider policy questions raised by the scientific evidence. Topics include lectures on methodology, seminars on the review and criticism of current literature, and presentations by outside experts on specific environmental and occupational health issues of current interest.
Professor:
Francine Laden
Marc Weisskopf
Season:
Spring
Days:
W
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
ID215-01
Research Areas:
• Human Health
ID215: Environmental and Occupational Epidemiology
This course examines application of epidemiologic methods to environmental and occupational health problems. Objectives are to review methods used in evaluating the health effects of physical and chemical agents in the environment, to review available evidence on the health effects of such exposures, and to consider policy questions raised by the scientific evidence. Topics include lectures on methodology, seminars on the review and criticism of current literature, and presentations by outside experts on specific environmental and occupational health issues of current interest.
Professor:
Francine Laden
Marc Weisskopf
Season:
Spring
Days:
W
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
ID215-01

Research Areas:
• Human Health
ID269: Respiratory Epidemiology
Reviews the epidemiology of respiratory diseases, including chronic obstructive pulmonary disease, asthma, respiratory cancer, and infectious respiratory disease. Demographic distribution, time trends and risk factors of these diseases are discussed.
Professor:
Douglas Dockery
Professor:
Diane Gold
Season:
Fall
Days:
Th
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
ID269-01
Research Areas:
• Human Health
ID269: Respiratory Epidemiology
Reviews the epidemiology of respiratory diseases, including chronic obstructive pulmonary disease, asthma, respiratory cancer, and infectious respiratory disease. Demographic distribution, time trends and risk factors of these diseases are discussed.
Professor:
Douglas Dockery
Professor:
Diane Gold
Season:
Fall
Days:
Th
Time:
1:30-3:20
School:
• Harvard School of Public Health
Catalog Number:
ID269-01
Research Areas:
• Human Health
ID271 Advanced Regression for Environmental Epidemiology
This course covers applied advanced regression analysis. Its focus is on relaxing classical assumptions in regression analysis to better match what epidemiological data really looks like. Specifically, the course will cover nonlinear exposure-response relationships and repeated measure designs, including non-parametric and semi-parametric smoothing techniques, generalized additive models, and time series models. In addition to the theoretical material, students will apply these techniques using R to actual datasets including modeling the effects of environmental exposures on health outcomes. These techniques also are widely applicable to problems in infectious disease, psychiatric, nutritional, occupational, and cancer epidemiology. Basic biostatistics and a course in regression analysis recommended.
Professor:

Joel Schwartz
Season:
Spring
Days:
T
Th
Time:
Tuesdays 1:30-3:20; Thursdays 12:30-3:20
School:
• Harvard School of Public Health
Research Areas:
• Human Health
ID271 Advanced Regression for Environmental Epidemiology
This course covers applied advanced regression analysis. Its focus is on relaxing classical assumptions in regression analysis to better match what epidemiological data really looks like. Specifically, the course will cover nonlinear exposure-response relationships and repeated measure designs, including non-parametric and semi-parametric smoothing techniques, generalized additive models, and time series models. In addition to the theoretical material, students will apply these techniques using R to actual datasets including modeling the effects of environmental exposures on health outcomes. These techniques also are widely applicable to problems in infectious disease, psychiatric, nutritional, occupational, and cancer epidemiology. Basic biostatistics and a course in regression analysis recommended.
Professor:
Joel Schwartz
Season:
Spring
Days:
T
Th
Time:
Tuesdays 1:30-3:20; Thursdays 12:30-3:20
School:
• Harvard School of Public Health
Research Areas:
• Human Health
IGA-406: Policy Analysis and Design for Sustainable Development
(Previously offered as IGA-944.) Sustainable development—promoting human well-being while conserving the life-supporting services of the natural environment over the long run—has emerged as a central challenge of the 21st century. This course explores interdisciplinary approaches for harnessing knowledge to support action in pursuit of sustainable development.In particular, it addresses the diagnosis of barriers to sustainable development, the design of policy and technology interventions to overcome those barriers, and the evaluation of how those interventions are likely to perform.The conceptual foundations of the course include the politics and ethics of defining goals and metrics for sustainable development; the complex and adaptive social-environmental systems that constitute the stage on which efforts to promote sustainable development are acted out; and the productive base of assets-manufactured capital, human capital, natural capital, institutions and knowledge-that together determine societies' potential for sustainable development. The core concepts of the course are applied to specific cases of sustainable development ranging from local management of conservation reserves in the developing world, through comparative analysis of historical performance of nations and sectors, to the design of global governance institutions for supporting sustainable development. The course is designed for students who have achieved a degree of mastery in one or more relevant sciences (e.g. economics, ecology, political science,engineering, earth systems science, public health, etc.) but who wish to understand how other bodies of expertise can complement their own in efforts to the promote sustainable development. No student (or the instructor) will have a sophisticated understanding of all the disciplinary perspectives we explore; all are expected to bring some relevant expertise to the table, and to integrate it with that of their classmates through discussion and teamwork.

Second year masters students and doctoral students from throughout the university are welcome. Mid-career masters students with suitable backgrounds may be admitted on written application to the instructor.
Professor:
William C. Clark
Season:
Fall
Days:
M
W
Time:
2:40-4:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-944
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
IGA-406: Policy Analysis and Design for Sustainable Development
(Previously offered as IGA-944.) Sustainable development—promoting human well-being while conserving the life-supporting services of the natural environment over the long run—has emerged as a central challenge of the 21st century. This course explores interdisciplinary approaches for harnessing knowledge to support action in pursuit of sustainable development.In particular, it addresses the diagnosis of barriers to sustainable development, the design of policy and technology interventions to overcome those barriers, and the evaluation of how those interventions are likely to perform.The conceptual foundations of the course include the politics and ethics of defining goals and metrics for sustainable development; the complex and adaptive social-environmental systems that constitute the stage on which efforts to promote sustainable development are acted out; and the productive base of assets-manufactured capital, human capital, natural capital, institutions and knowledge-that together determine societies' potential for sustainable development. The core concepts of the course are applied to specific cases of sustainable development ranging from local management of conservation reserves in the developing world, through comparative analysis of historical performance of nations and sectors, to the design of global governance institutions for supporting sustainable development. The course is designed for students who have achieved a degree of mastery in one or more relevant sciences (e.g. economics, ecology, political science,engineering, earth systems science, public health, etc.) but who wish to understand how other bodies of expertise can complement their own in efforts to the promote sustainable development. No student (or the instructor) will have a sophisticated understanding of all the disciplinary perspectives we explore; all are expected to bring some relevant expertise to the table, and to integrate it with that of their classmates through discussion and teamwork. Second year masters students and doctoral students from throughout the university are welcome. Mid-career masters students with suitable backgrounds may be admitted on written application to the instructor.
Professor:
William C. Clark
Season:
Fall
Days:
M
W
Time:
2:40-4:00
School:
• Harvard Kennedy School
Catalog Number:

IGA-944
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
IGA-406: Policy Analysis and Design for Sustainable Development
(Previously offered as IGA-944.) Sustainable development—promoting human well-being while conserving the life-supporting services of the natural environment over the long run—has emerged as a central challenge of the 21st century. This course explores interdisciplinary approaches for harnessing knowledge to support action in pursuit of sustainable development.In particular, it addresses the diagnosis of barriers to sustainable development, the design of policy and technology interventions to overcome those barriers, and the evaluation of how those interventions are likely to perform.The conceptual foundations of the course include the politics and ethics of defining goals and metrics for sustainable development; the complex and adaptive social-environmental systems that constitute the stage on which efforts to promote sustainable development are acted out; and the productive base of assets-manufactured capital, human capital, natural capital, institutions and knowledge-that together determine societies' potential for sustainable development. The core concepts of the course are applied to specific cases of sustainable development ranging from local management of conservation reserves in the developing world, through comparative analysis of historical performance of nations and sectors, to the design of global governance institutions for supporting sustainable development. The course is designed for students who have achieved a degree of mastery in one or more relevant sciences (e.g. economics, ecology, political science,engineering, earth systems science, public health, etc.) but who wish to understand how other bodies of expertise can complement their own in efforts to the promote sustainable development. No student (or the instructor) will have a sophisticated understanding of all the disciplinary perspectives we explore; all are expected to bring some relevant expertise to the table, and to integrate it with that of their classmates through discussion and teamwork. Second year masters students and doctoral students from throughout the university are welcome. Mid-career masters students with suitable backgrounds may be admitted on written application to the instructor.
Professor:
William C. Clark
Season:
Fall
Days:
M
W
Time:
2:40-4:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-944
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
IGA-409: Climate Engineering: Science, Technology and Policy
An introductory course bringing rigorous analysis to bear on the emerging global challenge of climate engineering. Important in its own right, geoengineering -- the deliberate alteration of the earth's climate -- also provides a new lens with which to view climate science and policy. A gram of aerosol in the stratosphere can offset the warming effect of a ton of carbon dioxide, a factor of a million to one. This is roughly the same factor by which nuclear explosives overpower conventional bombs. Like nuclear weapons climate engineering technologies present an extraordinary governance challenge in a divided world. The course is jointly offered by the faculty at Harvard Kennedy School and MIT. It introduces climate change, climate engineering, and climate policy assuming no prior knowledge of these topics. The course is intended for professional school students or graduate students. Confidence with mathematics and physical science at the freshman level is assumed. The course will have a substantial quantitative component, about two thirds of the content will be science and technology and one third will be public policy.

Professor:
David Keith
Professor:
Steven Barrett
Season:
Fall
Days:
W
Time:
4:00-7:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-409
Research Areas:
• Business, Law and Policy
• Climate
IGA-409: Climate Engineering: Science, Technology and Policy
An introductory course bringing rigorous analysis to bear on the emerging global challenge of climate engineering. Important in its own right, geoengineering -- the deliberate alteration of the earth's climate -- also provides a new lens with which to view climate science and policy. A gram of aerosol in the stratosphere can offset the warming effect of a ton of carbon dioxide, a factor of a million to one. This is roughly the same factor by which nuclear explosives overpower conventional bombs. Like nuclear weapons climate engineering technologies present an extraordinary governance challenge in a divided world. The course is jointly offered by the faculty at Harvard Kennedy School and MIT. It introduces climate change, climate engineering, and climate policy assuming no prior knowledge of these topics. The course is intended for professional school students or graduate students. Confidence with mathematics and physical science at the freshman level is assumed. The course will have a substantial quantitative component, about two thirds of the content will be science and technology and one third will be public policy.
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Professor:
David Keith
Professor:
Steven Barrett
Season:
Fall
Days:
W
Time:
4:00-7:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-409
Research Areas:
• Business, Law and Policy
• Climate
IGA-410: Energy Policy, Technologies, Systems, and Markets
Energy is a critical component of every dimension of human society. It is an essential input for economic development, transportation, and agriculture, and it shapes national and international policies in the environmental, national security, and technology arenas. IGA-410 is an introductory energy policy course which introduces students to the policy and economic dimensions of the energy choices to meet societal goals—both global and domestic. Oil and gas markets, electricity policy, technology innovation, renewable energy, energy efficiency, climate change and global energy politics will be covered. The first part of the course intodoces students to quantitative and qualitative analytical tools to assess energy problems and the fundamental concepts of energy policy. The second part relies heavily on case studies to explore specific challenges, which will allow students to apply the tools acquired in the first segment. Previous exposure to micro-economics is useful, but not required.
Professor:
Henry Lee
Season:
Fall
Days:
M
W
Time:
4:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-410
Research Areas:
• Business, Law and Policy
• Energy

IGA-410: Energy Policy, Technologies, Systems, and Markets
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Professor:
Henry Lee
Season:
Fall
Days:
M
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Time:
4:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-410
Research Areas:
• Business, Law and Policy
• Energy
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Professor:
Henry Lee
Season:
Fall
Days:
M
W
Time:
4:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-410
Research Areas:

• Business, Law and Policy
• Energy
IGA-412: The Geopolitics of Energy
The Geopolitics of Energy examines the intersection between international security, politics, and energy issues. The course begins with the recognition that energy has long been a major determinant of power in the international system and that every shift in global energy patterns has brought with it changes in international politics. IGA -412 explores how countries shape their grand strategies to meet their energy needs, as well as how such actions have implications for other countries and global politics. It looks at some of the pressing contemporary issues about peak oil, political reform and energy, pipeline politics, and the aggressive pursuit of oil and gas worldwide. The course also looks at new technologies and innovations – such as those making the extraction of shale gas economical or the growth of solar power – and how they are changing patterns of trades and could shape new alliances. Finally, IGA-412 considers the consequences of a successful shift away from petroleum based economies to anticipate how a new energy order will alter global politics in fundamental ways.
Professor:
Meghan O'Sullivan
Season:
Spring
Days:
M
W
Time:
2:40
School:
• Harvard Kennedy School
Catalog Number:
IGA-412
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Energy
IGA-412: The Geopolitics of Energy
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Professor:
Meghan O'Sullivan
Season:
Spring
Days:
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Time:

2:40
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Catalog Number:
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Subject Area:
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• Energy
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Professor:
Meghan O'Sullivan
Season:
Spring
Days:
M
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Time:
2:40
School:
• Harvard Kennedy School
Catalog Number:
IGA-412
Subject Area:
Government
Research Areas:
• Business, Law and Policy
• Energy
IGA-414: Political Economy of Oil and Mining Resources in Developing Countries
This course evaluates the political and economic determinants of oil and mineral resource policies in developing countries and their impact on world markets, the interaction between states and extractive industries, the challenges of resource wealth management, and the causal links between resource abundance/dependency and development, institutions, and regime type. Questions to be discussed include: Why has resource nationalism been on the rise again? Why are there such high rents in oil and mineral extraction? Why is there such a significant variation in domestic pricing policies? What are the political and economic consequences of volatile resource prices? Is there a resource curse? Do mineral rents hinder democracy and development? What is the effect of mineral dependence on institutions? Which institutions can help to make mineral wealth a blessing? The first part of the course centers on the political economy of the oil and mineral industry, markets, and policies. The second part focuses on the consequences of resource dependence for development and democracy. Although the main focus is on oil, other mineral resources are also considered and compared to renewable natural resources.

Professor:
Francisco Monaldi
Season:
Spring
Days:
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Time:
4:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-414
Research Areas:
• Business, Law and Policy
• Energy
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Professor:
Francisco Monaldi
Season:
Spring
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Professor:
Francisco Monaldi
Season:
Spring
Days:
M
W
Time:
4:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-414
Research Areas:
• Business, Law and Policy
• Energy
IGA-422: Global Food Politics and Policy
Food and farming have emerged as urgent social concerns. The policy challenges in this area range from widespread undernutrition in many poor countries to a growing obesity crisis in wealthy countries. Skewed ownership of agricultural land and inadequate public investment in infrastructure cause rural poverty and social inequity. Unsustainable farming systems, encouraged by sub-optimal government policy, are both a cause and a consequence of climate change. In poor countries governments typically tax farmers to subsidize food consumers, while in rich countries they instead subsidize farmers, often at excessive cost to consumers and taxpayers. Expanding livestock industries trigger conflict on grounds of health, food safety, and animal welfare. Rapidly evolving cultural demands for organic, local, and slow foods present challenges to the conventional food and farming sector. Genetically engineered seeds spark conflict. This course will review the politics of food and farming in both rich and poor countries. It emphasizes the durable importance of national governments and national policy making, plus the significant influence of intergovernmental organizations (IGOs), multinational food and agribusiness companies, and international NGOs ranging from humanitarian relief and advocacy organizations, to social entrepreneurs and philanthropic foundations.
Professor:
Robert Paarlberg
Season:
Fall
Days:
T
Th
Time:
10:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-422
Research Areas:
• Business, Law and Policy
IGA-422: Global Food Politics and Policy

Food and farming have emerged as urgent social concerns. The policy challenges in this area range from widespread undernutrition in many poor countries to a growing obesity crisis in wealthy countries. Skewed ownership of agricultural land and inadequate public investment in infrastructure cause rural poverty and social inequity. Unsustainable farming systems, encouraged by sub-optimal government policy, are both a cause and a consequence of climate change. In poor countries governments typically tax farmers to subsidize food consumers, while in rich countries they instead subsidize farmers, often at excessive cost to consumers and taxpayers. Expanding livestock industries trigger conflict on grounds of health, food safety, and animal welfare. Rapidly evolving cultural demands for organic, local, and slow foods present challenges to the conventional food and farming sector. Genetically engineered seeds spark conflict. This course will review the politics of food and farming in both rich and poor countries. It emphasizes the durable importance of national governments and national policy making, plus the significant influence of intergovernmental organizations (IGOs), multinational food and agribusiness companies, and international NGOs ranging from humanitarian relief and advocacy organizations, to social entrepreneurs and philanthropic foundations.
Professor:
Robert Paarlberg
Season:
Fall
Days:
T
Th
Time:
10:10
School:
• Harvard Kennedy School
Catalog Number:
IGA-422
Research Areas:
• Business, Law and Policy
IGA-451M: Controversies in Climate, Energy, and the Media: Improving Public Communication
The media plays a unique role in shaping the public policy, politics and understanding of crucial—and often controversial—energy, environment, and climate change issues in the United States and abroad. The media landscape is changing rapidly as mainstream news outlets struggle with fewer resources and less time. Meanwhile, the Internet provides a growing global megaphone for unsorted, confusing and often contradictory information and opinion on blogs and social media. This course will analyze the best and worst media coverage of recent energy and environmental events, including the Fukushima Japan nuclear accident; the Deepwater Horizon oil spill; "Climategate;" and the Cape Wind energy siting debate. Students will examine how researchers, policy experts, and decision makers in the private and public sectors utilize both formal and informal media to communicate about their work to the public and how this process can be improved.
Professor:
Cristine Russell
Season:
Spring
Days:
T
Th
Time:
11:40-1:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-451M

Research Areas:
• Business, Law and Policy
• Energy
IGA-451M: Controversies in Climate, Energy, and the Media: Improving Public Communication
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Professor:
Cristine Russell
Season:
Spring
Days:
T
Th
Time:
11:40-1:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-451M
Research Areas:
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• Energy
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Professor:
Cristine Russell
Season:
Spring
Days:
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Th
Time:
11:40-1:00
School:
• Harvard Kennedy School

Catalog Number:
IGA-451M
Research Areas:
• Business, Law and Policy
• Energy
IGA-513: Science, Power, and Politics
This seminar introduces students to the major contributions of the field of science and technology studies (STS) to the analysis of politics and policymaking in democratic societies. The objective is to expand students' understanding of the ways in which science and technology participate in the creation of social and political order. The seminar is devoted to reading and analyzing works by scholars in STS and related fields who have addressed such topics as the relationship between scientific and political authority, science's relations with the state, science and democracy, scientific and technical controversies, and citizenship in technological societies.
Also offered by the History of Science Department as HistSci 285.
Professor:
Sheila Jasanoff
Season:
Fall
Days:
W
Time:
2:10-4:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-513
Research Areas:
• Business, Law and Policy
• Social Sciences
IGA-513: Science, Power, and Politics
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Also offered by the History of Science Department as HistSci 285.
Professor:
Sheila Jasanoff
Season:
Fall
Days:
W
Time:
2:10-4:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-513
Research Areas:
• Business, Law and Policy

• Social Sciences
IGA-513: Science, Power, and Politics
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Also offered by the History of Science Department as HistSci 285.
Professor:
Sheila Jasanoff
Season:
Fall
Days:
W
Time:
2:10-4:00
School:
• Harvard Kennedy School
Catalog Number:
IGA-513
Research Areas:
• Business, Law and Policy
• Social Sciences
JOUR E-162: Environmental Journalism
The aim of this course is to teach students how to produce newsworthy stories on environmental topics, ranging from climate change to toxins in the environment to sustainability. Part of the course focuses on the basics of environmental science and reporting in order to incorporate that knowledge into journalism. The goal is for students to understand the fundamental elements of an environmental story—expert opinion, data analysis, real people, impact, and descriptive writing—and interweave them into a finished product. We also focus on how freelance writers can successfully pitch environmental stories to editors, from op-eds to feature-length pieces. Students are introduced to the basics of environmental law, investigative environmental reporting, nature writing, climate change, energy and sustainability issues, communicating risk, toxicology, epidemiology, advocacy journalism, and dealing with spin. Also includes guest speakers from the worlds of environmental journalism and environmental science.
Prerequisite(s): Proof of English proficiency is required of students whose native language is not English.
Professor:
Joy Horowitz
Season:
Fall
Days:
T
Time:
5:30-7:30
Catalog Number:
14540
Research Areas:
• Arts and Humanities
JOUR E-166: Photographing the Environment
This course concentrates on photographing the landscape, both urban and natural, from the point-of-view of an environmental journalist. Students are required to shoot outdoors each week at various times during the day, in the pre-dawn light, and at night. Topics and

homework exercises include light (becoming aware of how light falls on the land, from dawn through nightfall), long exposures (some subjects require long exposures from 1/15 second to several hours), the city at dusk, the full moon, the night sky, time lapse (how to record a series of images over the course of a day or weeks, such as the bloom cycle of a flower, emissions from a power plant, traffic patterns of humans, the advance of a glacier), weather (bad weather makes good pictures, how to document weather events without destroying the camera), shooting at sea, and scale (from macro lenses for small creatures to telephoto lenses for shy creatures, what to use when).
Prerequisite(s): Proof of English proficiency is required of students whose native language is not English.
Professor:
Maria Stenzel
Season:
Spring
Days:
Th
Time:
5:30-7:30
Catalog Number:
24243
Research Areas:
• Arts and Humanities
LAW-2025: Energy and Climate Law and Policy
This seminar integrates traditional U.S. energy law with U.S. climate law. Topics covered include: federal and state laws governing electricity regulation and transmission; coal, natural gas, nuclear and renewable power; energy efficiency; federal climate policy under the Clean Air Act; oil and alternatives to oil for the transportation sector; state clean energy programs; and energy security. The materials will raise interesting questions about the federalism, regulatory design, economic, and technological challenges in this space, and will push students to confront the obstacles to aligning the (sometimes) conflicting goals of energy and environmental policy. The animating question for the course is: what legal infrastructure is necessary to facilitate a transition to cleaner energy, while controlling costs, ensuring system resilience, and protecting national security?
Readings will include traditional legal materials such as cases and statutes (we will use a casebook on energy law) but also a variety of supplementary policy documents drawn from government, nonprofit, academic and private sector sources.
Professor:
Jody Freeman
Season:
Spring
Days:
W
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2025
Research Areas:
• Business, Law and Policy
• Energy
LAW-2025: Energy and Climate Law and Policy
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will raise interesting questions about the federalism, regulatory design, economic, and technological challenges in this space, and will push students to confront the obstacles to aligning the (sometimes) conflicting goals of energy and environmental policy. The animating question for the course is: what legal infrastructure is necessary to facilitate a transition to cleaner energy, while controlling costs, ensuring system resilience, and protecting national security?

Readings will include traditional legal materials such as cases and statutes (we will use a casebook on energy law) but also a variety of supplementary policy documents drawn from government, nonprofit, academic and private sector sources.

Professor:

Jody Freeman

Season:

Spring

Days:

W

Time:

5:00-7:00

School:

• Harvard Law School

Catalog Number:

2025

Research Areas:

• Business, Law and Policy

• Energy

LAW-2025: Energy and Climate Law and Policy

This seminar integrates traditional U.S. energy law with U.S. climate law. Topics covered include: federal and state laws governing electricity regulation and transmission; coal, natural gas, nuclear and renewable power; energy efficiency; federal climate policy under the Clean Air Act; oil and alternatives to oil for the transportation sector; state clean energy programs; and energy security. The materials will raise interesting questions about the federalism, regulatory design, economic, and technological challenges in this space, and will push students to confront the obstacles to aligning the (sometimes) conflicting goals of energy and environmental policy. The animating question for the course is: what legal infrastructure is necessary to facilitate a transition to cleaner energy, while controlling costs, ensuring system resilience, and protecting national security?

Readings will include traditional legal materials such as cases and statutes (we will use a casebook on energy law) but also a variety of supplementary policy documents drawn from government, nonprofit, academic and private sector sources.

Professor:

Jody Freeman

Season:

Spring

Days:

W

Time:

5:00-7:00

School:

• Harvard Law School

Catalog Number:

2025

Research Areas:

• Business, Law and Policy

• Energy

LAW-2074: Environmental Law

This introductory course will focus on the variety of legal mechanisms we use to address environmental harms such as air and water pollution, global climate change, and habitat destruction. We will focus on the key federal environmental statutes, including the National Environmental Policy Act, the Clean Air Act, the Clean Water Act, and the Endangered Species Act, and the leading cases in which these statutes have been interpreted by courts. The statutes will be studied in some detail so that students emerge with a basic understanding of their major regulatory provisions. Thematically, the statutes serve as illustrations of different regulatory approaches to environmental problems, from command and control standards to market-based instruments. In addition, we will discuss important matters of policy, including the Obama administrations efforts to address climate change through the use of Executive Power. The course will also cover developments in Commerce Clause, Takings and Standing jurisprudence which significantly affect federal environmental law; the role of cost-benefit analysis in environmental regulation. Finally, we will discuss the political economy of environmental regulation, specifically the role played by interest groups (both industry and environmental organizations) in producing, implementing and enforcing environmental law.

Students need not be self-identified "environmentalists" to be interested in this course. Nearly every area of law is now affected by environmental regulation, including corporate law, real estate and bankruptcy. The legal issues presented by environmental problems offer ample opportunities for students to develop important and transferable legal skills, including statutory interpretation, constitutional analysis and application of administrative law doctrines.

Professor:

Jody Freeman

Season:

Fall

Days:

M

T

Time:

1:00-3:00

School:

• Harvard Law School

Catalog Number:

2074

Research Areas:

• Business, Law and Policy

LAW-2074: Environmental Law

This introductory course will focus on the variety of legal mechanisms we use to address environmental harms such as air and water pollution, global climate change, and habitat destruction. We will focus on the key federal environmental statutes, including the National Environmental Policy Act, the Clean Air Act, the Clean Water Act, and the Endangered Species Act, and the leading cases in which these statutes have been interpreted by courts. The statutes will be studied in some detail so that students emerge with a basic understanding of their major regulatory provisions. Thematically, the statutes serve as illustrations of different regulatory approaches to environmental problems, from command and control standards to market-based instruments. In addition, we will discuss important matters of policy, including the Obama administrations efforts to address climate change through the use of Executive Power. The course will also cover developments in Commerce Clause, Takings and Standing jurisprudence which significantly affect federal environmental law; the role of cost-benefit analysis in environmental regulation. Finally, we will discuss the political economy of environmental regulation, specifically the role played by interest groups (both industry and environmental organizations) in producing, implementing and enforcing environmental law.

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Professor:

Jody Freeman

Season:

Fall
Days:
M
T
Time:
1:00-3:00
School:
• Harvard Law School
Catalog Number:
2074
Research Areas:
• Business, Law and Policy
LAW-2106: Green New York
For almost a decade, New York City has undertaken an ambitious urban agenda that includes a major focus on environmental issues, ranging from reducing the city?s impact on climate change to dealing with waterways and brownfields. This seminar will address the legal problems that New York City confronts in undertaking this effort. Taught in conjunction with attorneys now working for the New York City Law Department, the seminar will consist of two parts. The first, which involves classroom work, will take place predominantly in the fall. This element will introduce basic issues of local government law and local environmental policy. The second, which involves clinical work with the New York City Law Department, will take place principally in the Spring. It will enable students to help the City in its effort to resolve some of the legal issues that it now faces. The seminar is limited to 12 students, and every student must be involved in both aspects of the seminar. To join the seminar, you must obtain permission from the instructor. To do so, you should emai

frug@law.harvard.edu

, explaining your background and your interest. Applications are considered on a rolling basis. Interested students are encouraged to apply as early as possible.
Professor:
Gerald E. Frug
Season:
Fall
Days:
W
Time:
1:00-3:00
School:
• Harvard Law School
Catalog Number:
2106
Research Areas:
• Business, Law and Policy
LAW-2106: Green New York
For almost a decade, New York City has undertaken an ambitious urban agenda that includes a major focus on environmental issues, ranging from reducing the city?s impact on climate change to dealing with waterways and brownfields. This seminar will address the legal problems that New York City confronts in undertaking this effort. Taught in conjunction with attorneys now working for the New York City Law Department, the seminar will consist of two parts. The first, which involves classroom work, will take place predominantly in the fall. This element will introduce basic issues of local government law and local environmental policy. The second, which involves clinical work with the New York City Law Department, will take place principally in the Spring. It will enable students to

help the City in its effort to resolve some of the legal issues that it now faces. The seminar is limited to 12 students, and every student must be involved in both aspects of the seminar. To join the seminar, you must obtain permission from the instructor. To do so, you should emai

frug@law.harvard.edu

, explaining your background and your interest. Applications are considered on a rolling basis. Interested students are encouraged to apply as early as possible.
Professor:
Gerald E. Frug
Season:
Fall
Days:
W
Time:
1:00-3:00
School:
• Harvard Law School
Catalog Number:
2106
Research Areas:
• Business, Law and Policy
LAW-2123: International Environmental Law
This course explores the economic, political, and legal concepts relevant to international efforts to promote environmental protection. After laying a foundation in the nature of international law, institutions and the challenges of sustainable development, the course addresses concrete regimes designed to deal with specific international environmental problems, such as ozone depletion, marine pollution, fisheries depletion, biodiversity loss and, of course, climate change, among others. The course focuses principally on the dynamic of treaties, negotiations, and state and non-state actors on the international plane, with some discussion of the interplay between domestic legislation and international protection efforts.
Professor:
Season:
Winter
Days:
W
Th
F
Time:
1:00-4:30
School:
• Harvard Law School
Catalog Number:
2123
Research Areas:
• Business, Law and Policy
LAW-2123: International Environmental Law
This course explores the economic, political, and legal concepts relevant to international efforts to promote environmental protection. After laying a foundation in the nature of international law, institutions and the challenges of sustainable development, the course addresses concrete regimes designed to deal with specific international environmental problems, such as ozone depletion, marine

pollution, fisheries depletion, biodiversity loss and, of course, climate change, among others. The course focuses principally on the dynamic of treaties, negotiations, and state and non-state actors on the international plane, with some discussion of the interplay between domestic legislation and international protection efforts.
Professor:
Season:
Winter
Days:
W
Th
F
Time:
1:00-4:30
School:
• Harvard Law School
Catalog Number:
2123
Research Areas:
• Business, Law and Policy
LAW-2359: Food Law and Policy
This seminar will present an overview of topics in food policy and will examine how law and policy shape our food system and what we eat. In recent years, increasing attention has been focused on agricultural policy, the safety of the food chain, and the dual burdens of hunger and obesity.
We will examine food policy from various viewpoints, including a historical perspective, past and current economic attitudes, and the lenses of farmers versus consumers versus food corporations. We will concentrate on food law in the United States, but will also discuss the global food system, and will include comparative international perspectives in areas such as food aid programs, farming support, and increasing healthy food access.
This seminar will begin with the big picture, looking at the broader ways in which domestic and international law have interacted to lead to malnutrition and obesity both in the United States and abroad. Following this overview, we will analyze federal agricultural policy and farm subsidies and take a look at the environmental, health, and safety implications of farming in our current food system. We will also discuss genetically modified crops, and the meaning of "organic," "sustainable," and "fair trade," as well as ongoing debates about these labels. We will then take a series of weeks to look at the role the government plays in what foods are eaten in the United States, through its food assistance programs, food purchasing programs, and nutrition guidelines. Finally, we will spend the last few weeks of the semester evaluating potential solutions, including interventions aimed at improving education about healthy foods, changing food advertising and marketing practices, and increasing access to healthy foods.
The reading materials for the seminar will be provided in a course reader, and will include various book chapters, cases, regulations, news reports, and scholarly articles that present diverse viewpoints on the topics presented. The seminar is intended to spark debate between different sides of these often controversial issues. In addition to discussion of the reading for each class theme, students will also be assigned to participate in role plays and debates.
The seminar is open to any student interested in food and agricultural policy and its implications on health and the environment, and no background or prerequisites are required. Rather than an examination, students will be required to sumbit reading responses, via the online course blog; prepare for and participate in in-class role play debates; and submit one short policy brief. The policy brief will be geared to the appropriate government level and agency (state or federal government, depending on who controls the issue) and will explain a food-related problem and recommend a policy change or set of changes intended to improve the health, nutrition, or environmental outcomes. Grades will be determined on the basis of these written submissions, in-class role plays, and class participation.
Professor:
Robert Greenwald
Emily Michele Broad Leib
Season:

Spring
Fall
Days:
M
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2359
Research Areas:
• Business, Law and Policy
LAW-2359: Food Law and Policy
This seminar will present an overview of topics in food policy and will examine how law and policy shape our food system and what we eat. In recent years, increasing attention has been focused on agricultural policy, the safety of the food chain, and the dual burdens of hunger and obesity.
We will examine food policy from various viewpoints, including a historical perspective, past and current economic attitudes, and the lenses of farmers versus consumers versus food corporations. We will concentrate on food law in the United States, but will also discuss the global food system, and will include comparative international perspectives in areas such as food aid programs, farming support, and increasing healthy food access.
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The reading materials for the seminar will be provided in a course reader, and will include various book chapters, cases, regulations, news reports, and scholarly articles that present diverse viewpoints on the topics presented. The seminar is intended to spark debate between different sides of these often controversial issues. In addition to discussion of the reading for each class theme, students will also be assigned to participate in role plays and debates.
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Professor:
Robert Greenwald
Emily Michele Broad Leib
Season:
Spring
Fall
Days:
M
Time:
5:00-7:00

School:
• Harvard Law School
Catalog Number:
2359
Research Areas:
• Business, Law and Policy
LAW-2387: Public Interest Environmental Litigation
This course provides a overview of the practice of public interest environmental litigation. Most federal environmental statutes, such as the Clean Air Act and the Clean Water Act, include a provision allowing any person to bring suit in federal court against any person who violates the statute. These citizen suits have many unique characteristics that distinguish them from typical civil litigation. Public interest plaintiffs may also challenge agency action under certain other environmental statutes, such as the National Environmental Policy Act, pursuant to the Administrative Procedure Act.
Students in this class will learn, from start to finish, how to litigate cases under the federal environmental laws-both true citizen-suit cases and cases brought under the APA. The emphasis will not be on mastering the substance of the various environmental laws (although some of that will be necessary), but instead on the practical skills and knowledge necessary to prosecute and defend these suits.
The topics to be covered include:
• Factual investigation of potential claims and evidentiary issues.
• Drafting notice letters.
• Conditions precedent to suit and other procedural requirements and defenses.
• Standing declarations: interviewing clients and helping them prepare a declaration to establish their standing.
• Intervention.
• Remedies, including injunctions, civil penalties, and attorneys fees.
• Characteristics of different types of environmental suits.
• Strategies for plaintiffs, defendants, and intervenors.
• Media relations.
• Ethical issues in public interest environmental litigation.
Students are encouraged to enroll in the Environmental Law & Policy Clinic, which will provide students with practical experience through projects for clinic clients. Some seats in this seminar are reserved for students who are enrolled in the clinic (students must be enrolled in the clinic before they can claim one of these reserved seats). A students enrollment in a reserved clinical seat is dependent on the students enrollment in the Environmental Law & Policy Clinic. Please see the clinics description for more information.
Professor:
Shaun Goho
Season:
Fall
Days:
T
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2387
Research Areas:
• Business, Law and Policy
LAW-2387: Public Interest Environmental Litigation
This course provides a overview of the practice of public interest environmental litigation. Most federal environmental statutes, such as the Clean Air Act and the Clean Water Act, include a provision allowing any person to bring suit in federal court against any person who violates the statute. These citizen suits have many unique characteristics that distinguish them from typical civil litigation. Public interest

plaintiffs may also challenge agency action under certain other environmental statutes, such as the National Environmental Policy Act, pursuant to the Administrative Procedure Act.
Students in this class will learn, from start to finish, how to litigate cases under the federal environmental laws-both true citizen-suit cases and cases brought under the APA. The emphasis will not be on mastering the substance of the various environmental laws (although some of that will be necessary), but instead on the practical skills and knowledge necessary to prosecute and defend these suits.
The topics to be covered include:
• Factual investigation of potential claims and evidentiary issues.
• Drafting notice letters.
• Conditions precedent to suit and other procedural requirements and defenses.
• Standing declarations: interviewing clients and helping them prepare a declaration to establish their standing.
• Intervention.
• Remedies, including injunctions, civil penalties, and attorneys fees.
• Characteristics of different types of environmental suits.
• Strategies for plaintiffs, defendants, and intervenors.
• Media relations.
• Ethical issues in public interest environmental litigation.
Students are encouraged to enroll in the Environmental Law & Policy Clinic, which will provide students with practical experience through projects for clinic clients. Some seats in this seminar are reserved for students who are enrolled in the clinic (students must be enrolled in the clinic before they can claim one of these reserved seats). A students enrollment in a reserved clinical seat is dependent on the students enrollment in the Environmental Law & Policy Clinic. Please see the clinics description for more information.
Professor:
Shaun Goho
Season:
Fall
Days:
T
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2387
Research Areas:
• Business, Law and Policy
LAW-2402: Human Rights and the Environment
Over the past half century, human rights law and environmental law have made great strides largely independently of one another. This clinical seminar will explore a growing field that seeks to bring the two together. Students will examine how the separate legal frameworks intersect and analyze the strategic advantages and disadvantages of linking them. In some circumstances, environmental protection and human rights promotion benefit each other, while in others, these two worthy causes can be at odds.
Through local and global case studies, students will discuss the use of law to address contemporary issues such as climate change, conservation, environmental justice, extractive industries, the protection of indigenous peoples, and environmental harm caused by armed conflict. They will consider: How should one deal with situations where the interests of human rights and the environment compete? What is the proper balance between addressing present generations needs and protecting future generations interests? Should advocates rely on traditional legal principles or promote emerging rights, for example, the right to a healthy environment? Can currently distinct branches of law inform creation of new law with both humanitarian and environmental benefits?
While learning about this field, students will also build advocacy skills by doing fact-finding, media, and treaty negotiation role plays. A fall clinical practice component in the International Human Rights Clinic is required of all students.
Required Clinic Component: International Human Rights Clinic (2-4 fall credits). Students enrolled in the fall clinic must take either this

course or Human Rights Advocacy (fall). Students will be enrolled in one of these required courses by the Office of Clinical and Pro Bono Programs. Students are guaranteed a seat in one of these two required courses, but are not guaranteed their first choice. Students may enroll in only one of the two available courses.
Additional Co-/Pre-Requisites: None.
By Permission: No.
Add/Drop Deadline: September 3, 2014.
LLM Students: LLM students may apply to the clinic by submitting an application.
Professor:
Bonnie Lynn Docherty
Season:
Fall
Days:
T
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2402
Research Areas:
• Business, Law and Policy
LAW-2402: Human Rights and the Environment
Over the past half century, human rights law and environmental law have made great strides largely independently of one another. This clinical seminar will explore a growing field that seeks to bring the two together. Students will examine how the separate legal frameworks intersect and analyze the strategic advantages and disadvantages of linking them. In some circumstances, environmental protection and human rights promotion benefit each other, while in others, these two worthy causes can be at odds.
Through local and global case studies, students will discuss the use of law to address contemporary issues such as climate change, conservation, environmental justice, extractive industries, the protection of indigenous peoples, and environmental harm caused by armed conflict. They will consider: How should one deal with situations where the interests of human rights and the environment compete? What is the proper balance between addressing present generations needs and protecting future generations interests? Should advocates rely on traditional legal principles or promote emerging rights, for example, the right to a healthy environment? Can currently distinct branches of law inform creation of new law with both humanitarian and environmental benefits?
While learning about this field, students will also build advocacy skills by doing fact-finding, media, and treaty negotiation role plays. A fall clinical practice component in the International Human Rights Clinic is required of all students.
Required Clinic Component: International Human Rights Clinic (2-4 fall credits). Students enrolled in the fall clinic must take either this course or Human Rights Advocacy (fall). Students will be enrolled in one of these required courses by the Office of Clinical and Pro Bono Programs. Students are guaranteed a seat in one of these two required courses, but are not guaranteed their first choice. Students may enroll in only one of the two available courses.
Additional Co-/Pre-Requisites: None.
By Permission: No.
Add/Drop Deadline: September 3, 2014.
LLM Students: LLM students may apply to the clinic by submitting an application.
Professor:
Bonnie Lynn Docherty
Season:
Fall
Days:
T

Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2402
Research Areas:
• Business, Law and Policy
LAW-2662: Supreme Court and Environmental Law
This seminar will explore the role of the United States Supreme Court in the shaping of the nations environmental and natural resources laws. Students will review and discuss some of the most significant Supreme Court rulings and Justices, beginning with the nations early years and extending to current times and issues now before the Court. The seminar will also examine the role of advocacy before the Court in environmental cases. Readings will include legal scholarship on the Courts environmental law precedent, the Courts opinions, and in-depth examination of the briefs and oral arguments in significant environmental law Supreme Court cases.
Professor:
Richard J. Lazarus
Professor:
Season:
Fall
Days:
T
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2662
Research Areas:
• Business, Law and Policy
LAW-2662: Supreme Court and Environmental Law
This seminar will explore the role of the United States Supreme Court in the shaping of the nations environmental and natural resources laws. Students will review and discuss some of the most significant Supreme Court rulings and Justices, beginning with the nations early years and extending to current times and issues now before the Court. The seminar will also examine the role of advocacy before the Court in environmental cases. Readings will include legal scholarship on the Courts environmental law precedent, the Courts opinions, and in-depth examination of the briefs and oral arguments in significant environmental law Supreme Court cases.
Professor:
Richard J. Lazarus
Professor:
Season:
Fall
Days:
T
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2662

Research Areas:
• Business, Law and Policy
LAW-2712: Contemporary Issues in Oil and Gas Law: Fracking, Takings, Pipelines, and Regulation
This Reading Group will explore hot legal issues in oil and gas law relating to public health, environmental quality, fair compensation for public natural resources, and eminent domain for public utilities. The goal of the Reading Group is to provide an overview of energy law and to demonstrate how this rich subject interacts with many other areas of law. We will also apply problem-solving skills in our discussions of often contentious topics, and think about how to represent clients in these settings or craft creative policy solutions and management strategies.
We will meet for six two-hour sessions. After a brief introduction to oil and gas activity in the United States, the group will tackle four legal topics - chemical disclosure, royalty transparency on public lands, methane emissions from the natural gas sector, and pipeline siting - in an informal, interactive setting. Students will be responsible for the readings, to ensure robust class discussions.
Professor:
Katherine Konschnik
Season:
Fall
Days:
Th
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2717
Research Areas:
• Business, Law and Policy
LAW-2712: Contemporary Issues in Oil and Gas Law: Fracking, Takings, Pipelines, and Regulation
This Reading Group will explore hot legal issues in oil and gas law relating to public health, environmental quality, fair compensation for public natural resources, and eminent domain for public utilities. The goal of the Reading Group is to provide an overview of energy law and to demonstrate how this rich subject interacts with many other areas of law. We will also apply problem-solving skills in our discussions of often contentious topics, and think about how to represent clients in these settings or craft creative policy solutions and management strategies.
We will meet for six two-hour sessions. After a brief introduction to oil and gas activity in the United States, the group will tackle four legal topics - chemical disclosure, royalty transparency on public lands, methane emissions from the natural gas sector, and pipeline siting - in an informal, interactive setting. Students will be responsible for the readings, to ensure robust class discussions.
Professor:
Katherine Konschnik
Season:
Fall
Days:
Th
Time:
5:00-7:00
School:
• Harvard Law School
Catalog Number:
2717
Research Areas:
• Business, Law and Policy

LAW-8008: Emmett Environmental Law and Policy Clinic Workshop A
The Emmett Environmental Law and Policy Clinic (ELPC) offers students an opportunity to do hands-on, meaningful, real-life, and real-time environmental regulatory, policy and advocacy work. Clinic offerings include local, national, and international projects covering the spectrum of environmental issues, under the leadership of Director and Clinical Professor Wendy Jacobs. Clinic students work on policy projects and white papers, regulatory and statutory drafting and comments, manuals and guidance to help non-lawyers identify and protect their rights, litigation and advocacy work, including developing case strategies, research and drafting briefs (filed in state and federal courts, including the U.S. Supreme Court), preparing witnesses and their testimony, meeting with clients and attending and presenting at administrative and court hearings. Our clients include state and municipal governments, non-governmental organizations, advocacy and community groups, and research and policy institutions. The subject matter varies each semester, but is likely to include climate change mitigation and adaptation, offshore drilling and water protection, sustainable agriculture/aquaculture, ethics in the study of human exposure to environmental contaminants, and development of legal frameworks for emerging technologies such as carbon capture and sequestration and extraction of natural gas by hydraulic fracturing.
Please note: Some ELPC students work off-campus with government agencies and nonprofit organizations, while others work on campus at the Clinic on cutting-edge projects and case work. Students are carefully matched to their projects/placements by the Clinic Director.
[Visit the course website for more details.]
Professor:
W. Jacobs
Season:
Fall
Time:
TBD
School:
• Harvard Law School
Catalog Number:
8008
Research Areas:
• Business, Law and Policy
LAW-8008: Emmett Environmental Law and Policy Clinic Workshop A
The Emmett Environmental Law and Policy Clinic (ELPC) offers students an opportunity to do hands-on, meaningful, real-life, and real-time environmental regulatory, policy and advocacy work. Clinic offerings include local, national, and international projects covering the spectrum of environmental issues, under the leadership of Director and Clinical Professor Wendy Jacobs. Clinic students work on policy projects and white papers, regulatory and statutory drafting and comments, manuals and guidance to help non-lawyers identify and protect their rights, litigation and advocacy work, including developing case strategies, research and drafting briefs (filed in state and federal courts, including the U.S. Supreme Court), preparing witnesses and their testimony, meeting with clients and attending and presenting at administrative and court hearings. Our clients include state and municipal governments, non-governmental organizations, advocacy and community groups, and research and policy institutions. The subject matter varies each semester, but is likely to include climate change mitigation and adaptation, offshore drilling and water protection, sustainable agriculture/aquaculture, ethics in the study of human exposure to environmental contaminants, and development of legal frameworks for emerging technologies such as carbon capture and sequestration and extraction of natural gas by hydraulic fracturing.
Please note: Some ELPC students work off-campus with government agencies and nonprofit organizations, while others work on campus at the Clinic on cutting-edge projects and case work. Students are carefully matched to their projects/placements by the Clinic Director.
[Visit the course website for more details.]
Professor:
W. Jacobs
Season:
Fall
Time:
TBD

School:
• Harvard Law School
Catalog Number:
8008
Research Areas:
• Business, Law and Policy
LAW-8008: Emmett Environmental Law and Policy Clinic Workshop B
The Emmett Environmental Law and Policy Clinic (ELPC) offers students an opportunity to do hands-on, meaningful, real-life, and real-time environmental regulatory, policy and advocacy work. Clinic offerings include local, national, and international projects covering the spectrum of environmental issues, under the leadership of Director and Clinical Professor Wendy Jacobs. Clinic students work on policy projects and white papers, regulatory and statutory drafting and comments, manuals and guidance to help non-lawyers identify and protect their rights, litigation and advocacy work, including developing case strategies, research and drafting briefs (filed in state and federal courts, including the U.S. Supreme Court), preparing witnesses and their testimony, meeting with clients and attending and presenting at administrative and court hearings. Our clients include state and municipal governments, non-governmental organizations, advocacy and community groups, and research and policy institutions. The subject matter varies each semester, but is likely to include climate change mitigation and adaptation, offshore drilling and water protection, sustainable agriculture/aquaculture, ethics in the study of human exposure to environmental contaminants, and development of legal frameworks for emerging technologies such as carbon capture and sequestration and extraction of natural gas by hydraulic fracturing.
Please note: Some ELPC students work off-campus with government agencies and nonprofit organizations, while others work on campus at the Clinic on cutting-edge projects and case work. Students are carefully matched to their projects/placements by the Clinic Director.
[Visit the course website for more details.]
Professor:
Wendy Jacobs
Season:
Winter
Time:
TBD
School:
• Harvard Law School
Catalog Number:
8008
Research Areas:
• Business, Law and Policy
LAW-8008: Emmett Environmental Law and Policy Clinic Workshop B
The Emmett Environmental Law and Policy Clinic (ELPC) offers students an opportunity to do hands-on, meaningful, real-life, and real-time environmental regulatory, policy and advocacy work. Clinic offerings include local, national, and international projects covering the spectrum of environmental issues, under the leadership of Director and Clinical Professor Wendy Jacobs. Clinic students work on policy projects and white papers, regulatory and statutory drafting and comments, manuals and guidance to help non-lawyers identify and protect their rights, litigation and advocacy work, including developing case strategies, research and drafting briefs (filed in state and federal courts, including the U.S. Supreme Court), preparing witnesses and their testimony, meeting with clients and attending and presenting at administrative and court hearings. Our clients include state and municipal governments, non-governmental organizations, advocacy and community groups, and research and policy institutions. The subject matter varies each semester, but is likely to include climate change mitigation and adaptation, offshore drilling and water protection, sustainable agriculture/aquaculture, ethics in the study of human exposure to environmental contaminants, and development of legal frameworks for emerging technologies such as carbon capture and sequestration and extraction of natural gas by hydraulic fracturing.
Please note: Some ELPC students work off-campus with government agencies and nonprofit organizations, while others work on campus at the Clinic on cutting-edge projects and case work. Students are carefully matched to their projects/placements by the Clinic Director.
[Visit the course website for more details.]

Professor:
Wendy Jacobs
Season:
Winter
Time:
TBD
School:
• Harvard Law School
Catalog Number:
8008
Research Areas:
• Business, Law and Policy
LAW-8008: Emmett Environmental Law and Policy Clinic Workshop C
The Emmett Environmental Law and Policy Clinic (ELPC) offers students an opportunity to do hands-on, meaningful, real-life, and real-time environmental regulatory, policy and advocacy work. Clinic offerings include local, national, and international projects covering the spectrum of environmental issues, under the leadership of Director and Clinical Professor Wendy Jacobs. Clinic students work on policy projects and white papers, regulatory and statutory drafting and comments, manuals and guidance to help non-lawyers identify and protect their rights, litigation and advocacy work, including developing case strategies, research and drafting briefs (filed in state and federal courts, including the U.S. Supreme Court), preparing witnesses and their testimony, meeting with clients and attending and presenting at administrative and court hearings. Our clients include state and municipal governments, non-governmental organizations, advocacy and community groups, and research and policy institutions. The subject matter varies each semester, but is likely to include climate change mitigation and adaptation, offshore drilling and water protection, sustainable agriculture/aquaculture, ethics in the study of human exposure to environmental contaminants, and development of legal frameworks for emerging technologies such as carbon capture and sequestration and extraction of natural gas by hydraulic fracturing.
Please note: Some ELPC students work off-campus with government agencies and nonprofit organizations, while others work on campus at the Clinic on cutting-edge projects and case work. Students are carefully matched to their projects/placements by the Clinic Director.
[Visit the course website for more details.]
Professor:
W. Jacobs
Season:
Spring
Time:
TBD
School:
• Harvard Law School
Catalog Number:
8008
Research Areas:
• Business, Law and Policy
LAW-8008: Emmett Environmental Law and Policy Clinic Workshop C
The Emmett Environmental Law and Policy Clinic (ELPC) offers students an opportunity to do hands-on, meaningful, real-life, and real-time environmental regulatory, policy and advocacy work. Clinic offerings include local, national, and international projects covering the spectrum of environmental issues, under the leadership of Director and Clinical Professor Wendy Jacobs. Clinic students work on policy projects and white papers, regulatory and statutory drafting and comments, manuals and guidance to help non-lawyers identify and protect their rights, litigation and advocacy work, including developing case strategies, research and drafting briefs (filed in state and federal courts, including the U.S. Supreme Court), preparing witnesses and their testimony, meeting with clients and attending and presenting at administrative and court hearings. Our clients include state and municipal governments, non-governmental organizations, advocacy and community groups, and research and policy institutions. The subject matter varies each semester, but is

likely to include climate change mitigation and adaptation, offshore drilling and water protection, sustainable agriculture/aquaculture, ethics in the study of human exposure to environmental contaminants, and development of legal frameworks for emerging technologies such as carbon capture and sequestration and extraction of natural gas by hydraulic fracturing.
Please note: Some ELPC students work off-campus with government agencies and nonprofit organizations, while others work on campus at the Clinic on cutting-edge projects and case work. Students are carefully matched to their projects/placements by the Clinic Director.
[Visit the course website for more details.]
Professor:
W. Jacobs
Season:
Spring
Time:
TBD
School:
• Harvard Law School
Catalog Number:
8008
Research Areas:
• Business, Law and Policy
Life Sciences 120. Global Health Threats
The multidisciplinary application of epidemiology, molecular biology and genetics, pathogenesis, drug discovery, immunology and vaccine development, and economic analysis to understanding and combating major threats to human health in developing countries. Emphasis will be on critical readings and scientific writing. Grades will be based on papers in which students will propose the application of multidisciplinary approaches to global health threats not covered in lecture.
Prerequisite: Life Sciences 1a and 1b or LPSA and one additional course from the following: Chemistry 27, Engineering 53, Life Sciences 2, MCB 52, MCB 54, OEB 10, OEB 53, or SCRB 10, or permission of the instructors.
Note: Limited to 50 students. This course cannot be taken if MCB 120 has already been taken. LS 120 cannot be taken concurrently with MCB 120.
Professor:
Barry Bloom
Professor:
Richard Losick
Season:
Spring
Days:
T
Th
Time:
1-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
98532
Subject Area:
Life Sciences
Research Areas:
• Human Health
Life Sciences 120. Global Health Threats
The multidisciplinary application of epidemiology, molecular biology and genetics, pathogenesis, drug discovery, immunology and

vaccine development, and economic analysis to understanding and combating major threats to human health in developing countries. Emphasis will be on critical readings and scientific writing. Grades will be based on papers in which students will propose the application of multidisciplinary approaches to global health threats not covered in lecture.
Prerequisite: Life Sciences 1a and 1b or LPSA and one additional course from the following: Chemistry 27, Engineering 53, Life Sciences 2, MCB 52, MCB 54, OEB 10, OEB 53, or SCRB 10, or permission of the instructors.
Note: Limited to 50 students. This course cannot be taken if MCB 120 has already been taken. LS 120 cannot be taken concurrently with MCB 120.
Professor:
Barry Bloom
Professor:
Richard Losick
Season:
Spring
Days:
T
Th
Time:
1-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
98532
Subject Area:
Life Sciences
Research Areas:
• Human Health
Literature 146. Space and Place: The Environment in Film
Focuses on the effect of the environment in film. Reads films grouped according to environmental themes (humans, nature and animals, water, consumption, pollution, climate change) side by side with critical articles. Pays special attention to the relation between space, place and the planet, ecology and technology, globalization and urbanization, postcolonialism, race, gender and class.
Professor:
Verena Conley
Season:
Fall
Days:
T
Time:
11:00am-12:30pm
School:
• Faculty of Arts and Sciences
Catalog Number:
8228
Subject Area:
Comparative Literature
Research Areas:
• Arts and Humanities
Literature 146. Space and Place: The Environment in Film
Focuses on the effect of the environment in film. Reads films grouped according to environmental themes (humans, nature and animals,

water, consumption, pollution, climate change) side by side with critical articles. Pays special attention to the relation between space, place and the planet, ecology and technology, globalization and urbanization, postcolonialism, race, gender and class.
Professor:
Verena Conley
Season:
Fall
Days:
T
Time:
11:00am-12:30pm
School:
• Faculty of Arts and Sciences
Catalog Number:
8228
Subject Area:
Comparative Literature
Research Areas:
• Arts and Humanities
MCB 121. The Microbes
This general microbiology course will focus on the genetics, cell biology, and physiology of microorganisms. The goal of this course is to give the students a broad overview of microbial physiology in the context of disease and environmental applications. The course will primarily consist of lectures with problem sets; we will also incorporate current and classical literature.
Professor:
Katherine Gibbs
Season:
Fall
Days:
T
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
19325
Subject Area:
Molecular and Cellular Biology
Research Areas:
• Human Health
MCB 121. The Microbes
This general microbiology course will focus on the genetics, cell biology, and physiology of microorganisms. The goal of this course is to give the students a broad overview of microbial physiology in the context of disease and environmental applications. The course will primarily consist of lectures with problem sets; we will also incorporate current and classical literature.
Professor:
Katherine Gibbs
Season:
Fall
Days:

T
Th
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
19325
Subject Area:
Molecular and Cellular Biology
Research Areas:
• Human Health
MGMT E-5625: Sustainability and International Business
Sustainability in international business is more than simply adopting sustainable practices—it has the potential to help companies gain competitive advantage. This course examines the global business environment in the context of sustainability and explores the challenges and opportunities that the new movement toward sustainability offers multinational enterprises and the countries in which they do business. It focuses on the meaning of sustainable development for profit-making global corporations, the effect of sustainability on global corporate development strategies, and how corporations and industries interact with nations to develop relationships and partnerships that support sustainable economic development. We investigate regions of the world such as Africa, Europe—particularly Scandinavia—Asia, and Latin America to learn about how multinationals are approaching sustainability in these regions. We also look at companies such as Unilever, Goodyear, SAB, Hitachi, Chevron, Coca Cola, and GlaxoSmithKline and study their specific approaches to sustainability. Topics covered in this course include corporate social and environmental responsibility; risk management; governments, investors, and stakeholder expectations; the social and environmental footprint throughout the business value chain; and impacts and opportunities for multinationals in the age of climate change.
Prerequisite(s): Proof of English proficiency is required of students whose native language is not English.
Professor:
Maurie Kelly
Season:
Fall
Days:
W
Time:
5:30-7:30
Catalog Number:
14484
Research Areas:
• Business, Law and Policy
OEB 10. Foundations of Biological Diversity
An integrated approach to the diversity of life, emphasizing how chemical, physical, genetic, ecological and geologic processes contribute to the origin and maintenance of biological diversity. Topics to be covered include the evolution of metabolic pathways, multicellularity and structural complexity; causes and consequences of differences in diversity over space and time; the role of species interactions (including symbioses) as an evolutionary force; and the evolution of humans and their impact on the environment.
Note: Knowledge of introductory molecular, cellular biology, and genetics is recommended. This course, when taken for a letter grade, meets the General Education requirement for Science of Living Systems or the Core requirement for Science B.
Professor:
Brian D. Farrell
Andrew Richardson
Professor:

Elena M. Kramer
Season:
Fall
Days:
M
W
F
Time:
12:00 and two hours of lab/discussion weekly, including field trips to marine and forest environments
School:
• Faculty of Arts and Sciences
Catalog Number:
7967
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 10. Foundations of Biological Diversity
An integrated approach to the diversity of life, emphasizing how chemical, physical, genetic, ecological and geologic processes contribute to the origin and maintenance of biological diversity. Topics to be covered include the evolution of metabolic pathways, multicellularity and structural complexity; causes and consequences of differences in diversity over space and time; the role of species interactions (including symbioses) as an evolutionary force; and the evolution of humans and their impact on the environment.
Note: Knowledge of introductory molecular, cellular biology, and genetics is recommended. This course, when taken for a letter grade, meets the General Education requirement for Science of Living Systems or the Core requirement for Science B.
Professor:
Brian D. Farrell
Andrew Richardson
Professor:
Elena M. Kramer
Season:
Fall
Days:
M
W
F
Time:
12:00 and two hours of lab/discussion weekly, including field trips to marine and forest environments
School:
• Faculty of Arts and Sciences
Catalog Number:
7967
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 118. Biological Oceanography

The ocean as an ecological system, with focus on environmental-organismal interactions that regulate plankton production and transfer to higher trophic levels. Specific topics include bloom events, the limits to fish harvest, and the effects of climate change on ocean systems. Plankton demonstrations and optional coastal research vessel day trip.
Note: For biology and other natural science concentrators.
Prerequisite: OEB 10, Physical Sciences 1 or permission of instructor.
Professor:
James J. McCarthy
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
7752
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 118. Biological Oceanography
The ocean as an ecological system, with focus on environmental-organismal interactions that regulate plankton production and transfer to higher trophic levels. Specific topics include bloom events, the limits to fish harvest, and the effects of climate change on ocean systems. Plankton demonstrations and optional coastal research vessel day trip.
Note: For biology and other natural science concentrators.
Prerequisite: OEB 10, Physical Sciences 1 or permission of instructor.
Professor:
James J. McCarthy
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
7752
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 119. Deep Sea Biology
The oceans contain 97% of Earth’s water, and host the most disparate ecosystems on the planet. This course provides an introduction to deep ocean habitats, macrofauna and microorganisms. Emphasis is placed on the physiological adaptations of organisms to their

environment, as well the role of microbes in mediating oceanic biogeochemical cycles.
Professor:
Peter Girguis
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
1397
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 119. Deep Sea Biology
The oceans contain 97% of Earth's water, and host the most disparate ecosystems on the planet. This course provides an introduction to deep ocean habitats, macrofauna and microorganisms. Emphasis is placed on the physiological adaptations of organisms to their environment, as well the role of microbes in mediating oceanic biogeochemical cycles.
Professor:
Peter Girguis
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
1397
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 120. Plants and Climate
How plants are affected by climate - both spatially across the globe and as climate changes over time - is relevant to understanding patterns of plant evolution, ecosystem structure, and the impact of humans on our planet. This course examines how variation in rainfall, temperature, atmospheric humidity and CO_2 affects the growth and productivity of plants. Topics include photosynthesis, respiration, transpiration, and vascular transport; experimental approaches and measurement techniques will also be covered.
Professor:
Noel Michele Holbrook
Professor:
Season:

Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
19816
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 120. Plants and Climate
How plants are affected by climate - both spatially across the globe and as climate changes over time - is relevant to understanding patterns of plant evolution, ecosystem structure, and the impact of humans on our planet. This course examines how variation in rainfall, temperature, atmospheric humidity and CO2 affects the growth and productivity of plants. Topics include photosynthesis, respiration, transpiration, and vascular transport; experimental approaches and measurement techniques will also be covered.
Professor:
Noel Michele Holbrook
Professor:
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
19816
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 191. Physiological and Biochemical Adaptation
This course examines how microbes and animals have evolved to maintain function throughout the wide range of extant habitats. Emphasis is on physiological/biochemical evolution in response to environmental conditions, including climate change and life in extreme environments. As the first course in the "genomes to biomes" series, we will examine new approaches to interrogating organismal physiology in nature. Those interested can continue the "genomes to biomes" program via LS 100r.
Prerequisite: OEB 10 or CHEM 27 or permission of the instructor.
Professor:
Peter Girguis
Season:
Spring
Days:

T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2314
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 191. Physiological and Biochemical Adaptation
This course examines how microbes and animals have evolved to maintain function throughout the wide range of extant habitats. Emphasis is on physiological/biochemical evolution in response to environmental conditions, including climate change and life in extreme environments. As the first course in the "genomes to biomes" series, we will examine new approaches to interrogating organismal physiology in nature. Those interested can continue the "genomes to biomes" program via LS 100r.
Prerequisite: OEB 10 or CHEM 27 or permission of the instructor.
Professor:
Peter Girguis
Season:
Spring
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
2314
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 215. Topics in Ecophysiology
A discussion based course exploring the physiological processes involved in an organism's interactions with its environment. Readings will focus on adaptation to environmental variability, with an emphasis on responses to climate change and habitat alteration.
Prerequisite: OEB 191 or permission of instructor
Professor:
Stacey Combes
Season:
Spring
Days:
T
Time:
3:00-5:00
School:

• Faculty of Arts and Sciences
Catalog Number:
99294
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 215. Topics in Ecophysiology
A discussion based course exploring the physiological processes involved in an organism’s interactions with its environment. Readings will focus on adaptation to environmental variability, with an emphasis on responses to climate change and habitat alteration.
Prerequisite: OEB 191 or permission of instructor
Professor:
Stacey Combes
Season:
Spring
Days:
T
Time:
3:00-5:00
School:
• Faculty of Arts and Sciences
Catalog Number:
99294
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 216. Modern Conservation Biology
Readings (mainly from the scientific literature) and discussion of what defines and theoretically underpins the field of conservation biology - though discussion is on the current version of the field, readings will span its development over the last 50+ years.
Professor:
Elizabeth M. Wolkovich
Professor:
Season:
Fall
Days:
W
Time:
2:00-3:30
School:
• Faculty of Arts and Sciences
Catalog Number:
32679
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 216. Modern Conservation Biology

Readings (mainly from the scientific literature) and discussion of what defines and theoretically underpins the field of conservation biology - though discussion is on the current version of the field, readings will span its development over the last 50+ years.
Professor:
Elizabeth M. Wolkovich
Professor:
Season:
Fall
Days:
W
Time:
2:00-3:30
School:
• Faculty of Arts and Sciences
Catalog Number:
32679
Subject Area:
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 52. Biology of Plants
Introduction to the structure, diversity, and physiology of plants with an emphasis on evolutionary relationships and adaptations to life on land. Topics include growth, resource acquisition, interactions with other organisms (i.e., fungi, bacteria, insects), reproduction, and survival in extreme environments. Laboratory sessions provide an overview of plant and diversity and an introduction to basic physiological processes.
Note: This course, when taken for a letter grade, meets the General Education requirement for Science of Living Systems.
Professor:
Elena Kramer
Season:
Spring
Days:
T
Th
Time:
10:00-11:30; one afternoon lab per week, plus occasional field trips
School:
• Faculty of Arts and Sciences
Catalog Number:
1343
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 52. Biology of Plants
Introduction to the structure, diversity, and physiology of plants with an emphasis on evolutionary relationships and adaptations to life on land. Topics include growth, resource acquisition, interactions with other organisms (i.e., fungi, bacteria, insects), reproduction, and survival in extreme environments. Laboratory sessions provide an overview of plant and diversity and an introduction to basic physiological processes.

Note: This course, when taken for a letter grade, meets the General Education requirement for Science of Living Systems.
Professor:
Elena Kramer
Season:
Spring
Days:
T
Th
Time:
10:00-11:30; one afternoon lab per week, plus occasional field trips
School:
• Faculty of Arts and Sciences
Catalog Number:
1343
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 53. Evolutionary Biology
The course covers micro- and macro-evolution, ranging in its focus from population genetics through molecular evolution to the grand patterns of the fossil record. Topics emphasized include both natural and sexual selection, the ecological context of adaptation, genomic and developmental mechanisms of evolutionary innovation, speciation, phylogenetics, and evolutionary approaches to human problems.
Prerequisite: Life Sciences 1b or permission of instructor.
Professor:
Andrew Berry
James Louis Borlase Mallet
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
3342
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 53. Evolutionary Biology
The course covers micro- and macro-evolution, ranging in its focus from population genetics through molecular evolution to the grand patterns of the fossil record. Topics emphasized include both natural and sexual selection, the ecological context of adaptation, genomic and developmental mechanisms of evolutionary innovation, speciation, phylogenetics, and evolutionary approaches to human problems.
Prerequisite: Life Sciences 1b or permission of instructor.

Professor:
Andrew Berry
James Louis Borlase Mallet
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
3342
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 55. Ecology: Populations, Communities, and Ecosystems
Relationships of organisms to their environment at the individual, population, and community level. Topics in pure and applied ecology including adaptations to physical environment, competition, population dynamics, predator-prey interactions, herbivore effects, community ecology, ecosystem structure, stability and function, and resource management.
Prerequisite: Mathematics 1a or 1b.
Professor:
Paul Moorcroft
Season:
Spring
Days:
M
W
F
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
3365
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 55. Ecology: Populations, Communities, and Ecosystems
Relationships of organisms to their environment at the individual, population, and community level. Topics in pure and applied ecology including adaptations to physical environment, competition, population dynamics, predator-prey interactions, herbivore effects, community ecology, ecosystem structure, stability and function, and resource management.
Prerequisite: Mathematics 1a or 1b.

Professor:
Paul Moorcroft
Season:
Spring
Days:
M
W
F
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
3365
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 59. Plants and Human Affairs
An introduction to the uses of plants by humans. Topics include the form, structure, and genetics of plants related to their use as sources of food, shelter, fiber, flavors, beverages, drugs, and medicines. Plant structure and reproduction are studied in lecture and laboratory with a particular focus on relationships between the plant's structural, chemical, or physiological attributes and the utility plant.
Prerequisite: OEB10 or permission of the instructor.
Professor:
Charles Davis
Season:
Fall
Days:
M
W
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
5281
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
OEB 59. Plants and Human Affairs
An introduction to the uses of plants by humans. Topics include the form, structure, and genetics of plants related to their use as sources of food, shelter, fiber, flavors, beverages, drugs, and medicines. Plant structure and reproduction are studied in lecture and laboratory with a particular focus on relationships between the plant's structural, chemical, or physiological attributes and the utility plant.
Prerequisite: OEB10 or permission of the instructor.
Professor:

Charles Davis
Season:
Fall
Days:
M
W
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
5281
Subject Area:
Core
Organismic and Evolutionary Biology
Research Areas:
• Ecology and Biodiversity
Physical Sciences 1. Chemical Bonding, Energy, and Reactivity: An Introduction to the Physical Sciences
This course covers the chemistry and physics underlying molecular phenomena in the world around you. Starting from a single electron, we will build up to atoms, molecules, and materials. We will study interactions of molecules through thermochemistry, equilibria, entropy and free energy, acids and bases, electrochemistry, and kinetics. We will apply these concepts to (1) world energy demands and global climate change (2) application of physical principles in biology, and (3) modern materials and technology.
Note: This course is part of an integrated introduction to the physical science intended for students who plan to pursue a concentration in the physical or life sciences and/or satisfy pre-medical requirements in general/inorganic Chemistry. This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe or the Core area requirement for Science A. Physical Sciences 1 and Physical Sciences II cannot both be taken for credit.
Prerequisite: A few operations of calculus are developed and used. Fluency in pre-calculus secondary school mathematics is assumed. Students are expected to have AP or honors level high school chemistry, or have completed Life and Physical Sciences A (LPS A) with a satisfactory grade.
Professor:
Sirinya Matchacheep
Lindsay Hinkle
Season:
Spring
Days:
M
W
F
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
2225
Subject Area:
Chemistry and Chemical Biology
Physics
Research Areas:

• Energy
Physical Sciences 1. Chemical Bonding, Energy, and Reactivity: An Introduction to the Physical Sciences
This course covers the chemistry and physics underlying molecular phenomena in the world around you. Starting from a single electron, we will build up to atoms, molecules, and materials. We will study interactions of molecules through thermochemistry, equilibria, entropy and free energy, acids and bases, electrochemistry, and kinetics. We will apply these concepts to (1) world energy demands and global climate change (2) application of physical principles in biology, and (3) modern materials and technology.
Note: This course is part of an integrated introduction to the physical science intended for students who plan to pursue a concentration in the physical or life sciences and/or satisfy pre-medical requirements in general/inorganic Chemistry. This course, when taken for a letter grade, meets the General Education requirement for Science of the Physical Universe or the Core area requirement for Science A. Physical Sciences 1 and Physical Sciences II cannot both be taken for credit.
Prerequisite: A few operations of calculus are developed and used. Fluency in pre-calculus secondary school mathematics is assumed. Students are expected to have AP or honors level high school chemistry, or have completed Life and Physical Sciences A (LPS A) with a satisfactory grade.
Professor:
Sirinya Matchacheep
Lindsay Hinkle
Season:
Spring
Days:
M
W
F
Time:
10:00
School:
• Faculty of Arts and Sciences
Catalog Number:
2225
Subject Area:
Chemistry and Chemical Biology
Physics
Research Areas:
• Energy
Physics 129. Energy Science
Non-fossil energy sources and energy storage are important for our future. We cover four main subjects to which students with a background in physics and physical chemistry could make paradigm changing contributions: photovoltaic cells, nuclear power, batteries, and photosynthesis. Fundamentals of electrodynamics, statistical/thermal physics, and quantum mechanics are taught as needed to give students an understanding of the topics covered.
Prerequisite: Physics 15a (or 16), 15b, c or 11a, b. Pre/co-requisite Physics 143a or Chemistry 160 or equivalent.
Professor:
L. Hau
Season:
Spring
Days:
T
Th
Time:
11:30-1:00

School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
42157
Subject Area:
Physics
Research Areas:
• Energy
Physics 129. Energy Science
Non-fossil energy sources and energy storage are important for our future. We cover four main subjects to which students with a background in physics and physical chemistry could make paradigm changing contributions: photovoltaic cells, nuclear power, batteries, and photosynthesis. Fundamentals of electrodynamics, statistical/thermal physics, and quantum mechanics are taught as needed to give students an understanding of the topics covered.
Prerequisite: Physics 15a (or 16), 15b, c or 11a, b. Pre/co-requisite Physics 143a or Chemistry 160 or equivalent.
Professor:
L. Hau
Season:
Spring
Days:
T
Th
Time:
11:30-1:00
School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
42157
Subject Area:
Physics
Research Areas:
• Energy
Physics 129. Energy Science
Non-fossil energy sources and energy storage are important for our future. We cover four main subjects to which students with a background in physics and physical chemistry could make paradigm changing contributions: photovoltaic cells, nuclear power, batteries, and photosynthesis. Fundamentals of electrodynamics, statistical/thermal physics, and quantum mechanics are taught as needed to give students an understanding of the topics covered.
Prerequisite: Physics 15a (or 16), 15b, c or 11a, b. Pre/co-requisite Physics 143a or Chemistry 160 or equivalent.
Professor:
L. Hau
Season:
Spring
Days:
T
Th
Time:
11:30-1:00

School:
• Faculty of Arts and Sciences
• School of Engineering & Applied Sciences
Catalog Number:
42157
Subject Area:
Physics
Research Areas:
• Energy
Portuguese 263. Habitat, Ecology, and the Ethical Revoution of the 20th Century
The exhuberant and delicate tropical nature of Brazilian territory was ravaged by the predatory practices of colonialism and its aftermath. Contemporary culture is trying to come to terms with this ruthless past.
Professor:
TBD
Season:
Spring
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98368
Subject Area:
Romance Languages and Literatures
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
Portuguese 263. Habitat, Ecology, and the Ethical Revoution of the 20th Century
The exhuberant and delicate tropical nature of Brazilian territory was ravaged by the predatory practices of colonialism and its aftermath. Contemporary culture is trying to come to terms with this ruthless past.
Professor:
TBD
Season:
Spring
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98368
Subject Area:
Romance Languages and Literatures
Research Areas:
• Business, Law and Policy

• Ecology and Biodiversity
Portuguese 263. Habitat, Ecology, and the Ethical Revoution of the 20th Century
The exhuberant and delicate tropical nature of Brazilian territory was ravaged by the predatory practices of colonialism and its aftermath. Contemporary culture is trying to come to terms with this ruthless past.
Professor:
TBD
Season:
Spring
Days:
T
Time:
1:00-3:00
School:
• Faculty of Arts and Sciences
Catalog Number:
98368
Subject Area:
Romance Languages and Literatures
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
RDS500: Risk Assessment
Introduces the framework of risk assessment, considers its relationship with cost-benefit, decision analysis and other tools for improving environmental decisions. The scientific foundations for risk assessment (epidemiology, toxicology, and exposure assessment) are discussed. The mathematical sciences involved in developing models of dose-response, fate and transport, and the statistical aspects of parameter estimation and uncertainty analysis are introduced. Case studies are used to illustrate various issues in risk assessment and decision making. Course Activities: Lectures, discussions, case studies.
Note: Course required for all Exposure, Epidemiology and Risk Program students.
Professor:
Elsie Sunderland
Season:
Spring
Days:
T
Th
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
RDS500-02
Research Areas:
• Human Health
RDS500: Risk Assessment
Introduces the framework of risk assessment, considers its relationship with cost-benefit, decision analysis and other tools for improving environmental decisions. The scientific foundations for risk assessment (epidemiology, toxicology, and exposure assessment) are discussed. The mathematical sciences involved in developing models of dose-response, fate and transport, and the statistical aspects of parameter estimation and uncertainty analysis are introduced. Case studies are used to illustrate various issues in risk assessment and

decision making. Course Activities: Lectures, discussions, case studies.
Note: Course required for all Exposure, Epidemiology and Risk Program students.
Professor:
Elsie Sunderland
Season:
Spring
Days:
T
Th
Time:
10:30-12:20
School:
• Harvard School of Public Health
Catalog Number:
RDS500-02
Research Areas:
• Human Health
Religion 1046. Introduction to Religion and Ecology
This course will explore the intersection between religious traditions and ecological activism, with special attention to current conversations about "ethical eating." We will consider both the resources that religious traditions provide to ecological activists and the ways these activists have challenges aspects of traditional religion. The course will also function as a general introduction to the multiple ways of knowing that comprise the scholarly study of religion, with attention to scriptural interpretation, history, ethnography, theology, ethics, and comparative studies.
Notes
Expected to be offered again in spring of 2017. Offered jointly with the Divinity School as 2798.
Professor:
Daniel McKanan
Professor:
Season:
Days:
M
W
Time:
10:00-11:00
School:
• Faculty of Arts and Sciences
Catalog Number:
16547
Subject Area:
The Study of Religion
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
Religion 1046. Introduction to Religion and Ecology
This course will explore the intersection between religious traditions and ecological activism, with special attention to current conversations about "ethical eating." We will consider both the resources that religious traditions provide to ecological activists and the ways these activists have challenges aspects of traditional religion. The course will also function as a general introduction to the multiple ways of knowing that comprise the scholarly study of religion, with attention to scriptural interpretation, history, ethnography, theology,

ethics, and comparative studies.
Notes
Expected to be offered again in spring of 2017. Offered jointly with the Divinity School as 2798.
Professor:
Daniel McKanan
Professor:
Season:
Days:
M
W
Time:
10:00-11:00
School:
• Faculty of Arts and Sciences
Catalog Number:
16547
Subject Area:
The Study of Religion
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
Religion 1046. Introduction to Religion and Ecology
This course will explore the intersection between religious traditions and ecological activism, with special attention to current conversations about "ethical eating." We will consider both the resources that religious traditions provide to ecological activists and the ways these activists have challenges aspects of traditional religion. The course will also function as a general introduction to the multiple ways of knowing that comprise the scholarly study of religion, with attention to scriptural interpretation, history, ethnography, theology, ethics, and comparative studies.
Notes
Expected to be offered again in spring of 2017. Offered jointly with the Divinity School as 2798.
Professor:
Daniel McKanan
Professor:
Season:
Days:
M
W
Time:
10:00-11:00
School:
• Faculty of Arts and Sciences
Catalog Number:
16547
Subject Area:
The Study of Religion
Research Areas:
• Arts and Humanities
• Ecology and Biodiversity
SCI 6122: Energy in Architecture

This lecture course introduces students to energy and environmental issues, particularly those that must be faced by the discipline of architecture. An overview of the basic principles of energy generation and energy use will be provided, and the fundamental climatic precursors and patterns will be discussed. Building design issues in relation to basic energy needs and interior environmental requirements will be briefly outlined, and students will be exposed to the underlying complexity of developing solutions that address a wide range of local and global concerns. In addition, the technological response to interior environmental control will be contextualized within the larger framework of the scientific and socio-cultural influences that shaped the building systems we currently use.
Professor:
Kiel Moe
Season:
Fall
Days:
M
F
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0612200
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Energy
SCI 6122: Energy in Architecture
This lecture course introduces students to energy and environmental issues, particularly those that must be faced by the discipline of architecture. An overview of the basic principles of energy generation and energy use will be provided, and the fundamental climatic precursors and patterns will be discussed. Building design issues in relation to basic energy needs and interior environmental requirements will be briefly outlined, and students will be exposed to the underlying complexity of developing solutions that address a wide range of local and global concerns. In addition, the technological response to interior environmental control will be contextualized within the larger framework of the scientific and socio-cultural influences that shaped the building systems we currently use.
Professor:
Kiel Moe
Season:
Fall
Days:
M
F
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0612200
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design

• Energy
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Professor:
Kiel Moe
Season:
Fall
Days:
M
F
Time:
10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0612200
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Energy
SCI 6141: Ecologies, Techniques, Technologies I
Recognizing that plants are one of the essential mediums of landscape architecture, this class seeks to introduce the student to two basic relationships; the relationship between plants and people (horticulture) and the relationship between plants and the environment (ecology).

This is achieved through a field trip and lecture based class focusing on the following topics and objectives:
1. Concepts, and practices necessary for using plants as a design medium.
2. Demonstrations of how to identify individual plants, the landscape communities they are part of, the ecological factors that define individual communities.
3. Introduction to the spatial, visual, functional, temporal, and sensorial qualities of approximately 100 plants.
4. Introduction to the horticultural requirements of the above-mentioned plants as well as the pragmatic relationship between how plants are commercially produced and how they are used in the designed landscape.

The course is structured to include on field trip, one lecture and on plant identification quiz per week. Evaluation of student performance is based on quiz grades and class attendance.
Professor:
Matthew Urbanski
Rosetta Elkin
Season:
Fall
Days:
T
W

Time:
T 2:00-6:00; W 8:30-11:30
School:
• Graduate School of Design
Catalog Number:
0614100
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6141: Ecologies, Techniques, Technologies I
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Matthew Urbanski
Rosetta Elkin
Season:
Fall
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Time:
T 2:00-6:00; W 8:30-11:30
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0614100
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Architecture, Landscape Architecture, and Urban Planning
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• Architecture and Environmental Design
• Ecology and Biodiversity
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1. Concepts, and practices necessary for using plants as a design medium.
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Professor:
Matthew Urbanski
Rosetta Elkin
Season:
Fall
Days:
T
W
Time:
T 2:00-6:00; W 8:30-11:30
School:
• Graduate School of Design
Catalog Number:
0614100
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6241: Ecologies, Techniques, Technologies III: Introduction to Ecology
The science of ecology is introduced through the lenses of local sites, urban areas, and broad landscapes. Key motifs during the course include basic ecological principles, spatial patterns, field observations, and the application of principles. The ecology of plants in landscape architecture, as well as analysis of ecosystems and vegetation, receives special emphasis. Spatial patterns are commonly linked to functional flows and movements, as well as change over time. Field studies highlight ecological and horticultural perspectives, in addition to Southern New England forested and urban areas.

Pedagogic goals. The overarching goal is for students to develop a solid understanding of the basic principles of ecology, i.e., the study of how organisms interact with the environment, that are especially useful for landscape architecture. Emphasis is also placed on direct observation, analysis, and application of the ecological principles at different spatial scales in both natural and urban habitats. In addition, recognition of distinctive spatial, functional, and change patterns in the landscape is highlighted.

Basis of grades. 40% four short exercises; 30% final main exercise (2 parts); 30% attendance, participation, and other evidence of learning (15% class; 15% field studies)
Professor:
Peter Del Tredici
Erle Ellis
Laura Solano
Thomas Ryan
Season:

Fall
Days:
M
W
Time:
M 8:30-11:30; W 2:30-5:30
School:
• Graduate School of Design
Catalog Number:
0624100
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Ecology and Biodiversity
SCI 6241: Ecologies, Techniques, Technologies III: Introduction to Ecology
The science of ecology is introduced through the lenses of local sites, urban areas, and broad landscapes. Key motifs during the course include basic ecological principles, spatial patterns, field observations, and the application of principles. The ecology of plants in landscape architecture, as well as analysis of ecosystems and vegetation, receives special emphasis. Spatial patterns are commonly linked to functional flows and movements, as well as change over time. Field studies highlight ecological and horticultural perspectives, in addition to Southern New England forested and urban areas.

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Professor:
Peter Del Tredici
Erle Ellis
Laura Solano
Thomas Ryan
Season:
Fall
Days:
M
W
Time:
M 8:30-11:30; W 2:30-5:30
School:
• Graduate School of Design
Catalog Number:
0624100
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Ecology and Biodiversity
SCI 6273: Water Engineering (at SEAS)

Introduces the fundamentals of water biology, chemistry, physics and transport processes needed to understand water quality and water purification technologies. Practical instruction in basic water analyses concluding with a final drinking water treatment project in place of exam.
Prerequisite: Physical Sciences 1 or Physical Sciences 10 or equivalent and Engineering Sciences 6 or equivalent.
Also offered as SEAS Engineering Sciences 165. Catalog Number: 4274
Professor:
Chad D. Vecitis
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• Graduate School of Design
Catalog Number:
0627300
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Social Sciences
SCI 6273: Water Engineering (at SEAS)
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Prerequisite: Physical Sciences 1 or Physical Sciences 10 or equivalent and Engineering Sciences 6 or equivalent.
Also offered as SEAS Engineering Sciences 165. Catalog Number: 4274
Professor:
Chad D. Vecitis
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• Graduate School of Design
Catalog Number:
0627300
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Social Sciences
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Professor:
Chad D. Vecitis
Season:
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11:30-1:00
School:
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Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
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Professor:
Chad D. Vecitis
Season:
Fall
Days:
T
Th
Time:
11:30-1:00
School:
• Graduate School of Design
Catalog Number:
0627300
Research Areas:
• Business, Law and Policy
• Ecology and Biodiversity
• Social Sciences
SCI 6337: Changing Natural and Built Coastal Environments
This course will examine natural and anthropogenic processes affecting the coastal zone and nearshore environment. Ecological principles and their application to design and planning will be emphasized. Topics will include coastal wetland development, sediment movement in estuaries and long-shore, natural disturbance regimes including coastal storms, flooding, and erosion. Applications of ecological principles for landscape design, planning, restoration, recreation, management and conservation at regional scales will include

stormwater management, hardened coastlines, sediment and toxics management, marsh restoration, energy development.

As a later-sequence ecology course focused on natural processes and built environment issues in the coastal zone/nearshore environment, this class complements existing GSD emphasis on introductory ecology, terrestrial systems and freshwater wetlands. The course focus on ecologically-sound management of coastal zone is highly relevant to current/future concerns with sea level rise, stormwater management, energy infrastructure, commercial transportation. Coastal zone management is most fruitfully approached on a regional scale, an approach transferable to other, current design challenges.

Specific expertise brought to course by Parsons includes long-term studies along US northeast coasts of estuarine ecosystems and biodiversity, toxics and sediment management in urban ports (including metropolitan areas of New York City, Boston, Philadelphia/Wilmington, Baltimore), ecologically-based engineered solutions to habitat loss including islands, coastal wetlands, barrier beaches, and peninsulas. Specific expertise brought to course by Apfelbaum includes ecologically-sound applications to achieve restoration objectives, stormwater management, and risk assessment.
Professor:
Steven Apfelbaum
Katharine Parsons
Season:
Fall
Days:
F
Time:
10:00-1:00
School:
• Graduate School of Design
Catalog Number:
0633700
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6337: Changing Natural and Built Coastal Environments
This course will examine natural and anthropogenic processes affecting the coastal zone and nearshore environment. Ecological principles and their application to design and planning will be emphasized. Topics will include coastal wetland development, sediment movement in estuaries and long-shore, natural disturbance regimes including coastal storms, flooding, and erosion. Applications of ecological principles for landscape design, planning, restoration, recreation, management and conservation at regional scales will include stormwater management, hardened coastlines, sediment and toxics management, marsh restoration, energy development.

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Professor:
Steven Apfelbaum
Katharine Parsons
Season:
Fall
Days:
F
Time:
10:00-1:00
School:
• Graduate School of Design
Catalog Number:
0633700
Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
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Professor:
Steven Apfelbaum
Katharine Parsons
Season:
Fall
Days:
F
Time:
10:00-1:00
School:
• Graduate School of Design
Catalog Number:
0633700

Subject Area:
Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6450: High Performance Buildings and Systems Integration
The interrelationships of environmental control systems as they relate to high performance/well integrated buildings will be explored in details. The course will address the main principles of such buildings and allow participants to develop their critical views about buildings' environmental performance. Projects such as residential, educational and commercial buildings will be analyzed. Systems' integration and innovations will also be studied. Other factors affecting high performance buildings such as energy standards and how they relate to current sustainability rating systems globally will be discussed. The relationship between energy conservation and the principles of initial building cost versus life cycle costs will also be presented.
INSTRUCTIONAL METHODOLOGY

The first part of the course is used to analyze the design and performance of existing high performance buildings. This study will be accompanied by lectures about the fundamentals of systems components and current innovations, in the US and around the world. Additional lectures and discussions will focus on how these systems can be integrated with innovative building envelopes. A site visit will help to understand the systems and their integration.
The second part of the course will focus on developing an understanding of the concepts of environmental performance and the factors affecting the design, construction and operation of well integrated buildings. Lectures will introduce the use of sensing and simulation tools to help with this understanding. Main energy standards globally, life cycle costing along with energy production innovations and technologies will also be presented.
The final part of the course will be a study and redesign of a building. The layout of this building will be provided to the course participants. The work will begin with a proposal for the building envelope. Based on this design and the functional needs in the building, the environmental control systems will be developed through computational simulations. All concepts and techniques learned in the class will be utilized in this study; which will form the final project of the class.
Assignments will be given after each topic presented. Most assignments will utilize physical and computational tools to investigate different aspects of energy conservation in buildings and analyze buildings energy use and systems. When computational tools are presented, the computer lab will be used to provide instructions.
Professor:
Ali Malkawi
Professor:
Ali Malkawi
Season:
Fall
Days:
Th
Time:
10:00-1:00
School:
• Graduate School of Design
Catalog Number:
0645000
Research Areas:
• Architecture and Environmental Design
• Energy
SCI 6450: High Performance Buildings and Systems Integration
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Professor:
Ali Malkawi
Professor:
Ali Malkawi
Season:
Fall
Days:
Th
Time:
10:00-1:00
School:
• Graduate School of Design
Catalog Number:
0645000
Research Areas:
• Architecture and Environmental Design
• Energy
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Professor:

Ali Malkawi

Professor:

Ali Malkawi

Season:

Fall

Days:

Th

Time:

10:00-1:00

School:

• Graduate School of Design

Catalog Number:

0645000

Research Areas:

• Architecture and Environmental Design

• Energy

SCI 6451: Research Seminar on Urban Ecology

This 4-credit course is limited to 15 students who have completed the Ecologies, Techniques and Technologies sequence in the Landscape Architecture program (or its equivalent).The course meets once per week for three hours and will focus on the structure, function and history of the spontaneous urban ecosystems. These so-called emergent or novel ecosystems are a common feature of cities worldwide and they form without being planted or maintained by humans. They are cosmopolitan in their composition and resilient in terms of their ability to tolerate chronic environmental stress and disturbance. Parallel to the worldwide increase in urbanization, there has been an increased recognition of the important ecological services that spontaneous ecosystems provide in terms of the improvement of air and water quality, the mitigation of soil contamination and the promotion of biological diversity. In the context of shrinking park maintenance budges in many American cities, there is an opportunity for landscape architects to think creatively about how to manipulate spontaneous landscapes so as to increase their ecological, aesthetic and recreational functionality. The course will utilize the 24-acre Bussey Brook Meadow section of the Arnold Arboretum, adjacent to the Forest Hills subway station, as a 'research studio' site. Working in teams of two, students are expected to investigate a specific topic relating to the biology, hydrology, sociology or history of the site.

Students admitted to this course will be expected to keep up with weekly readings and participate fully in class discussions. The first six weeks of the course will consist of lectures on various aspects of urban ecology and by student-led discussions of selected readings. Project reviews will take place during class beginning in the middle of the semester, with final project presentations during final-exam week. Grades will be based on two writing assignments and the final research project.

Professor:

Peter Del Tredici

Season:
Fall
Days:
Th
Time:
11:30-2:00
School:
• Graduate School of Design
Catalog Number:
0645100
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6451: Research Seminar on Urban Ecology
This 4-credit course is limited to 15 students who have completed the Ecologies, Techniques and Technologies sequence in the Landscape Architecture program (or its equivalent).The course meets once per week for three hours and will focus on the structure, function and history of the spontaneous urban ecosystems. These so-called emergent or novel ecosystems are a common feature of cities worldwide and they form without being planted or maintained by humans. They are cosmopolitan in their composition and resilient in terms of their ability to tolerate chronic environmental stress and disturbance. Parallel to the worldwide increase in urbanization, there has been an increased recognition of the important ecological services that spontaneous ecosystems provide in terms of the improvement of air and water quality, the mitigation of soil contamination and the promotion of biological diversity. In the context of shrinking park maintenance budges in many American cities, there is an opportunity for landscape architects to think creatively about how to manipulate spontaneous landscapes so as to increase their ecological, aesthetic and recreational functionality. The course will utilize the 24-acre Bussey Brook Meadow section of the Arnold Arboretum, adjacent to the Forest Hills subway station, as a 'research studio' site. Working in teams of two, students are expected to investigate a specific topic relating to the biology, hydrology, sociology or history of the site.

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Professor:
Peter Del Tredici
Season:
Fall
Days:
Th
Time:
11:30-2:00
School:
• Graduate School of Design
Catalog Number:
0645100
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6451: Research Seminar on Urban Ecology
This 4-credit course is limited to 15 students who have completed the Ecologies, Techniques and Technologies sequence in the Landscape Architecture program (or its equivalent).The course meets once per week for three hours and will focus on the structure, function and history of the spontaneous urban ecosystems. These so-called emergent or novel ecosystems are a common feature of cities

worldwide and they form without being planted or maintained by humans. They are cosmopolitan in their composition and resilient in terms of their ability to tolerate chronic environmental stress and disturbance. Parallel to the worldwide increase in urbanization, there has been an increased recognition of the important ecological services that spontaneous ecosystems provide in terms of the improvement of air and water quality, the mitigation of soil contamination and the promotion of biological diversity. In the context of shrinking park maintenance budges in many American cities, there is an opportunity for landscape architects to think creatively about how to manipulate spontaneous landscapes so as to increase their ecological, aesthetic and recreational functionality. The course will utilize the 24-acre Bussey Brook Meadow section of the Arnold Arboretum, adjacent to the Forest Hills subway station, as a 'research studio' site. Working in teams of two, students are expected to investigate a specific topic relating to the biology, hydrology, sociology or history of the site.

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Professor:
Peter Del Tredici
Season:
Fall
Days:
Th
Time:
11:30-2:00
School:
• Graduate School of Design
Catalog Number:
0645100
Research Areas:
• Architecture and Environmental Design
• Ecology and Biodiversity
SCI 6470: Energy Simulation for Design
The best intent does not always lead to the best performing design, as intuition and rules of thumb sometimes fail to adequately inform decision making. Therefore, designers of high-performance architecture increasingly turn to analytical tools to eliminate some of the guesswork. This course explores the use of computerized energy simulation in pursuit of high-performance design.

The American Institute of Architects encourages designers to embrace energy simulation starting early in the project. In this course, students will learn to meet that challenge and strive beyond the "pretty graph" phase in a path towards producing meaningful and timely results that add value to the early-design process. Both studio-based and research-based students are encouraged to participate.

Learning Objectives

Students acquire skills in energy simulation and, using these skills, explore fundamental design issues such as building massing, natural ventilation, envelope construction, and daylighting. The course presents the benefits as well as the limitations of energy simulation. Topics include fundamentals such as modeling strategies, underlying physical principles, understanding simulation assumptions, and interpreting results with an emphasis on developing the ability to translate the analysis into design decisions. Through practice with the software tools, students develop a better understanding of physics in architecture and hone their own design intuition.
At the end of the course students will...

- be able to perform whole-building energy simulation to support the schematic architectural design process

- understand how to interpret simulation results and be able to engage more effectively with energy consultants

- have increased their understanding of high-performance design strategies
Professor:
Holly Samuelson
Professor:
Season:
Fall
Days:
M
W
Time:
Monday 11:30-1:00; Wednesday 10:00-11:30
School:
• Graduate School of Design
Catalog Number:
SCI 0647000
Research Areas:
• Architecture and Environmental Design
SCI 6470: Energy Simulation for Design
The best intent does not always lead to the best performing design, as intuition and rules of thumb sometimes fail to adequately inform decision making. Therefore, designers of high-performance architecture increasingly turn to analytical tools to eliminate some of the guesswork. This course explores the use of computerized energy simulation in pursuit of high-performance design.

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At the end of the course students will...

- be able to perform whole-building energy simulation to support the schematic architectural design process

- understand how to interpret simulation results and be able to engage more effectively with energy consultants

- have increased their understanding of high-performance design strategies
Professor:
Holly Samuelson
Professor:
Season:
Fall
Days:
M
W
Time:
Monday 11:30-1:00; Wednesday 10:00-11:30

School:
• Graduate School of Design
Catalog Number:
SCI 0647000
Research Areas:
• Architecture and Environmental Design
SCI 6470: Energy Simulation in Design
The best intent does not always lead to the best performing design, as intuition and rules of thumb sometimes fail to adequately inform decision making. Therefore, designers of high-performance architecture increasingly turn to analytical tools to eliminate some of the guesswork. This course explores the use of computerized energy simulation in pursuit of high-performance design.
The American Institute of Architects encourages designers to embrace energy simulation starting early in the project. In this course, students will learn to meet that challenge and strive beyond the "pretty graph" phase in a path towards producing meaningful and timely results that add value to the early-design process. Both studio-based and research-based students are encouraged to participate.
Learning Objectives:
Students acquire skills in energy simulation and, using these skills, explore fundamental design issues such as building massing, natural ventilation, envelope construction, and daylighting. The course presents the benefits as well as the limitations of energy simulation. Topics include fundamentals such as modeling strategies, underlying physical principles, understanding assumptions, and interpreting results with an emphasis on developing the ability to translate the analysis into design decisions. Through practice with the software tools, students develop a better understanding of physics in architecture and hone their own design intuition.
At the end of the course students will...
- be able to perform whole-building energy simulation to support the schematic design process
- understand how to interpret simulation results and be able to engage more effectively with energy consultants
- have increased their understanding of high-performance design strategies
Class Format:
The class format consists of lectures, in-class exercises, group discussions, and student presentations. Students learn simulation tools through a series of short tutorials and assignments. They ultimately apply the knowledge in small-group design projects.
Software:
Students will learn to use the DesignBuilder interface for the EnergyPlus energy modeling engine. However, students will find the concepts learned applicable to energy simulation in general.

Prerequisites:
1. GSD 06125 or 06250 Environmental Technologies in Buildings, or equivalent
2. a laptop capable of running graphics software for PCs
Professor:
Holly Samuelson
Professor:
Holly Samuelson
Season:
Fall
Days:
M
W
Time:
M 11:30-1:00; W 10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0647000
Research Areas:

• Architecture and Environmental Design
• Energy
SCI 6470: Energy Simulation in Design
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M 11:30-1:00; W 10:00-11:30
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Catalog Number:
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Learning Objectives:
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1. GSD 06125 or 06250 Environmental Technologies in Buildings, or equivalent
2. a laptop capable of running graphics software for PCs
Professor:
Holly Samuelson
Professor:
Holly Samuelson
Season:
Fall
Days:
M
W
Time:
M 11:30-1:00; W 10:00-11:30
School:
• Graduate School of Design
Catalog Number:
0647000
Research Areas:
• Architecture and Environmental Design
• Energy
SCI 6479: Daylighting
Picture a space, one that feels vibrant, comfortable, warm, and healthy. Now visualize someplace cheerless, depressing, and dull. What changed in your mind's eye? Most likely, lighting --specifically natural lighting-- played a significant role. Yet, none of these terms explicitly relate to light or darkness. This is the emotive power of daylighting. In addition to enlivening a space, daylight can connect us to nature, mark the passage of time, maintain circadian rhythms, and save energy. Conversely, poorly considered daylighting can lead to overheating, visual discomfort, and wasted energy.

This course explores the theme of daylighting in architecture. Because daylight design can be an unintuitive process, and because today's computerized tools offer designers a powerful tool for evaluating their ideas, this course includes a detailed focus on daylight simulation. Other topics include, design precedents, rules of thumb, and shading strategies, as well as the technical fundamentals of light, sun position, solar heat gain, and glare. This is primarily a technical course. Both studio-based and research-based students are encouraged to participate.
Professor:
Holly Samuelson
Professor:
Season:
Fall
Days:
M
F
Time:
4:30-6:00
School:
• Graduate School of Design
Catalog Number:
SCI 0647900
Research Areas:
• Architecture and Environmental Design
SCI 6479: Daylighting
Picture a space, one that feels vibrant, comfortable, warm, and healthy. Now visualize someplace cheerless, depressing, and dull. What changed in your mind's eye? Most likely, lighting --specifically natural lighting-- played a significant role. Yet, none of these terms explicitly relate to light or darkness. This is the emotive power of daylighting. In addition to enlivening a space, daylight can connect us to nature, mark the passage of time, maintain circadian rhythms, and save energy. Conversely, poorly considered daylighting can lead to overheating, visual discomfort, and wasted energy.
This course explores the theme of daylighting in architecture. Because daylight design can be an unintuitive process, and because today's computerized tools offer designers a powerful tool for evaluating their ideas, this course includes a detailed focus on daylight simulation. Other topics include, design precedents, rules of thumb, and shading strategies, as well as the technical fundamentals of light, sun position, solar heat gain, and glare. This is primarily a technical course. Both studio-based and research-based students are encouraged to participate.
Professor:
Holly Samuelson
Professor:
Season:
Fall
Days:
M
F
Time:
4:30-6:00
School:
• Graduate School of Design
Catalog Number:
SCI 0647900
Research Areas:
• Architecture and Environmental Design

Science of Living Systems 12. Understanding Darwinism
An interdisciplinary exploration of Darwin's ideas and their impact on science and society. The course links the history of Darwin's ideas with the key features of modern evolutionary biology. Darwin's celebrated book On the Origin of Species provided a compelling solution to one of science's most prominent problems–the origins of biological diversity and of our own species–and a whole new way of viewing the world. The course reviews the development of the main elements of the theory of evolution, highlighting the areas in which Darwin's ideas have proved remarkably robust and areas in which subsequent developments have significantly modified the theory. By also analyzing the historical context of the development of evolutionary thought beyond Darwin, the course emphasizes the dynamic interplay between science and society.
Note: This course fulfills the requirement that one of the eight General Education courses also engages substantially with Study of the Past.
Professor:
Janet Browne
Professor:
Andrew Berry
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
5523
Subject Area:
Core
General Education
Research Areas:
• Ecology and Biodiversity
• Social Sciences
Science of Living Systems 12. Understanding Darwinism
An interdisciplinary exploration of Darwin's ideas and their impact on science and society. The course links the history of Darwin's ideas with the key features of modern evolutionary biology. Darwin's celebrated book On the Origin of Species provided a compelling solution to one of science's most prominent problems–the origins of biological diversity and of our own species–and a whole new way of viewing the world. The course reviews the development of the main elements of the theory of evolution, highlighting the areas in which Darwin's ideas have proved remarkably robust and areas in which subsequent developments have significantly modified the theory. By also analyzing the historical context of the development of evolutionary thought beyond Darwin, the course emphasizes the dynamic interplay between science and society.
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Professor:
Janet Browne
Professor:
Andrew Berry
Season:
Fall
Days:

T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
5523
Subject Area:
Core
General Education
Research Areas:
• Ecology and Biodiversity
• Social Sciences
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Professor:
Janet Browne
Professor:
Andrew Berry
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
5523
Subject Area:
Core
General Education
Research Areas:
• Ecology and Biodiversity
• Social Sciences
Science of Living Systems 22. Human Influence on Life in the Sea
Many important marine fish stocks are over-harvested and their futures are in doubt. Other human activities, such as pollution and anthropogenic climate change, are also affecting the stability and productivity of marine ecosystems. This course will ask what we need

to know about the causes and effects of anthropogenic change to best protect marine ecosystems and ensure sustainable harvests from the sea.
Professor:
James J. McCarthy
Professor:
R. Wollacott
Season:
Fall
Days:
T
Th
Time:
11:30–1:00
School:
• Faculty of Arts and Sciences
Catalog Number:
42977
Subject Area:
Core
General Education
Research Areas:
• Ecology and Biodiversity
Science of Living Systems 22. Human Influence on Life in the Sea
Many important marine fish stocks are over-harvested and their futures are in doubt. Other human activities, such as pollution and anthropogenic climate change, are also affecting the stability and productivity of marine ecosystems. This course will ask what we need to know about the causes and effects of anthropogenic change to best protect marine ecosystems and ensure sustainable harvests from the sea.
Professor:
James J. McCarthy
Professor:
R. Wollacott
Season:
Fall
Days:
T
Th
Time:
11:30–1:00
School:
• Faculty of Arts and Sciences
Catalog Number:
42977
Subject Area:
Core
General Education
Research Areas:
• Ecology and Biodiversity
Science of the Physical Universe 12. Natural Disasters

Natural disasters, such as earthquakes, hurricanes, and floods, claim thousands of lives and cause tens of billions of dollars in damage each year. Moreover, changes in Earth's climate are raising sea level, changing precipitation patterns, and likely causing an increase in the occurrence of damaging storms, putting more of our global population at risk. In this course we develop an understanding of these natural hazards from an earth science perspective, and examine several case studies to assess their catastrophic impacts. Given our scientific understanding of these phenomena, we examine ways to assess and forecast future natural disasters, and to mitigate the adverse impacts to our societies. Sections will emphasize the use of GIS technology to measure the impacts of natural hazards.
Professor:
Brendan Meade
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
6001
Subject Area:
Core
General Education
Research Areas:
• Climate
Science of the Physical Universe 12. Natural Disasters
Natural disasters, such as earthquakes, hurricanes, and floods, claim thousands of lives and cause tens of billions of dollars in damage each year. Moreover, changes in Earth's climate are raising sea level, changing precipitation patterns, and likely causing an increase in the occurrence of damaging storms, putting more of our global population at risk. In this course we develop an understanding of these natural hazards from an earth science perspective, and examine several case studies to assess their catastrophic impacts. Given our scientific understanding of these phenomena, we examine ways to assess and forecast future natural disasters, and to mitigate the adverse impacts to our societies. Sections will emphasize the use of GIS technology to measure the impacts of natural hazards.
Professor:
Brendan Meade
Season:
Fall
Days:
T
Th
Time:
10:00-11:30
School:
• Faculty of Arts and Sciences
Catalog Number:
6001
Subject Area:
Core
General Education
Research Areas:

• Climate
Science of the Physical Universe 14: How to Build a Habitable Planet
The story of Earth from the inception of the universe at the Big Bang to the revolution in planetary function and capability associated with the rise of human civilization. The aim of the course is to place human beings in a universal and planetary context, and to see the steps in planetary evolution as an essential perspective on how we relate to Earth today. Topics covered include the Big Bang, origin of the elements, formation of minerals, origin of the solar system, formation of planets, climate regulation, origin of life, co-evolution of ocean, atmosphere, solid earth and biosphere, development of plate tectonics, the modern Earth as an interconnected system, and the human era and its consequences for the planet. Current environmental problems can then be considered in a planetary context. Finally we consider whether Earth may be a microcosm reflecting laws of planetary evolution that may be common to a class of planets throughout the universe, or alternatively may be a low probability accident.
Professor:
Charles Langmuir
Season:
Fall
Days:
M
W
F
Time:
11:00
School:
• Faculty of Arts and Sciences
Catalog Number:
7621
Subject Area:
Core
General Education
Research Areas:
• Climate
Science of the Physical Universe 14: How to Build a Habitable Planet
The story of Earth from the inception of the universe at the Big Bang to the revolution in planetary function and capability associated with the rise of human civilization. The aim of the course is to place human beings in a universal and planetary context, and to see the steps in planetary evolution as an essential perspective on how we relate to Earth today. Topics covered include the Big Bang, origin of the elements, formation of minerals, origin of the solar system, formation of planets, climate regulation, origin of life, co-evolution of ocean, atmosphere, solid earth and biosphere, development of plate tectonics, the modern Earth as an interconnected system, and the human era and its consequences for the planet. Current environmental problems can then be considered in a planetary context. Finally we consider whether Earth may be a microcosm reflecting laws of planetary evolution that may be common to a class of planets throughout the universe, or alternatively may be a low probability accident.
Professor:
Charles Langmuir
Season:
Fall
Days:
M
W
F
Time:
11:00

School:
• Faculty of Arts and Sciences
Catalog Number:
7621
Subject Area:
Core
General Education
Research Areas:
• Climate
Science of the Physical Universe 24. Introduction to Technology and Society
From the digital revolution to bio informatics, from global warming to sustainability, and from national security to renewable energy, technology plays a critical role in shaping our lives. In this course, the students will be exposed to applied science and engineering concepts that span disciplines and examine broadly how technology shapes society and vice versa. It will emphasize qualitative and semi-quantitative analysis, modeling and the conceptual basis of some of the grand challenges facing society.
Note: Limited to 60 students.
Professor:
Venkatesh Narayanamurti
Season:
Spring
Days:
M
W
Time:
2:30-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
14726
Subject Area:
Core
General Education
Research Areas:
• Social Sciences
Science of the Physical Universe 24. Introduction to Technology and Society
From the digital revolution to bio informatics, from global warming to sustainability, and from national security to renewable energy, technology plays a critical role in shaping our lives. In this course, the students will be exposed to applied science and engineering concepts that span disciplines and examine broadly how technology shapes society and vice versa. It will emphasize qualitative and semi-quantitative analysis, modeling and the conceptual basis of some of the grand challenges facing society.
Note: Limited to 60 students.
Professor:
Venkatesh Narayanamurti
Season:
Spring
Days:
M
W
Time:
2:30-4:00

School:
• Faculty of Arts and Sciences
Catalog Number:
14726
Subject Area:
Core
General Education
Research Areas:
• Social Sciences
Science of the Physical Universe 29. The Climate-Energy Challenge
This course will examine future climate change in the context of Earth history, and then consider various strategies for what might be done to deal with it. The likely impacts of continued greenhouse gas emissions will be explored, emphasizing the scientific uncertainties associated with various predictions, and how this can be understood in the context of risk. In the latter third of the class, the question of how to mitigate climate change will be discussed, including an examination of various options for advanced energy systems.
Professor:
Daniel P. Schrag
Professor:
Season:
Fall
Days:
M
Time:
1:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:
79392
Subject Area:
General Education
Research Areas:
• Climate
Science of the Physical Universe 29. The Climate-Energy Challenge
This course will examine future climate change in the context of Earth history, and then consider various strategies for what might be done to deal with it. The likely impacts of continued greenhouse gas emissions will be explored, emphasizing the scientific uncertainties associated with various predictions, and how this can be understood in the context of risk. In the latter third of the class, the question of how to mitigate climate change will be discussed, including an examination of various options for advanced energy systems.
Professor:
Daniel P. Schrag
Professor:
Season:
Fall
Days:
M
Time:
1:00-4:00
School:
• Faculty of Arts and Sciences
Catalog Number:

79392
Subject Area:
General Education
Research Areas:
• Climate
Science of the Physical Universe 31. Energy Resources and the Environment
The course provides an overview of the energy resources that we use to sustain our global economies, and explores the impact of these activities on our environment. We address the full life cycle of each energy resource, including its origins, methods used to explore for and exploit it, how it is used in our economies, and the environmental impacts of these activities. Topics include coal, petroleum (conventional and unconventional), nuclear power, geothermal systems, and renewable energy options (hydro, tidal, solar, wind power). Lectures and labs will introduce students to data and methods used in these energy and environmental sectors.
Notes
This course is similar in content to EPS 109. Interested students may want to consult the Q evaluations from that course. Students who took EPS 109 may not take this course for credit.
Professor:
John Shaw
Professor:
Season:
Spring
Days:
M
W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
84663
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Energy
Science of the Physical Universe 31. Energy Resources and the Environment
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Professor:
John Shaw
Professor:
Season:
Spring
Days:
M

W
Time:
1:00-2:30
School:
• Faculty of Arts and Sciences
Catalog Number:
84663
Subject Area:
Earth and Planetary Sciences
Research Areas:
• Energy
SES 5201: Urban Politics and Planning
The central foci of this course are the roles of public governance and modes of resolving stakeholder conflicts in shaping cities and urban regions. Key policy topics include land use planning and regulation, urban (particularly downtown) revitalization; large-scale infrastructure investment; air quality regulation; and contemporary efforts to achieve "smart" growth at large scale. Cross-cutting themes include the special role of business in local governance; citizen participation; equity issues in urban place-making, the costs and benefits of local government fragmentation; and contending theories about the balance of forces in U.S. urban politics.
While the issues and group conflicts on which we shall focus are urban from segregation sprawl, and programs for central city renewal to mass motorization, the recent revival of mass transit, and contemporary efforts both to enhance sustainability and promote more compact patterns of settlement, in which the governments involved are often national and/or state (provincial in some other countries) as well as local. The course purposes are at once to enhance your sophistication in thinking about the ways in which public decisions that shape urban places are arrived at, and your skill in thinking strategically about how to exercise influence in such decision processes.

Note: Offered jointly with the Harvard Kennedy School as SUP-601.
Professor:
Quinton Mayne
Season:
Spring
Days:
M
W
Time:
11:40-1:00
School:
• Graduate School of Design
Catalog Number:
0520100
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
SES 5201: Urban Politics and Planning
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Note: Offered jointly with the Harvard Kennedy School as SUP-601.
Professor:
Quinton Mayne
Season:
Spring
Days:
M
W
Time:
11:40-1:00
School:
• Graduate School of Design
Catalog Number:
0520100
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
SES 5201: Urban Politics and Planning
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While the issues and group conflicts on which we shall focus are urban from segregation sprawl, and programs for central city renewal to mass motorization, the recent revival of mass transit, and contemporary efforts both to enhance sustainability and promote more compact patterns of settlement, in which the governments involved are often national and/or state (provincial in some other countries) as well as local. The course purposes are at once to enhance your sophistication in thinking about the ways in which public decisions that shape urban places are arrived at, and your skill in thinking strategically about how to exercise influence in such decision processes.

Note: Offered jointly with the Harvard Kennedy School as SUP-601.
Professor:
Quinton Mayne
Season:
Spring
Days:
M
W
Time:
11:40-1:00
School:
• Graduate School of Design
Catalog Number:
0520100
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy

SES 5206: Land Use and Environmental Law

As a scarce and necessary resource for earthly activity, land triggers competition and conflict over its possession, use, development, and preservation. For privately owned land, the market manages much of the competition through its familiar allocative price-setting features. At the same time, because use of land in one location affects the interests of neighbors and the general public and because market mechanisms alone do not always protect or advance such interests, government has enacted land use and environmental laws that significantly affect how land is handled. Expressed through local ordinances, higher-level legislation, constitutions, discretionary governmental decisions, administrative regulations, judicial opinions, and private agreements, these laws affect the look, feel, character, and composition of cities, suburbs, and rural areas everywhere. This course introduces students to the content and controversies of land use and environmental laws. No prior legal knowledge is presumed. The purpose of the course is to provide students with a basic understanding of the theories, rationales, techniques, and implementing institutions involved in legally controlling the possession, use, development, and preservation of land. Particular attention is paid to law's intended and unintended impacts on the physical pattern of built environments and resulting social and economic outcomes, on the increasing overlap of land use law and environmental law regimes especially when climate change and urban resilience are front and center, and on the tensions between individual rights and asserted socio-economic goals often resolved within the context of constitutional law by the courts. Law's approach is distinguished from those employed by other fields and disciplines. The role of the non-lawyer professional (planner, designer, public policymaker, developer, activist, etc.) in the crafting and implementation of land use and environmental laws is highlighted. Although United States law provides the principal material for the course, comparisons with legal regimes in other countries are regularly made. For better and worse, United States law has been a key reference point for planning and environmental laws worldwide. The legal techniques explored in the course include laws dealing with zoning, subdivisions, growth management, transfer of development rights, exactions and impact fees, form-based codes, environmental impact reviews, wetlands and water, endangered species, clean air, solid and hazardous waste disposal, design review, environmental justice, climate change, historic preservation, energy siting, billboard/sign/cell tower controls, eminent domain, building codes, and private homeowner associations. Course readings are drawn from primary sources, including local ordinances, higher level legislation, constitutions, judicial opinions, and private agreements, and from secondary sources, including law review and journal articles, book excerpts, and professional reports. Assignments include a five-page paper and a final exam. Also offered by the Harvard Kennedy School as SUP-663.

Professor:

Jerold Kayden

Season:

Fall

Days:

M

W

Time:

10:00-11:30

School:

• Graduate School of Design

Catalog Number:

0520600

Subject Area:

Architecture, Landscape Architecture, and Urban Planning

Research Areas:

• Architecture and Environmental Design

• Business, Law and Policy

SES 5206: Land Use and Environmental Law

As a scarce and necessary resource for earthly activity, land triggers competition and conflict over its possession, use, development, and preservation. For privately owned land, the market manages much of the competition through its familiar allocative price-setting features. At the same time, because use of land in one location affects the interests of neighbors and the general public and because market mechanisms alone do not always protect or advance such interests, government has enacted land use and environmental laws that

significantly affect how land is handled. Expressed through local ordinances, higher-level legislation, constitutions, discretionary governmental decisions, administrative regulations, judicial opinions, and private agreements, these laws affect the look, feel, character, and composition of cities, suburbs, and rural areas everywhere. This course introduces students to the content and controversies of land use and environmental laws. No prior legal knowledge is presumed. The purpose of the course is to provide students with a basic understanding of the theories, rationales, techniques, and implementing institutions involved in legally controlling the possession, use, development, and preservation of land. Particular attention is paid to law's intended and unintended impacts on the physical pattern of built environments and resulting social and economic outcomes, on the increasing overlap of land use law and environmental law regimes especially when climate change and urban resilience are front and center, and on the tensions between individual rights and asserted socio-economic goals often resolved within the context of constitutional law by the courts. Law's approach is distinguished from those employed by other fields and disciplines. The role of the non-lawyer professional (planner, designer, public policymaker, developer, activist, etc.) in the crafting and implementation of land use and environmental laws is highlighted. Although United States law provides the principal material for the course, comparisons with legal regimes in other countries are regularly made. For better and worse, United States law has been a key reference point for planning and environmental laws worldwide. The legal techniques explored in the course include laws dealing with zoning, subdivisions, growth management, transfer of development rights, exactions and impact fees, form-based codes, environmental impact reviews, wetlands and water, endangered species, clean air, solid and hazardous waste disposal, design review, environmental justice, climate change, historic preservation, energy siting, billboard/sign/cell tower controls, eminent domain, building codes, and private homeowner associations. Course readings are drawn from primary sources, including local ordinances, higher level legislation, constitutions, judicial opinions, and private agreements, and from secondary sources, including law review and journal articles, book excerpts, and professional reports. Assignments include a five-page paper and a final exam. Also offered by the Harvard Kennedy School as SUP-663.

Professor:

Jerold Kayden

Season:

Fall

Days:

M

W

Time:

10:00-11:30

School:

- Graduate School of Design

Catalog Number:

0520600

Subject Area:

Architecture, Landscape Architecture, and Urban Planning

Research Areas:

- Architecture and Environmental Design
- Business, Law and Policy

SES 5206: Land Use and Environmental Law

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0520600
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Architecture, Landscape Architecture, and Urban Planning
Research Areas:
• Architecture and Environmental Design
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SES 5304: Transportation Planning and Development
This is an introductory course that examines the complex relationship between transportation, land use and urban form, and the varied instruments available to planners seeking to influence this relationship. The course is divided into three parts: First, we take a historical look at how technological innovations, socio-demographic shifts and political decision-making shaped the way people and goods move around cities today. We explore the contemporary "urban transportation problem," that extends beyond satisfying mobility needs into addressing the impact of transportation choices on energy use, equity, congestion, air pollution, safety, urban sprawl, etc. Second, the course provides an overview of alternatives available to transportation planners, as they attempt to (a) avoid long and unnecessary motorized travel, (b) shift the movement of people to socially efficient modes such as walking, biking, and public transit, and (c) improve the technology and operational management of transportation services. In this section, we survey transportation innovations increasingly discussed in cities around the world, such as bus rapid transit, congestion charging, adaptive parking and bike-sharing. Third, the course looks at how transportation planners craft projects and policies that are both technically sound and politically feasible, introducing (and critiquing) some of the tools and skills used by professionals in this field. Through lectures, discussions, case studies and written assignments, this course aims to introduce students to the field of transportation planning, and to develop their ability to critically evaluate plans and policies. No prerequisites.
Professor:

Onesimo Flores Dewey
Season:
Fall
Days:
M
W
Time:
3:30-5:00
School:
• Graduate School of Design
Catalog Number:
0530400
Research Areas:
• Architecture and Environmental Design
• Business, Law and Policy
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0530400
Research Areas:
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• Business, Law and Policy

The website URL where the inventory of course offerings with sustainability content is publicly available:

http://environment.harvard.edu/student-resources/course-guide/courses

A brief description of the methodology the institution followed to complete the course inventory:

The Harvard University Center for the Environment annually compiles a list of Harvard undergraduate and graduate courses most relevant to environmental studies. The course guide is populated using the official University's Course Catalog and the Faculty of Arts and Sciences Registrar's Course Guide.

How did the institution count courses with multiple offerings or sections in the inventory?:

Each course was counted as a single course regardless of the number of offerings or sections

A brief description of how courses with multiple offerings or sections were counted (if different from the options outlined above):

Which of the following course types were included in the inventory?:

	Yes or No
Internships	No
Practicums	No
Independent study	No
Special topics	No
Thesis/dissertation	No
Clinical	No
Physical education	No
Performance arts	No

Does the institution designate sustainability courses in its catalog of course offerings?:

No

Does the institution designate sustainability courses on student transcripts?:

No

Learning Outcomes

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Institution’s students graduate from degree programs that include sustainability as a learning outcome or include multiple sustainability learning outcomes. Sustainability learning outcomes (or the equivalent) may be specified at:

- Institution level (e.g. covering all students)
- Division level (e.g. covering one or more schools or colleges within the institution)
- Program level
- Course level

This credit includes graduate as well as undergraduate programs. For this credit, “degree programs” include majors, minors, concentrations, certificates, and other academic designations. Extension certificates and other certificates that are not part of academic degree programs do not count for this credit; they are covered in *EN 11: Continuing Education*. Programs that include co-curricular aspects may count as long as there is an academic component of the program. Learning outcomes at the course level count if the course is required to complete the program.

This credit is inclusive of learning outcomes, institutional learning goals, general education outcomes, and graduate profiles that are consistent with the definition of “sustainability learning outcomes” included in Standards and Terms.

Institutions that do not specify learning outcomes as a matter of policy or standard practice may report graduates from sustainability-focused programs (i.e. majors, minors, concentrations and the equivalent as reported for *AC 3: Undergraduate Program* and *AC 4: Graduate Program*) in lieu of the above criteria.

"---" *indicates that no data was submitted for this field*

Number of students who graduated from a program that has adopted at least one sustainability learning outcome:

1,200

Total number of graduates from degree programs:

1,662

A copy of the list or inventory of degree, diploma or certificate programs that have sustainability learning outcomes:

A list of degree, diploma or certificate programs that have sustainability learning outcomes:

In 2014 there were 1,662 graduates from Harvard College. Of those, we estimate that 1,200 students took at least one sustainability-related course, based on their concentrations and the general education requirements (many of which have sustainability-related offerings). Students enrolled in the following Harvard College departments are assumed to have taken at least one sustainability-related course during their experience at Harvard: Anthropology; Chemistry and Chemical Biology; Comparative Literature; Earth and Planetary Sciences; Economics; English; Environmental Science and Engineering; Government; History; History of Science; Human Evolutionary Biology; Materials Science; Molecular and Cellular Biology; Organismic and Evolutionary Biology; Physics; Romance Languages and Literatures; Visual and Environmental Studies *** We estimate that approximately 350 graduates from the following Harvard graduate Schools (out of 5,639 graduates in 2014) took at least one sustainability-related course: School of Engineering & Applied Sciences, Undergraduate (A.B., A.B./S.M., S.B.) and Graduate (S.M., M.E., Ph.D.); Harvard Business School; Division of Continuing Education; Graduate School of Design; Harvard Kennedy School; Harvard Law School; Harvard School of Public Health; Harvard Divinity School; Graduate School of Arts & Sciences; Harvard Medical School

A list or sample of the sustainability learning outcomes associated with degree, diploma or certificate programs (if not included in an inventory above):

The website URL where information about the institution’s sustainability learning outcomes is available:

http://environment.harvard.edu/

Undergraduate Program

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Institution offers at least one:

• Sustainability-focused program (major, degree program, or equivalent) for undergraduate students

And/or

• Undergraduate-level sustainability-focused minor or concentration (e.g. a concentration on sustainable business within a business major).

Extension certificates and other certificates that are not part of academic degree programs do not count for this credit; they are covered in *EN 11: Continuing Education*.

"---" *indicates that no data was submitted for this field*

Does the institution offer at least one sustainability-focused major, degree program, or the equivalent for undergraduate students?:

Yes

The name of the sustainability-focused, undergraduate degree program (1st program):

Environmental Science & Public Policy

A brief description of the undergraduate degree program (1st program):

The concentration in Environmental Science and Public Policy is designed to provide a multi-disciplinary introduction to current problems of the environment. It is founded on the premise that the ability to form rational judgments concerning many of the complex challenges confronting society today involving the environment requires both an understanding of the underlying scientific and technical issues and an appreciation for the relevant economic, political, legal, historical and ethical dimensions.

The website URL for the undergraduate degree program (1st program):

http://www.espp.fas.harvard.edu/

The name of the sustainability-focused, undergraduate degree program (2nd program):

Organismic & Evolutionary Biology

A brief description of the undergraduate degree program (2nd program):

OEB is a diverse, vibrant and growing department that prides itself on the scholarly pursuit of a broad range of research and teaching interests. These span field and laboratory studies that are key to understanding the evolution of organisms, how biodiversity is generated and maintained, how organisms work, and how organisms interact with their environment. These also span from the evolution and control of gene expression patterns within individuals and populations to the dynamics of ecosystems. The beauty of biology is revealed through the evolution of its complexity and the interactions of organisms in their environment. OEB has enjoyed a rich history in evolutionary and organismic biology. They seek to build on this strength and tradition to guide our initiatives as a faculty-student and staff community to meet our key missions in education (university and public) and research scholarship.

The website URL for the undergraduate degree program (2nd program):

http://www.oeb.harvard.edu/

The name of the sustainability-focused, undergraduate degree program (3rd program):

Earth & Planetary Sciences

A brief description of the undergraduate degree program (3rd program):

The Earth and Planetary Sciences field encompasses a broad range of science disciplines and applications to environmental and economic endeavors. EPS students at Harvard are involved in the development and application of new tools and technologies such as space probes and sophisticated instruments, as well as field work in remote and challenging settings. In an unparalleled research environment, Faculty and students are addressing fundamental questions about our world, from prehistoric geological processes to understanding weather patterns.

The website URL for the undergraduate degree program (3rd program):

http://eps.harvard.edu/

The name and website URLs of all other sustainability-focused, undergraduate degree program(s):

Environmental Science and Engineering:

http://www.seas.harvard.edu/programs/engineering/environmental-science-and-engineering

Does the institution offer one or more sustainability-focused minors, concentrations or certificates for undergraduate students?:

Yes

The name of the sustainability-focused undergraduate minor, concentration or certificate (1st program):

Secondary Field in Energy and Environment (minor)

A brief description of the undergraduate minor, concentration or certificate (1st program):

The energy-environment challenge is a defining issue of our time, and one of Harvard's greatest contributions to meeting that challenge will be the education of a new generation of leaders in science, business, law, and public service. Harvard has a responsibility to create opportunities for its undergraduate students to broaden and deepen their understanding of the complexities associated with energy and environmental issues, and provide them with the tools needed to address our challenges now and into the future. The Environmental Science and Public Policy Concentration, in coordination with the Harvard University Center for the Environment, offers the Secondary Field in Energy and Environment (E&E) to increase students' exposure to, and literacy in, the interconnecting set of issues related to energy and the environment. Through debate and dialogue in coursework and seminars, students identify the obstacles, highlight the opportunities, and define the discussion for an energy-environment strategy for the 21st century and beyond.

The website URL for the undergraduate minor, concentration or certificate (1st program):

http://espp.fas.harvard.edu/energy-environment

The name of the sustainability-focused undergraduate minor, concentration or certificate (2nd program):

Environmental Science and Public Policy Secondary Field (minor)

A brief description of the undergraduate minor, concentration or certificate (2nd program):

The secondary field in ESPP offers students in other concentrations an opportunity to complement their studies with courses that will provide an environmental science and policy perspective.

The website URL for the undergraduate minor, concentration or certificate (2nd program):

http://espp.fas.harvard.edu/pages/secondary-field-requirements-new

The name of the sustainability-focused undergraduate minor, concentration or certificate (3rd program):

Earth and Planetary Sciences Secondary Field

A brief description of the undergraduate minor, concentration or certificate (3rd program):

The EPS secondary field is intended to provide a strong foundation in one or more subfields of Earth science (geophysics, geochemistry, climate science, atmospheric chemistry, geology, earth history, paleontology, planetary science) to students who have sufficient preparation in physics, chemistry, and mathematics.

The website URL for the undergraduate minor, concentration or certificate (3rd program):

http://eps.harvard.edu/pages/concentration-requirements

The name, brief description and URL of all other undergraduate-level sustainability-focused minors, concentrations and certificates:

Graduate Program

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Institution offers at least one:

- Sustainability-focused program (major, degree program, or equivalent) for graduate students

  And/or

- Graduate-level sustainability-focused minor, concentration or certificate (e.g. a concentration on sustainable business within an MBA program).

Extension certificates and other certificates that are not part of academic degree programs do not count for this credit; they are covered in *EN 11: Continuing Education*.

"---" *indicates that no data was submitted for this field*

Does the institution offer at least one sustainability-focused major, degree program, or the equivalent for graduate students?:

Yes

The name of the sustainability-focused, graduate-level degree program (1st program):

Sustainability & Environmental Management

A brief description of the graduate degree program (1st program):

Explore the critical environmental factors affecting air, water, climate, sustainability, and ecosystems. Equipped with the master's degree, you'll be primed to create solutions to the crises affecting our global community.
At Harvard you'll find:
Focused fields to deepen your insight

The ecosystems concentration focuses on the stewardship of natural assets and the handling of contaminants.
The sustainability concentration focuses on developing practices that conserve resources for future generations.

Flexibility to fit your schedule

Online and evening courses, so you can balance school and other commitments. At least one on-campus course here in Cambridge is required.

Courses that run year round to accelerate degree completion.

Certificates to complement your degree

You can select degree electives that count toward a certificate in:

Built environment and community sustainability
Corporate sustainability and innovation
Environment policy and international development
Ecosystems science and natural resource management

Access to the larger Harvard community resources

Work with a professor as a part-time research assistant.
Participate in an internship, study abroad in Venice or Tuscany, and network with peers through our active Environmental Club.
Prepare for your next step with support from the Harvard Office of Career Services.

The website URL for the graduate degree program (1st program) :

http://www.extension.harvard.edu/degrees-certificates/sustainability-environmental-management

The name of the sustainability-focused, graduate-level degree program (2nd program):

Master in Design Studies: Energy and Environments

A brief description of the graduate degree program (2nd program):

The existing discourse on "sustainable" design inadequately frames questions of energy and environment. Whether you consider the narrowly defined system boundaries of buildings or landscapes, incomplete interpretations of the thermodynamics that support life today, or the externalities of contemporary "sustainability," a more ambitious and totalizing praxis for energy and environments is necessary today. The Energy and Environments concentration focuses on buildings and landscapes as both small and large-scale thermodynamic systems that aim to maximize energy intake, use, and feedback, achieving broad design and ecological impacts. For instance, the design of urban wood buildings has far-reaching effects on forestry practices, global carbon cycles, as well as minute thermal phenomena. Rather than focusing on the constrained principles of efficiency, conservation, and optimization, we examine the capacities and propensities of material/energy systems along with their historical and socio-ecological entanglements. This approach is necessary for a more thermodynamically cogent, ecologically exuberant, and vitally civilizing method of practice for the 21st century.

Energy and Environments allows students to examine material and energy issues – broadly defined, from the molecular to the territorial – across disciplines and scales, taking full advantage of courses and initiatives throughout the GSD and Harvard University. It is closely associated with the Energy, Environments, and Design Research Lab, a way to couple theory with applied research. The curriculum is diverse: from short workshops, half-semester module courses, regular seminars and lectures, and to year-long thesis projects and multi-year lab projects.

The website URL for the graduate degree program (2nd program):

http://www.gsd.harvard.edu/#/academic-programs/master-in-design-studies/energy-and-environments
/index.html

The name of the sustainability-focused, graduate-level degree program (3rd program):

Harvard School of Engineering & Applied Sciences - Graduate Engineering Sciences Degree: Environmental Science and Engineering (S.M., M.E., Ph.D)

A brief description of the graduate degree program (3rd program):

Our society's influence on the natural world's ecosystems and resources has never been more prominent or problematic than it is today. In order to better understand and address environmental challenges, environmental scientists and engineers provide technical solutions and advance innovations in environmental measurements, modeling, and control through the application of scientific and engineering principles.

Harvard has long been a pioneer in environmental education and research. This tradition continues today with faculty that are committed to teaching and researching engineered solutions to problems in the atmospheric, terrestrial, and aquatic compartments of the environment. Undergraduate research and design projects in Environmental Sciences and Engineering cut across departments and schools, and cover topics in environmental technology, atmospheric sciences, environmental chemistry, microbiology, water management, energy, climate, and oceanography.

Students in Environmental Sciences and Engineering (ESE) study the fundamental processes and technologies underlying environmental systems, including natural and polluted waters and soils, the atmosphere, climate, and energy. Students learn to apply these principles to develop solutions to complex environmental problems and to mitigate human impacts on the environment.

The website URL for the graduate degree program (3rd program):

http://www.seas.harvard.edu/environmental-science-engineering/degree-and-course-options

The name and website URLs of all other sustainability-focused, graduate-level degree program(s):

Does the institution offer one or more graduate-level sustainability-focused minors, concentrations or certificates?:

Yes

The name of the graduate-level sustainability-focused minor, concentration or certificate (1st program):

Graduate Consortium on Energy and Environment

A brief description of the graduate minor, concentration or certificate (1st program):

The Harvard Graduate Consortium on Energy and Environment fosters a community of doctoral students who are well versed in the broad, interconnected issues of energy and environment while maintaining their focus in their primary discipline. Through debate and dialogue in coursework and seminars, students are able to identify the obstacles, highlight the opportunities, and define the discussion of an energy strategy for the 21st century and beyond. To date, nearly 150 students have participated in the program.
Program Description

The Consortium is open to Ph.D. or Sc.D. students at Harvard who have completed at least one year in their home department or school and can demonstrate that participation in the Consortium will advance the goals of their research experience. Students representing a broad range of disciplines in the natural and social sciences are encouraged to participate in the Consortium, reflecting the interdisciplinary nature of energy and the environment in contemporary society.

Once admitted to the Consortium, students are required to take three courses designed to give them an introduction to several critical aspects of energy issues. Students are also required to participate in a weekly reading seminar, led by faculty members from around the university, which provides an overview of the energy field from a wide range of perspectives. Each student in the program is eligible to apply for graduate fellowship support and up to $1,000 towards attending conferences or other appropriate professional activities during their time in the program.

The website URL for the graduate minor, concentration or certificate (1st program):

http://environment.harvard.edu/graduate-consortium

The name of the graduate-level sustainability-focused minor, concentration or certificate (2nd program):

Sustainability Certificate

A brief description of the graduate minor, concentration or certificate (2nd program):

Offered through the Harvard Extension school, students will gain understanding, knowledge, and fluency in: The benefits of conventional and renewable energy systems, issues surrounding new transportation technologies, energy intensity of food production, effects of supply chain management and international commerce in energy security, energy management in buildings, and the mechanisms needed to evolve into sustainable energy operations; Sustainability management at the nexus of a local business, local government, and community as well as use of management systems and performance frameworks.; and focused subject areas, such as environmental economics, greenhouse emissions management, sustainable building design, sustainable supply chain management, environmental toxicology, or risk management.

The website URL for the graduate minor, concentration or certificate (2nd program):

http://www.extension.harvard.edu/professional-certificates/sustainability-certificate

The name of the graduate-level sustainability-focused minor, concentration or certificate (3rd program):

Secondary PhD Field Science, Technology and Society

A brief description of the graduate minor, concentration or certificate (3rd program):

STS is an emerging field dedicated to studying the institutions and practices of scientists, engineers, physicians, architects, planners, and other technical professionals, as well as the complex relationships between science, technology and society. STS employs a variety of methods from the humanities and social sciences to examine how science and technology both influence and are influenced by their social, cultural, and material contexts. A major area of interest is the role of technologies and technological systems in shaping the purposes, possibilities, and meanings of human lives, from the creation of novel biological organisms to the design of urban infrastructures and the management of global risks to health, food, security, and the environment.

The website URL for the graduate minor, concentration or certificate (3rd program):

http://www.gsas.harvard.edu/programs_of_study/science_technology_and_society.php

The name and website URLs of all other graduate-level, sustainability-focused minors, concentrations and certificates:

Immersive Experience

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution offers at least one immersive, sustainability-focused educational study program. The program is one week or more in length and may take place off-campus, overseas, or on-campus.

For this credit, the program must meet one or both of the following criteria:

- It concentrates on sustainability, including its social, economic, and environmental dimensions

  And/or

- It examines an issue or topic using sustainability as a lens.

For-credit programs, non-credit programs and programs offered in partnership with outside entities may count for this credit. Programs offered exclusively by outside entities do not count for this credit.

See the Credit Example in the STARS Technical Manual for further guidance.

"---" *indicates that no data was submitted for this field*

Does the institution offer at least one immersive, sustainability-focused educational study program that meets the criteria for this credit?:

Yes

A brief description of the sustainability-focused immersive program(s) offered by the institution:

Harvard's Schools provide a wide variety of immersive programming that include a sustainability focus. Many of these are organized by one of Harvard's dozens of energy and environment programs.

Here is an example of a week long engineering trip undergraduate students took to Brazil to learn about sustainable development topics:

http://news.harvard.edu/gazette/story/2015/02/an-exchange-in-ideas-and-culture/

Harvard Forest runs immersive programs in research and learning on working forests:

http://harvardforest.fas.harvard.edu/other-tags/reu

Harvard Business School students take part in a FIELD immersive program, often on sustainability-related challenges:

http://www.hbs.edu/mba/academic-experience/FIELD/Pages/default.aspx

The website URL where information about the immersive program(s) is available:

http://environment.harvard.edu/harvard-energy-environmental-programs

Sustainability Literacy Assessment

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution conducts an assessment of the sustainability literacy of its students. The sustainability literacy assessment focuses on knowledge of sustainability topics and may also address values, behaviors and/or beliefs. Assessments that focus exclusively on values, behaviors and/or beliefs are not sufficient to earn points for this credit.

Institution may conduct a follow-up assessment of the same cohort group(s) using the same instrument.

This credit includes graduate as well as undergraduate students.

"---" *indicates that no data was submitted for this field*

The percentage of students assessed for sustainability literacy (directly or by representative sample) and for whom a follow-up assessment is conducted:

0

The percentage of students assessed for sustainability literacy (directly or by representative sample) without a follow-up assessment:

1.40

A copy of the questions included in the sustainability literacy assessment(s):

The questions included in the sustainability literacy assessment(s) :

Survey questions can be accessed here:

https://harvard.az1.qualtrics.com/SE/?SID=SV_daOr7DoZKggxIHz

15 questions covered waste reduction, energy reduction and living sustainably while on campus

A brief description of how the assessment(s) were developed:

Developed solely by Harvard College undergraduates and administered in coordination with the Office for Sustainability and Freshman Dean's office, this sustainability literacy assessment survey was distributed to all incoming freshman during Move-In week in August 2014. Approximately 30% (or 458) of first year students responded by taking the survey which accounts for 1.4% of the total graduate and undergraduate student body. There was not a follow-up assessment, so we chose 1.4% for the second question above, but left the first as 0 (as that one states specifically there must have been a follow-up assessment).

A brief description of how the assessment(s) were administered:

Developed solely by Harvard College undergraduates and administered in coordination with the Office for Sustainability and Freshman Dean's office, this sustainability literacy assessment survey was distributed to all incoming freshman during Move-In week in August 2014. Approximately 30% (or 458) of first year students responded by taking the survey which accounts for 1.4% of the total graduate and undergraduate student body. There was not a follow-up assessment, so we chose 1.4% for the second question above, but left the first as 0 (as that one states specifically there must have been a follow-up assessment).

A brief summary of results from the assessment(s):

Approximately 30% of incoming freshmen took the survey.

The website URL where information about the literacy assessment(s) is available:

https://harvard.az1.qualtrics.com/SE/?SID=SV_daOr7DoZKggxIHz

Incentives for Developing Courses

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Institution has an ongoing program or programs that offer incentives for faculty in multiple disciplines or departments to develop new sustainability courses and/or incorporate sustainability into existing courses or departments. The program specifically aims to increase student learning of sustainability.

Incentives may include release time, funding for professional development, and trainings offered by the institution.

Incentives for expanding sustainability offerings in academic, non-credit, and/or continuing education courses count for this credit.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Campus as a Living Laboratory

Criteria

Institution is utilizing its infrastructure and operations for multidisciplinary student learning, applied research and practical work that advances sustainability on campus in at least one of the following areas:

- Air & Climate
- Buildings
- Dining Services/Food
- Energy
- Grounds
- Purchasing
- Transportation
- Waste
- Water
- Coordination, Planning & Governance
- Diversity & Affordability
- Health, Wellbeing & Work
- Investment
- Public Engagement
- Other

This credit includes substantive work by students and/or faculty (e.g. class projects, thesis projects, term papers, published papers) that involves active and experiential learning and contributes to positive sustainability outcomes on campus (see the Credit Example in the STARS Technical Manual). On-campus internships and non-credit work (e.g. that take place under supervision of sustainability staff or committees) may count as long as the work has a learning component.

This credit does not include immersive education programs, co-curricular activities, or community-based work, which are covered by *AC 5: Immersive Experience*, credits in the Campus Engagement subcategory, and credits in the Public Engagement subcategory, respectively.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Research

This subcategory seeks to recognize institutions that are conducting research on sustainability topics. Conducting research is a major function of many colleges and universities. By researching sustainability issues and refining theories and concepts, higher education institutions can continue to help the world understand sustainability challenges and develop new technologies, strategies, and approaches to address those challenges.

Credit
Academic Research
Support for Research
Access to Research

Academic Research

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Part 1

Institution's faculty and/or staff conduct sustainability research and the institution makes an inventory of its sustainability research publicly available.

Part 2

Institution's academic departments (or the equivalent) include faculty and staff who conduct sustainability research.

Any level of sustainability research is sufficient to be included for this credit. In other words, a researcher who conducts both sustainability research and other research may be included.

In order to report for this credit, the institution should conduct an inventory to identify its sustainability research activities and initiatives.

Each institution is free to choose a methodology to identify sustainability research that is most appropriate given its unique circumstances. For example, an institution may distribute a survey to all faculty members and ask them to self-identify as being engaged in sustainability research or ask the chairperson of each department to identify the sustainability research activities within his or her department. The research inventory should be based on the definition of "sustainability research" outlined in Standards and Terms and include, at minimum, all research centers, laboratories, departments, and faculty members whose research focuses on or is related to sustainability.

Submission Note:

Latest news about research on environment and sustainability here:

http://news.harvard.edu/gazette/section/science-n-health/environment/

Full list of faculty involved in sustainability research is here:
http://environment.harvard.edu/about/directory/faculty/all

"---" *indicates that no data was submitted for this field*

Number of the institution's faculty and/or staff engaged in sustainability research:

239

Total number of the institution's faculty and/or staff engaged in research:

2,400

Number of academic departments (or the equivalent) that include at least one faculty or staff member that conducts sustainability research:

32

The total number of academic departments (or the equivalent) that conduct research:

45

A copy of the sustainability research inventory that includes the names and department affiliations of faculty and staff engaged in sustainability research:

Names and department affiliations of faculty and staff engaged in sustainability research:

RAWI E. ABDELAL Harvard Business School
FREDERICK H. ABERNATHY School of Engineering & Applied Sciences
GARY ADAMKIEWICZ Harvard School of Public Health
PHILIPPE AGHION FAS Economics
JOANNA AIZENBERG School of Engineering & Applied Sciences / FAS Chemistry
EMMANUEL AKYEAMPONG FAS History / African and African American Studies
JOSEPH ALDY Harvard Business School / Harvard Kennedy School
WILLIAM P. ALFORD Harvard Law School
JOSEPH ALLEN Harvard School of Public Health
GRAHAM ALLISON Harvard Kennedy School
LAURA DIAZ ANADON Harvard Kennedy School
JAMES G. ANDERSON School of Engineering & Applied Sciences / FAS Chemistry
STEPHEN ANSOLABEHERE FAS Government
NAVA ASHRAF Harvard Business School
ALAN ASPURU-GUZIK FAS Chemistry & Chemical Biology
MICHAEL J. AZIZ School of Engineering & Applied Sciences
ANDREA BACCARELLI Harvard School of Public Health
GEORGE BAKER Harvard Business School
OFER BAR-YOSEF FAS Anthropology
MAX H. BAZERMAN Harvard Business School / Harvard Kennedy School / FAS Psych
PIERRE BELANGER Harvard Graduate School of Design
ALAN BERGER MIT Dept. of Urban Studies & Planning
LISA BERKMAN Harvard School of Public Health
AARON BERNSTEIN Harvard Medical School
THEODORE BESTOR FAS Anthropology
THEODORE BETLEY FAS Chemistry & Chemical Biology
BARRY BLOOM Harvard School of Public Health
DAVID BLOOM Harvard School of Public Health
JEREMY BLOXHAM FAS Earth & Planetary Sciences
PETER K. BOL FAS East Asian Studies
KIRSTEN BOMBLIES FAS Organismic & Evolutionary Biology
JOSEPH BRAIN Harvard School of Public Health

MICHAEL P. BRENNER School of Engineering & Applied Sciences
NEIL BRENNER Harvard Graduate School of Design
JOHN BRISCOE School of Engineering & Applied Sciences / HSPH
JANET BROWNE FAS History of Science
CAROLINE BUCKEE Harvard School of Public Health
LAWRENCE BUELL FAS English
MATTHEW BUNN Harvard Kennedy School
STEPHEN BURT FAS English
FEDERICO CAPASSO School of Engineering & Applied Sciences
MARCIA CASTRO Harvard School of Public Health
STEVEN CATON FAS Anthropology
COLLEEN M. CAVANAUGH FAS Organismic & Evolutionary Biology
JOYCE CHAPLIN FAS History
DAVID CHRISTIANI Harvard School of Public Health / Harvard Medical School
GEORGE M. CHURCH Harvard Medical School
JON CLARDY Harvard Medical School
WILLIAM C. CLARK Harvard Kennedy School
DAVID CLARKE School of Engineering & Applied Sciences
JESSICA COHEN Harvard School of Public Health
ADAM COHEN FAS Chemistry & Chemical Biology / FAS Physics
RICHARD N. COOPER FAS Economics
BRENT COULL Harvard School of Public Health
VERENA CONLEY FAS Comparative Literature / Romance Languages and Literature
CHARLES DAVIS FAS Organismic & Evolutionary Biology
DIANE DAVIS Harvard Graduate School of Design
MELISSA DELL FAS Economics
PHILIP DEMOKRITOU Harvard School of Public Health
RAFAEL M. DI TELLA Harvard Business School
DOUGLAS DOCKERY Harvard School of Public Health / Harvard Medical School
DAVID DRAKE Harvard Business School
ROBERT ECCLES Harvard Business School
DIANA L. ECK Harvard Divinity School / FAS South Asian Studies
AMY C. EDMONDSON Harvard Business School
SCOTT V. EDWARDS FAS Organismic & Evolutionary Biology
DAVID A. EDWARDS School of Engineering & Applied Sciences
JAMES ENGELL FAS English / FAS Literature / FAS Comp. Lit.
BRIAN D. FARRELL FAS Organismic & Evolutionary Biology
BRIAN F. FARRELL School of Engineering & Applied Sciences / FAS EPS
RICHARD T. T. FORMAN Harvard Graduate School of Design
DAVID FOSTER FAS Organismic & Evolutionary Biology
ALISON FRANK FAS History
JEFFREY FRANKEL Harvard Kennedy School
JODY FREEMAN Harvard Law School
JULIO FRENK Harvard School of Public Health
WILLIAM (NED) FRIEDMAN FAS Organismic & Evolutionary Biology
CYNTHIA FRIEND School of Engineering & Applied Sciences / FAS Chemistry
GERALD FRUG Harvard Law School
ARCHON FUNG Harvard Kennedy School

PETER L. GALISON FAS History of Science
PETER GIRGUIS FAS Organismic & Evolutionary Biology
GONZALO GIRIBET FAS Organismic & Evolutionary Biology
EDWARD GLAESER Harvard Kennedy School
JOSE A. GOMEZ-IBANEZ Harvard Kennedy School
ROY GORDON FAS Chemistry & Chemical Biology
JERRY R. GREEN Harvard Business School / FAS Economics
JAMES K. HAMMITT Harvard School of Public Health
JAMES HANKEN FAS Organismic & Evolutionary Biology
REMA HANNA Harvard Kennedy School
SHARON HARPER FAS Visual and Environmental Studies
RUSS HAUSER Harvard School of Public Health
RICARDO HAUSMANN Harvard Kennedy School
BRUCE L. HAY Harvard Law School
REBECCA HENDERSON Harvard Business School
MICHAEL J. HISCOX FAS Government
HOPI HOEKSTRA FAS Organismic & Evolutionary Biology
JENNY HOFFMAN FAS Physics
WILLIAM HOGAN Harvard Kennedy School
NOEL MICHELE HOLBROOK FAS Organismic & Evolutionary Biology
RICHARD HORNBECK FAS Economics
CHRISTOPHER HUG Harvard Medical School
JANE HUTTON Harvard Graduate School of Design
PETER HUYBERS FAS Earth & Planetary Sciences
MIAKI ISHII FAS Earth & Planetary Sciences
DANIEL JACOB School of Engineering & Applied Sciences / FAS EPS
ERIC JACOBSEN FAS Chemistry & Chemical Biology
STEIN JACOBSEN FAS Earth & Planetary Sciences
SHEILA JASANOFF Harvard Kennedy School / FAS History of Science
DAVID T. JOHNSTON FAS Earth & Planetary Sciences
DALE JORGENSON Harvard Kennedy School / FAS Economics
CALESTOUS JUMA Harvard Kennedy School
EFTHIMIOS KAXIRAS School of Engineering & Applied Sciences / FAS Physics
JEROLD KAYDEN Harvard Kennedy School / Harvard GSD
DAVID KEITH School of Engineering & Applied Sciences; Kennedy School
ROBIN KELSEY FAS History of Art & Architecture
FRANK KEUTSCH School of Engineering & Applied Sciences
PHILIP KIM FAS Physics
NIALL KIRKWOOD Harvard Graduate School of Design
ROY KISHONY School of Engineering & Applied Sciences / HMS
ANDREW KNOLL FAS Earth & Planetary Sciences / FAS Organismic and Ev. Biology
ROBERTO KOLTER Harvard Medical School
HOWARD KOH Harvard School of Public Health
PETROS KOUTRAKIS Harvard School of Public Health
MICHAEL KREMER Harvard Kennedy School / FAS Economics
ZHIMING KUANG School of Engineering & Applied Sciences / FAS EPS
FRANCINE LADEN Harvard School of Public Health
CHARLES LANGMUIR FAS Earth & Planetary Sciences

JOSEPH LASSITER Harvard Business School
ROBERT LAWRENCE Harvard Kennedy School
RICHARD LAZARUS Harvard Law School
JENNIFER LEANING Harvard School of Public Health / HMS
HENRY LEE Harvard Kennedy School
HERMAN DUTCH LEONARD Harvard Business School
JENNIFER LEWIS School of Engineering & Applied Sciences
NA LI School of Engineering & Applied Sciences
CHARLES LIEBER School of Engineering & Applied Sciences / FAS Chemistry
YUKIO LIPPIT FAS History of Art and Architecture
MARC LIPSITCH Harvard School of Public Health
JENNIFER LOGAN School of Engineering & Applied Sciences
JONATHAN LOSOS FAS Organismic & Evolutionary Biology
CHENSHENG (ALEX) LU Harvard School of Public Health
FRANCIS MACDONALD FAS Earth & Planetary Sciences
JOHN MACOMBER Harvard Business School
L. MAHADEVAN SEAS / HMS / FAS Organismic & Evolutionary Biology
ALI MALKAWI Harvard Graduate School of Design
CHRISTOPHER MARQUIS Harvard Business School
SCOT MARTIN School of Engineering & Applied Sciences
QUINTON MAYNE Harvard Kennedy School
MAITREYI MAZUMDAR Harvard School of Public Health / Harvard Medical School
ERIC MAZUR School of Engineering & Applied Sciences / FAS Physics
JAMES J. MCCARTHY Harvard Medical School / FAS OEB / FAS Physics
MICHAEL MCCORMICK FAS History
MICHAEL B. MCELROY School of Engineering & Applied Sciences / FAS EPS
DANIEL MCKANAN Harvard Divinity School
BRENDAN MEADE FAS Earth & Planetary Sciences
KARIN B. MICHELS Harvard Med. School / Harvard School of Pub. Health
LORETTA J. MICKLEY School of Engineering & Applied Sciences
IAN J. MILLER FAS History
RALPH MITCHELL School of Engineering & Applied Sciences
JERRY X. MITROVICA FAS Earth & Planetary Sciences
KIEL MOE Graduate School of Design
PAUL MOORCROFT FAS Organismic & Evolutionary Biology
SENDHIL MULLAINATHAN FAS Economics
J. WILLIAM MUNGER School of Engineering & Applied Sciences / FAS EPS
CHERRY MURRAY School of Engineering & Applied Sciences
MEGAN MURRAY Harvard Med. School / Harvard School of Pub. Health
SAMUEL MYERS Harvard Medical School
RAMANA NANDA Harvard Business School
VENKATESH NARAYANAMURTI SEAS / Harvard Kennedy School / FAS Physics
DANIEL G. NOCERA FAS Chemistry & Chemical Biology
JOSEPH NYE Harvard Kennedy School
RICHARD O’CONNELL FAS Earth & Planetary Sciences
MEGHAN O’SULLIVAN Harvard Kennedy School
NAOMI ORESKES FAS History of Science
ARIEL PAKES FAS Economics

ROHINI PANDE Harvard Kennedy School
ANN PEARSON FAS Earth & Planetary Sciences
NAOMI PIERCE FAS Organismic & Evolutionary Biology
DAVID PILBEAM FAS Anthropology
CHRIS REED Graduate School of Design
ALEXANDER REHDING FAS Music
FOREST REINHARDT Harvard Business School
JAMES R. RICE School of Engineering & Applied Sciences / FAS EPS
ANDREW RICHARDSON FAS Organismic & Evolutionary Biology
PETER ROGERS School of Engineering & Applied Sciences
JOYCE KLEIN ROSENTHAL Harvard Graduate School of Design
EMMA ROTHSCHILD FAS History
JOAN RUDERMAN Harvard Medical School
WILLIAM A. SAHLMAN Harvard Business School
HOLLY SAMUELSON Harvard Graduate School of Design
A. HASHIM SARKIS Harvard Graduate School of Design
DANIEL P. SCHRAG School of Engineering & Applied Sciences / FAS EPS
MATTHIAS SCHULER Harvard Graduate School of Design
JOEL SCHWARTZ Harvard School of Public Health / HMS
MARTHA SCHWARTZ Harvard Graduate School of Design
JOHN SHAW FAS Earth & Planetary Sciences
MARC SHELL FAS Comp. Lit.
JAMES SHINE Harvard School of Public Health
PAMELA SILVER Harvard Medical School
MARIANO SISKIND FAS Romance Languages & Literatures
DORIS SOMMER FAS Romance Languages & Literatures
FRANK SPEIZER Harvard School of Public Health
JOHN SPENGLER Harvard School of Public Health
ROBERT N. STAVINS Harvard Kennedy School / FAS Economics
JAMES STOCK Harvard Kennedy School
AJANTHA SUBRAMANIAN FAS Anthropology
LAWRENCE H. SUMMERS Harvard Kennedy School / FAS Economics
ELSIE SUNDERLAND School of Eng. / Harvard School of Public Health
ZHIGANG SUO School of Engineering & Applied Sciences
ERIC TCHETGEN TCHETGEN Harvard School of Public Health
KIMBERLY THEIDON FAS Anthropology
KAREN THORNBER FAS Comparative Literature
DUSTIN TINGLEY FAS Government
MICHAEL TOFFEL Harvard Business School
CHRISTIAN TRYON FAS Anthropology
NOREEN TUROSS FAS Human Evolutionary Biology
ELI TZIPERMAN School of Engineering & Applied Sci. / FAS EPS
VISHAL S. VAIDYA Harvard School of Public Health / HMS
MICHAEL VANROOYEN Harvard School of Public Health / HMS
CHAD D. VECITIS School of Engineering & Applied Sciences
RICHARD VIETOR Harvard Business School
JOOST VLASSAK School of Engineering & Applied Sciences
JOHN WAKELEY FAS Organismic & Evolutionary Biology

CHARLES WALDHEIM Harvard Graduate School of Design
MARC WEISSKOPF Harvard School of Public Health
DAVID WEITZ School of Engineering & Applied Sci / FAS Physics
MARTIN WEITZMAN Harvard Kennedy School / FAS Economics
GEORGE WHITESIDES FAS Chemistry & Chemical Biology / FAS Physics
WALTER WILLETT Harvard School of Public Health / HMS
EDWARD O. WILSON FAS Organismic & Ev. Biology / HMS
DYANN WIRTH Harvard School of Public Health
STEVEN WOFSY School of Engineering & Applied Sci / FAS EPS
ELIZABETH WOLKOVICH FAS Organismic & Evolutionary Biology
ROBERT WOOD School of Engineering & Applied Sciences
ROBIN WORDSWORTH School of Engineering & Applied Sciences
RICHARD WRANGHAM FAS Anthropology
MARK WU Harvard Law School
RICHARD ZECKHAUSER Harvard Kennedy School

A brief description of the methodology the institution followed to complete the research inventory:

The Harvard University Center for the Environment brings together one of the largest and most varied faculty communities on campus. HUCE Faculty Associates participate in events, workshops, grant programs, and meet twice-monthly to discuss their research and environmental issues more broadly.The Center for the Environment's faculty associate database contains profiles of the more than 250 faculty affiliated with the Center. The directory is searchable by research area, School, and keyword.

A brief description of notable accomplishments during the previous three years by faculty and/or staff engaged in sustainability research:

Past Year:

Harvard University’s $20 million initiative funds projects aimed at confronting the climate change challenge. Recipients include faculty and students from across all Harvard disciplines:

http://environment.harvard.edu/news/general/support-seven-president%E2%80%99s-climate-fund

Organic mega flow battery, developed by Professor Michael Aziz (School of Engineering and Applied Sciences), promises breakthrough for renewable energy:

http://www.seas.harvard.edu/news/2014/01/organic-mega-flow-battery-promises-breakthrough-for-re

newable-energy

Study co-authored by Professor Jerry Mitrovica (Dept. of Earth and Planetary Sciences) found acceleration of sea level rise is much larger than scientists previously thought:

http://environment.harvard.edu/news/faculty-news/sea-level-rise-picking-speed

Scientists, led by Alan Aspuru-Guzik (Dept. of Chemistry and Chemical Biology), have developed a theoretical model of a material that one day could anchor the development of highly efficient solar panels:

http://environment.harvard.edu/news/faculty-news/material-gain

New study co-authored by Joel Schwartz (Harvard School of Public Health) links strong carbon standards to substantial reductions in air pollution and widespread health benefits:

http://environment.harvard.edu/news/general/power-plant-standards-could-save-thousands-us-lives

-every-year

Harvard launches research center for Green Buildings, led by Ali Malkawi (Graduate School of Design):

http://environment.harvard.edu/news/faculty-news/harvard-launches-research-center-green-buildin

gs

Department of Energy announces a $12 million award to establish an Energy Frontier Research Center at Harvard, directed by Professor Cynthia Friend (School of Engineering and Applied Sciences):

http://environment.harvard.edu/news/faculty-news/doe-awards-energy-frontier-research-center-ccb

-and-seas

Two decades later, pivotal Harvard School of Public Health Six Cities Study key in fight for clean air:

http://environment.harvard.edu/news/huce-headlines/air-pollutions-invisible-toll

New Harvard Report authored by Professor Michael McElroy (School of Engineering and Applied Sciences) probes security risks of extreme weather and climate change:

http://environment.harvard.edu/climate-extremes

Harvard University Center for the Environment adds secondary field where undergraduates can study climate change:

http://environment.harvard.edu/news/general/studying-energy-environment

Climate specialists, including Professor Daniel Schrag (Department of Earth and Planetary Sciences), came together for a special HUCE talk to consider a dangerous milestone in carbon dioxide levels:

http://environment.harvard.edu/news/general/another-step-wrong-direction

Rising carbon dioxide levels will have an impact on food nutrition, says Sam Myers (Harvard School of Public Health/Harvard Medical School):

http://environment.harvard.edu/news/faculty-news/rising-carbon-dioxide-levels-will-have-impact-

food-nutrition

Professor Michael McCormick (Department of History) will lead a project aimed at constructing the most detailed historical record yet of European climate:

http://environment.harvard.edu/news/faculty-news/annals-climate

And much, much more here:

http://environment.harvard.edu/news/headlines

The website URL where information about sustainability research is available:

http://environment.harvard.edu/news/headlines

Support for Research

Responsible Party

Kellie Nault
Communications Coordinator
Harvard University Center for the Environment

Criteria

Institution encourages and/or supports sustainability research through one or more of the following:

- An ongoing program to encourage students in multiple disciplines or academic programs to conduct research in sustainability. The program provides students with incentives to research sustainability. Such incentives may include, but are not limited to, fellowships, financial support, and mentorships. The program specifically aims to increase student sustainability research.
- An ongoing program to encourage faculty from multiple disciplines or academic programs to conduct research in sustainability topics. The program provides faculty with incentives to research sustainability. Such incentives may include, but are not limited to, fellowships, financial support, and faculty development workshops. The program specifically aims to increase faculty sustainability research.
- Formally adopted policies and procedures that give positive recognition to interdisciplinary, transdisciplinary, and multidisciplinary research during faculty promotion and/or tenure decisions.
- Ongoing library support for sustainability research and learning in the form of research guides, materials selection policies and practices, curriculum development efforts, sustainability literacy promotion, and e-learning objects focused on sustainability.

"---" *indicates that no data was submitted for this field*

Does the institution have a program to encourage student sustainability research that meets the criteria for this credit?:

Yes

A brief description of the institution's program(s) to encourage student research in sustainability:

The Center for the Environment's Undergraduate Summer Research Fund provides financial support for student research projects related to the environment. The Fund offers two types of research experiences for Harvard students:
1) Independent Research: The Center supports independent, original environmental research, usually towards a thesis and under faculty supervision/advice. Award amounts for independent research are usually between $500-$3,500.
2) Research Assistantship: This experience allows students to participate in summer research with Harvard faculty. The program offers funding for up to ten weeks and students are paid a competitive hourly wage.

The website URL where information about the student research program is available:

http://environment.harvard.edu/student-resources/undergraduate-summer-research-fund

Does the institution have a program to encourage faculty sustainability research that meets the criteria for this

credit?:

Yes

A brief description of the institution’s program(s) to encourage faculty research in sustainability:

The Harvard University Center for the Environment (HUCE) awards research grants to faculty teams and individual faculty members to seed innovative and exciting new projects on issues that address major problems related to energy and environment. The program is designed to facilitate new directions in research and catalyze new faculty collaborations across disciplines.

The $20 million President's Climate Change Solutions Fund, administered by the Provost's Office, disseminates grants to support faculty and student research related to cleaner energy solutions and confronting the challenge of climate change.

The website URL where information about the faculty research program is available:

http://environment.harvard.edu/grants/faculty-grants

Has the institution formally adopted policies and procedures that give positive recognition to interdisciplinary, transdisciplinary, and multidisciplinary research during faculty promotion and/or tenure decisions?:

Yes

A brief description or the text of the institution’s policy regarding interdisciplinary research:

Since its establishment in 1992, the Provost's Office at Harvard has sought to foster collaboration across the University and manage changes in policies and practices that affect the academic life of the university as a whole. The Office and its Provost, Dr. Alan Garber, have broad responsibility for a variety of University-wide activities including fostering interfaculty collaboration in the sciences, social sciences, and humanities.

One of the core activities of the Provost’s Office is fostering interfaculty collaboration. The University-wide character of the office and the close relationships nurtured with the schools place the Provost and the office in a unique position to facilitate collaborations across school boundaries. When approaching a specific problem or pressing need, solutions increasingly require the combination and application of knowledge derived from myriad sources traditionally dispersed across departments at universities. The promise of interdisciplinary programs is to reintegrate knowledge for the purposes of discovery. Interdisciplinary approaches significantly impact ways of teaching, learning, and research.

The website URL where information about the treatment of interdisciplinary research is available:

http://www.provost.harvard.edu/interfaculty_collaboration/

Does the institution provide ongoing library support for sustainability research and learning that meets the criteria for this credit?:

Yes

A brief description of the institution's library support for sustainability research and learning:

The Harvard Library, under the leadership of librarian George E. Clark, Ph.D., maintains a quick guide to key research resources at Harvard in environmental and sustainability studies.

The website URL where information about the institution's library support for sustainability is available:

http://guides.library.harvard.edu/friendly.php?s=enviro&gid=4877

Access to Research

Criteria

Institution has a formally adopted open access policy that ensures that versions of all future scholarly articles by faculty and staff and all future theses and dissertations are deposited in a designated open access repository.

The open access repository may be managed by the institution or the institution may participate in a consortium with a consortial and/or outsourced open access repository.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Engagement

Campus Engagement

This subcategory seeks to recognize institutions that provide their students with sustainability learning experiences outside the formal curriculum. Engaging in sustainability issues through co-curricular activities allows students to deepen and apply their understandings of sustainability principles. Institution-sponsored co-curricular sustainability offerings, often coordinated by student affairs offices, help integrate sustainability into the campus culture and set a positive tone for the institution.

In addition, this subcategory recognizes institutions that support faculty and staff engagement, training, and development programs in sustainability. Faculty and staff members' daily decisions impact an institution's sustainability performance. Equipping faculty and staff with the tools, knowledge, and motivation to adopt behavior changes that promote sustainability is an essential activity of a sustainable campus.

Credit
Student Educators Program
Student Orientation
Student Life
Outreach Materials and Publications
Outreach Campaign
Employee Educators Program
Employee Orientation
Staff Professional Development

Student Educators Program

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution coordinates an ongoing peer-to-peer sustainability outreach and education program for degree-seeking students. The institution:

- Selects or appoints students to serve as educators and formally designates the students as educators (paid and/or volunteer),
- Provides formal training to the educators in how to conduct outreach, and
- Offers faculty or staff and/or other financial support to the program.

This credit focuses on programs for degree-seeking students enrolled in a for-credit program. Continuing education and/or non-credit students are excluded from this credit.

This credit recognizes ongoing student educator programs that engage students on a regular basis. For example, student educators may be responsible for serving (i.e. directly targeting) a particular subset of students, such as those living in residence halls or enrolled in certain academic subdivisions. Thus, a group of students may be served by a program even if not all of these students avail themselves of the outreach and education offerings.

Sustainability outreach campaigns, sustainability events, and student clubs or groups are not eligible for this credit unless the criteria outlined above are met. These programs are covered by *EN 5: Outreach Campaign* and *EN 3: Student Life*.

Submission Note:

Additional links for peer-to-peer programming:

http://www.dining.harvard.edu/flp/about.html

http://www.huhousing.harvard.edu/graduatecommonsprogram/index.aspx

"---" *indicates that no data was submitted for this field*

Does the institution coordinate one or more ongoing student, peer-to-peer sustainability outreach and education programs that meet the criteria for this credit?:

Yes

Number of degree-seeking students enrolled at the institution:

21,049

Name of the student educators program (1st program):

Resource Efficiency Program (REP)

Number of students served (i.e. directly targeted) by the program (1st program):

10,583

A brief description of the program, including examples of peer-to-peer outreach activities (1st program):

The Resource Efficiency Program (REP), a partnership between the Faculty of Arts & Sciences and the Office for Sustainability, employs undergraduate students to be representatives (REP Reps) to their peers in their dorms and houses. These students educate their peers on environmental issues while advocating for pragmatic environmental efforts, such as swapping bulbs for the most efficient fixture available, recycling, double-sided printing, and reducing food waste. The program also works with the administration to make sustainable changes in facilities and operations.

The Reps run two or three campaigns each month focusing on key topics, for which the Reps use creative strategies influenced by Community Based Social Market theories Tactics include running pledges, providing incentives, and peer-to-peer outreach. The House-based portion of the program centers around the "Green Cup" Competition, which is a year-long competition among the Houses focused on energy, waste, and food waste reductions, as well as participation rates in environmental events and contests.

A brief description of how the student educators are selected (1st program):

The REPs for each house are selected through a competitive hiring process. The student positions are posted, applications reviewed, top students are interviewed, and a position offer is made to the most qualified students. Returning students who wish to be a REP a second year are given priority.

A brief description of the formal training that the student educators receive (1st program):

The Reps are trained and coached by the staff Rep Coordinator and the Captain of their group of Houses (an experienced student Rep) Training begins with an orientation at the beginning of the academic year, where they are given an overview of the program and goals. Reps meet as a group with the Coordinator bi-weekly throughout the year to review work plans and priorities. During these meetings, the coordinator and experienced Reps train the new Reps on the logistics, talking points, and other details of upcoming campaigns. Reps also have the opportunity to attend the annual New England Eco-Rep Symposium to share best practices and challenges with their peers at other institutions.

A brief description of the financial or other support the institution provides to the program (1st program):

The REP program is part of the FAS (Faculty of Arts & Sciences) Green Program, which is a collaboration between the Office for Sustainability and FAS. The REP program is run by a full time professional REP Coordinator, who is always a recent Harvard College graduate. The Program is funded primarily by the Faculty of Arts & Sciences, with some additional funding support from Harvard University Dining Services, and Campus Services Recycling Program.

Name of the student educators program (2nd program):

Green Living Program - Harvard Business School

Number of students served (i.e. directly targeted) by the program (2nd program):

1,912

A brief description of the program, including examples of peer-to-peer outreach activities (2nd program):

The Green Living program, a peer-to-peer based program aimed at reducing environmental impacts of Harvard Business School (HBS) students and raising awareness about environmental issues among the student population. The program involves hiring of 7 HBS students (Student Sustainability Associates) to serve as student leaders in this area, running outreach campaigns and working with the Operations Department to identify and implement creative, practical projects on the campus. 10 additional students are selected by their first year sections to be the Green Representative for the Green Cup competition. This competition is year long with 6-8 events that the first year sections compete on to gain points for their sections.

A brief description of how the student educators are selected (2nd program):

The HBS Green Living Student Sustainability Associate Positions are competitive, and students apply and interview for the associate position based on their interest, passion, and experience.

The HBS Section Green Representatives are selected by their section by election or nomination.

A brief description of the formal training that the student educators receive (2nd program):

The Student Sustainability Associates are trained and coached by the HBS Sustainability Engagement Manager and the Assistant Director of Sustainability and Energy Management. Biweekly group meetings are held meetings to review workplans and priorities.

The Section Green Representatives are coached by the HBS Sustainability Engagement Manager and the Common Space Student Sustainability Associate. The Student Sustainability Associate meets with each Section Representative on a regular basis and the Sustainability Engagement Manager meets with each Section Representative on a monthly basis.

A brief description of the financial or other support the institution provides to the program (2nd program):

The Green Living program is part of the HBS Business and Environment Program, and is managed and funded by the operations team. The Green Living program is run by a full time professional Sustainability Engagement Manager. The Program is funded by the Business School.

Name of the student educators program (3rd program):

Green Living Program - Harvard Law School (HLS)

Number of students served (i.e. directly targeted) by the program (3rd program):

1,984

A brief description of the program, including examples of peer-to-peer outreach activities (3rd program):

The Green Living program, a peer-to-peer based program aimed at reducing environmental impacts of Harvard Law School (HLS) students and raising awareness about environmental issues among the student population. The program involves hiring of 6 HLS students (Green Representatives) to serve as student leaders in this area, running outreach campaigns and working with the Operations Department to identify and implement creative, practical projects on the campus. 7 additional students are selected by their first year sections to be the Green Representative for the Green Cup competition. This competition is year long with 6-8 events that the first year sections compete on to gain points for their sections.

A brief description of how the student educators are selected (3rd program):

The HLS Green Rep Positions are competitive, and students apply and interview for the associate position based on their interest, passion, and experience.

The HLS Section Green Representatives are selected by their section by election or nomination.

A brief description of the formal training that the student educators receive (3rd program):

The Green Reps are trained and coached by the HLS Sustainability Engagement Manager. Biweekly group meetings are held meetings to review workplans and priorities.

The Section Green Representatives are coached by the HLS Sustainability Engagement Manager.

A brief description of the financial or other support the institution provides to the program (3rd program):

The Green Living program is part of the HLS Sustainability Program, which is a collaboration between the Office for Sustainability and HLS. The Green Living program is run by a full time professional Sustainability Engagement Manager. The Program is funded by the Law School.

Name(s) of the student educator program(s) (all other programs):

Food Literacy Program, Harvard University Housing Student Community Leaders, Harvard University Housing Graduate Commons Program

Number of students served (i.e. directly targeted) by all other student educator programs:

21,049

A brief description of the program(s), including examples of peer-to-peer outreach activities (all other programs):

The Food Literacy Project cultivates an understanding of food from the ground up. Education focuses on four integrated areas of food and society: agriculture, nutrition, food preparation and community. Ultimately, the project goal is to promote enduring knowledge, enabling consumers to make informed food choices. The Food Literacy Project employs 18 students (FLP Reps) to do special projects (tastings, movie screenings, cooking classes, study breaks, field trips, etc.) in each dorm. We also have Reps at the Harvard Divinity School and Graduate School of Arts and Sciences.

The Sustainable Community Leaders Program provides a unique opportunity for residents living in Harvard University Housing to have a direct and meaningful impact on the University's greenhouse gas reduction goal and sustainability efforts. Our Leaders take a hands-on, creative approach toward engaging and educating Harvard's residential community on conservation methods and personal environmental responsibility. These dedicated change agents are not only influencing their neighbors today, they are shaping the habits and attitudes of tomorrow's leaders.

The Harvard Graduate Commons Program is committed to making the Harvard experience a truly remarkable one, both in and outside the classroom by hosting events that spark your intellectual curiosity, challenge your physical being, and make a difference to your community. This unique interdisciplinary program provides a "home away from home" for the Harvard graduate students, faculty, staff, and their families living in participating Harvard University Housing properties. Programming includes wine and coffee nights, Meet the Scholar events, yoga classes, game nights, networking Happy Hours, Boston traditions like the Boston Pops! Holiday concert and much, much more!

A brief description of how the student educators are selected (all other programs):

The Food Literacy Project employs 18 students (FLP Reps) to do special projects (tastings, movie screenings, cooking classes, study breaks, field trips, etc.) in each dorm. We also have Reps at the Harvard Divinity School and Graduate School of Arts and Sciences.

The Sustainable Community Leaders Program employes 9 students, students are responsible for engaging with their local community and completing specific projects.

Harvard Graduate Commons Program employes 8 resident advisers with 3 full time Harvard employed staff.

A brief description of the formal training that the student educators receive (all other programs):

The Food Literacy Project student representatives (FLP Reps) get special training from Harvard University Dining Services and they also conduct research for campaigns.

The Harvard University Housing Sustainable Community Leaders receive training from the Harvard University Housing Sustainability Engagement Manger. Training consists of learning various engagement and outreach strategies, Housing specific policies, and general environmental knowledge and facts. Students are encouraged to conduct additional research.

Harvard Graduate Commons Program Resident Advisers work with the Harvard Graduate Commons Program manager and receive training around specific University policies.

A brief description of the financial or other support the institution provides to the program (all other programs):

The Food Literacy Project is financial supported by Harvard University Dining Services and there is a FLP Coordinator employed by Dining Services that manages the project.

http://www.dining.harvard.edu/flp/about.html

The Sustainable Community Leaders Program is part of the Harvard University Housing Sustainability Program, which is a collaboration between the Office for Sustainability and Harvard University Housing. The program is run by a full time professional Sustainability Engagement Manager. The program is funded by Harvard University Housing.

http://green.harvard.edu/scl

Harvard Graduate Commons Program is part of Harvard University Housing and is fully funded by them.

http://www.huhousing.harvard.edu/graduatecommonsprogram/index.aspx

Total number of hours student educators are engaged in peer-to-peer sustainability outreach and education activities annually:

8,750

The website URL for the peer-to-peer student outreach and education program(s):

http://green.harvard.edu/schools-units/harvard-university-housing

Student Orientation

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution includes sustainability prominently in its student orientation activities and programming. Sustainability activities and programming are intended to educate about the principles and practices of sustainability. The topics covered include multiple dimensions of sustainability (i.e. social, environmental and economic).

Because orientation activities vary from one institution to another, prominent inclusion of sustainability may not take the same form on each campus. Prominent inclusion of sustainability may also take different forms for different types of students (e.g. undergraduate students, transfer students, graduate students). When reporting for this credit, each institution will determine what prominent inclusion of sustainability means given its particular context. (See the Credit Example in the STARS Technical Manual.)

As this credit is intended to recognize programming and student learning about sustainability, incorporating sustainability strategies into event planning (e.g. making recycling bins accessible or not serving bottled water) is not, in and of itself, sufficient for this credit. Such strategies may count if they are highlighted and are part of the educational offerings. For example, serving local food would not, in and of itself, be sufficient for this credit; however, serving local food and providing information about sustainable food systems during meals could contribute to earning this credit.

Submission Note:

Here's a story highlighting some of the sustainability orientation activities this past year:

http://green.harvard.edu/news/orientations-go-green

"---" *indicates that no data was submitted for this field*

The percentage of entering students that are provided an opportunity to participate in orientation activities and programming that prominently include sustainability:

100

A brief description of how sustainability is included prominently in new student orientation:

Sustainability is featured prominently in the orientation activities for both undergraduate and graduate students both by being incorporated into written materials (handbook, guides), online (websites, etc...) and through activities such as tours, outreach tabling and give-aways of LED bulbs, recycling quizzes and interactive quizzes, lectures and events.

The "green edu" program was developed by students for students and includes videos, a survey and other educational materials and events:

http://green.harvard.edu/greenedu

. In addition, the College's first freshman "brain break" is environmentally-focused and includes an environmental fair where over 1400 freshman receive re-usable mugs and signs an eco-pledge.

We provide sustainable welcome totes to all incoming undergraduate students and all graduate students living in Harvard Housing, the totes include green cleaning products, information on how to operate their apartment, and information about the sustainability programs on campus. Depending on the School, incoming students receive brochures and/or reusable mugs or bottles at orientation.

At the 11 graduate schools sustainability related programming and educational events are organized, establishing a "green" norm for students before they even move to campus.

The website URL where information about sustainability in student orientation is available:

http://green.harvard.edu/greenedu

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has co-curricular sustainability programs and initiatives. The programs and initiatives fall into one or more of the following categories:

- Active student groups focused on sustainability
- Gardens, farms, community supported agriculture (CSA) or fishery programs, and urban agriculture projects where students are able to gain experience in organic agriculture and sustainable food systems
- Sustainable enterprises that include sustainability as part of their mission statements or stated purposes (e.g. cafés through which students gain sustainable business skills)
- Sustainable investment funds, green revolving funds or sustainable microfinance initiatives through which students can develop socially, environmentally and fiscally responsible investment and financial skills
- Conferences, speaker series, symposia or similar events related to sustainability that have students as the intended audience
- Cultural arts events, installations or performances related to sustainability that have students as the intended audience
- Wilderness or outdoors programs (e.g. that organize hiking, backpacking, kayaking, or other outings for students and follow Leave No Trace principles
- Sustainability-related themes chosen for themed semesters, years, or first-year experiences (e.g. choosing a sustainability-related book for common reading)
- Programs through which students can learn sustainable life skills (e.g. a series of sustainable living workshops, a model room in a residence hall that is open to students during regular visitation hours and demonstrates sustainable living principles, or sustainability-themed housing where residents and visitors learn about sustainability together)
- Sustainability-focused student employment opportunities offered by the institution
- Graduation pledges through which students pledge to consider social and environmental responsibility in future job and other decisions
- Other co-curricular sustainability programs and initiatives

Multiple programs and initiatives may be reported for each category and each category may include institution-governed and/or student-governed programs.

"---" *indicates that no data was submitted for this field*

Does the institution have one or more co-curricular sustainability programs and initiatives that fall into the following categories?:

	Yes or No

Active student groups focused on sustainability	Yes
Gardens, farms, community supported agriculture (CSA) or fishery programs, or urban agriculture projects where students are able to gain experience in organic agriculture and sustainable food systems	Yes
Student-run enterprises that include sustainability as part of their mission statements or stated purposes	Yes
Sustainable investment funds, green revolving funds or sustainable microfinance initiatives through which students can develop socially, environmentally and fiscally responsible investment and financial skills	Yes
Conferences, speaker series, symposia or similar events related to sustainability that have students as the intended audience	Yes
Cultural arts events, installations or performances related to sustainability that have students as the intended audience	Yes
Wilderness or outdoors programs that follow Leave No Trace principles	Yes
Sustainability-related themes chosen for themed semesters, years, or first-year experiences	Yes
Programs through which students can learn sustainable life skills	Yes
Sustainability-focused student employment opportunities offered by the institution	Yes
Graduation pledges through which students pledge to consider social and environmental responsibility in future job and other decisions	No
Other co-curricular sustainability programs and initiatives	Yes

The name and a brief description of each student group focused on sustainability:

The Council of Student Sustainability Leaders (CSSL) is a partnership between Harvard's environmental community and the Office for Sustainability. CSSL will meet three times per year to discuss the overarching goals that inform campus sustainability at Harvard: the Greenhouse Gas Reduction Goal, Green Building Principles, and Sustainability Principles. CSSL will provide feedback and recommendations on OFS's initiatives which will be compiled into a student advisory report for President Faust's GHG Reduction Executive Committee and GHG Task Force which will reconvene in 2012.

Harvard College Environmental Action Committee (EAC): The Harvard College Environmental Action Committee seeks to help achieve a sustainable world and protect the environment for its human and non-human inhabitants. To this end, the EAC aims to raise the consciousness of Harvard's students to the effect of their own actions on the environment and to their status as stewards of this planet's resources. We advocate specific changes at the campus, local, national, and international levels. Furthermore, we serve as a forum for discussion and a source of information on environmental issues. Finally, we seek to enrich our members through fun and fulfilling experiences.

Harvard Divinity School ECOdiv: EcoDiv brings ecological perspectives to bear on the study and practice of religion and ministry, calling on students, staff, and faculty to attend to the ecosystem in the many academic disciplines and activities at Harvard Divinity School. EcoDiv promotes and hosts speakers, conversations, films, workshops, advocacy, and other events. EcoDiv was instrumental in starting the HDS community garden and works closely with the HDS Green Team to support infrastructure and behavior change at HDS. EcoDiv also offers religious awareness and sensibility to larger ecological efforts, through collaboration with other organizations to coordinate events and provide resources.

Harvard Environmental Law Society: he Harvard Environmental Law Society (HELS) is a non-partisan, not-for-profit organization directed and staffed by students at Harvard Law School. HELS provides students with hands-on exposure to the numerous issues in law, policy, science and management that confront professionals in the field of environmental law. Members participate in conferences, host speakers, take trips and collaborate with groups throughout the University and the world in their effort to address environmental issues.

Graduate School of Design Green Design:

Founded in fall 2005, GSD Green Design offers a platform to discuss the ways in which the GSD and students can contribute in a new way to the global green design discussion using the unique methodologies practiced at the GSD. We do this by hosting speakers, tours, exhibits and events which address issues of interest to multiple disciplines and schools at Harvard. We coordinate our efforts with those of other Harvard environmental groups such as the Harvard Environmental Society, the Environmental Action Committee and the Green Campus Initiative. Recognizing the need for healthy and pleasant living and working environments, we also strive to encourage proper use, recycling, composting and disposal of materials and food in Gund Hall and throughout Harvard.

Harvard Business School Energy and Environment Club:

The mission of the Energy and Environment Club is to support future business leaders interested in the important relationship between business and the environment through exposure to careers, industries, organizations, leaders, and business models. Members of the Energy and Environment Club are ideally positioned to identify, understand, and promote innovative environmental market opportunities and sustainability practices within the business community.

Harvard School of Public Health Environmental Health and Sustainability Club: The HSPH Environmental Health and Sustainability Student Club has been established to provide the Harvard community with an open forum specifically to facilitate the discussion of Environmental Health and Sustainability issues. This includes debates, speakers, and panels on issues of the environment and approaches to sustainability. This includes the relationship between these topics and human health, the science behind these linkages, and policy, law, and economic instruments to help reduce/avoid potential damage caused by these issues. The discussions also highlight the application of science and implications of these instruments in the occupational environment, environmental controversies, or other topics that the membership and officers deem pertinent to the membership.

Harvard Medical School Students for Environmental Awareness in Medicine (SEAM): SEAM was founded out of concern about escalating trends in environmental degradation and the absence of public discourse about the threat this degradation poses to human health. SEAM aims to address these issues within and outside of the Harvard Medical School (HMS) community. SEAM aims to educate and engage the HMS community around these important changes through lunch talks, films, and journal clubs. Furthermore, SEAM collaborates with the Longwood Green Campus Initiative on a number of projects to improve energy efficiency and recycling and to reduce waste among students and staff.

Harvard Climate Collaborative: The Harvard Climate Collaborative (HCC) brings together leaders of Harvard’s environmental groups on a monthly basis to discuss individual and collective challenges in bringing more progressive environmental practices to our communities within and beyond Harvard. These discussions are a critical setting for peer collaboration and feedback, as well as an avenue for liaising with key administration members in an effort to voice student’s concerns. The group facilitates two-way student-administration accountability, feedback, student-to-student collaboration and sharing of best practices. Additionally, the HCC provides a mechanism for institutional memory within the environmental community and dissemination of information via a comprehensive annual report. The annual report outlines the actions taken by one or many school-affiliated environmental groups and makes recommendations for improving sustainable practices on campus, especially in relation to the greenhouse gas reduction commitment.

Energy & Environment Professional Interest Council (EEPIC): The Energy & Environment Professional Interest Council (EEPIC) brings together students at the John F. Kennedy School of Government who are interested in energy and environmental issues, particularly as they relate to public policy, advocacy, development, and business. EEPIC provides a forum for education, networking, and career services across the energy and environmental spectrum.

Harvard Energy Journal Club (HEJC): A weekly journal club to facilitate discussion and understanding of the technical details of energy technology and energy economics. Each session, members will discuss a technical article regarding the science, technology, or economics of energy. HEJC's primary purpose is not to discuss policy issues, but rather it is to enable its members to develop the necessary technical background to better understand energy issues and policy.

Harvard College Council on Business and the Environment: The purpose of the Harvard College Council on Business and the Environment (CBE) is to provide the Harvard undergraduate student body with a means of exploring opportunities in business that have to do with issues of the environment. CBE's approach is two-fold: First, CBE aims to increase the visibility of the growing intersections between business and the environment among the student body by inviting speakers and organizing forums on campus. Second, CBE intends to provide Harvard undergraduates with tangible opportunities with which to exercise their interests on the subject of business and the environment. To accomplish this, CBE will facilitate both internships and full-time positions with a variety of companies and organizations.

Harvard Environmental Law Review: The Harvard Environmental Law Review (HELR) has been published semi-annually, in winter and spring, since 1976. HELR publishes articles on a broad range of environmental affairs, such as land use; air, water, and noise regulation; toxic substances control; radiation control; energy use; workspace pollution; science and technology control; and resource use and regulation. HELR draws upon environmental experts from government, academia, private practice, industry and public interest groups to cover legal developments at the local, state, federal, foreign, and international levels.

Harvard Food Law Society: The Food Law Society provides students with hands-on exposure to the numerous issues in law, policy, science and management that confront professionals in the fields of food law and food policy. Members participate in clinical projects and conferences, host speakers, take trips and collaborate with groups throughout the University and the world in their effort to address food issues.

https://orgs.law.harvard.edu/foodlaw/

Harvard Extension Environmental Club (HEEC): Established in 2004, The Harvard Extension Environmental Club (HEEC –better known as "The EC") is a club made up of students and alumni of the Environmental Management Program at the Harvard University Extension School. The mission of the EC is to provide a network and connection to the Harvard University Community at large by organizing social and environmental activities. The club activities include guest lectures, career network socials, field trips, site visits and participation in Earth Day and the Charles River Clean-Up Efforts. The EC has strong support from the Environmental Management Faculty and Teaching Fellows. With this support and partnership in place, The EC looks to provide support to all students that are looking to further their education towards a more sustainable environment for future generations.

The Sustainability Educators Coalition (SEC): The mission of the Graduate School of Education's environmental group, The Sustainability Educators Coalition, is to position sustainability at the forefront of the dialog at HGSE. Our mission has four core areas: 1) Serve as a student voice at the Ed School on issues of sustainability and environmental awareness; 2) Engage in "greening" the GSE campus through concerted facilities and behavioral changes; 3) Develop relationships with student and professional groups across Harvard and throughout the region to foster interdisciplinary dialogue; 4) Augment the traditional syllabus with curricular and extra-curricular educational programming and provide an increased range of exposure to leading theoretical and practical ideas in environmental education.

Harvard Institute of Learning in Retirement Green Committee: Learning in Retirement Green Committee

An active group of students in the Harvard Institute for Learning in Retirement who hold a week-long Green Fair, started a Green Team and take on other education and advocacy projects.

Harvard Undergraduate Beekeepers: The Harvard Undergraduate Beekeepers provide students with an opportunity to be active beekeepers as undergrads and to learn about the role and importance of bees in our local ecosystem. To our knowledge, we are the only directly honeybee-related, insect-related, or experiential-apiculture-education-related Harvard student organization.

Divest Harvard: Spearheaded by Harvard Students for a Just and Stable Future, Divest Harvard calls upon Harvard University to:
immediately freeze any new investments in fossil fuel companies
immediately divest direct holdings (currently $79.5 million) from the top 200 publicly traded fossil fuel companies
divest indirect holdings in the top 200 fossil fuel companies within 5 years, and reinvest in socially responsible funds.

The website URL where information about student groups is available:

http://environment.harvard.edu/student-resources/student-groups

A brief description of gardens, farms, community supported agriculture (CSA) or fishery programs, and urban agriculture projects where students are able to gain experience in organic agriculture and sustainable food systems:

Harvard has three on-campus community gardens that engage students and staff working together to learn organic gardening and farming experience. All three produce educational and educational events for the community

Harvard undergraduate students operate the Harvard Community Garden. Staff and student operate the Harvard Divinity School Garden and Countaway Community Garden at the Longwood campus.

The website URL where information about the organic agriculture and/or sustainable food systems projects and initiatives is available:

http://www.garden.harvard.edu/

A brief description of student-run enterprises that include sustainability as part of their mission statements or stated purposes:

The Council on Business and the Environment is a student-run not-for-profit consulting group based out of Harvard University. We work with early-stage green startups locally and nationally to achieve their strategic intent, grow their bottom line, and innovate both as businesses as well as socially conscious ventures.

The website URL where information about the student-run enterprise(s) is available:

http://harvardcouncil.com/

A brief description of the sustainable investment or finance initiatives:

The student advocacy group Divest Harvard is launching a fossil fuel-free fund to which alumni can donate as an alternative to the University's endowment, according to the group's announcement from earlier this month. The coalition of students, faculty, and alumni that calls for the University to divest its endowment from fossil fuels occupied Massachusetts Hall for 24 hours last week.

The website URL where information about the sustainable investment or finance initiatives is available:

http://divestharvard.com/fossil-free-alumni-fund/

A brief description of conferences, speaker series, symposia or similar events related to sustainability that have students as the intended audience:

- The Future of Energy and other sustainable and environmentally-themed speaker series and conferences hosted by the Harvard Center for the Environment are specifically targeted to students.
- Bi-annual university-wide Green Carpet Awards recognition event, includes students awards for individual and team achievements.
- School-based initiatives and environmental clubs regularly host speaker series and major events related to sustainability.

The website URL where information about the event(s) is available:

http://www.environment.harvard.edu/

A brief description of cultural arts events, installations or performances related to sustainability that have students as the intended audience:

The American Reparatory Theater and the Harvard University Center for the Environment have announced a multi-year partnership to jointly commission new theatrical works related to environmental themes, and to create cross-disciplinary roundtables among artists, students and faculty that will enhance the artistic process and stimulate new discussions on campus.

The website URL where information about the cultural arts event(s) is available:

http://americanrepertorytheater.org/

A brief description of wilderness or outdoors programs for students that follow Leave No Trace principles:

The First Year Outdoor Program organizes wilderness trips for incoming freshman using Leave No Trace Principles:

http://fop.fas.harvard.edu/icb/icb.do

The student-run Harvard Outing Club organizing outdoor experiences for students and follows Leave No Trace Principles.

The website URL where information about the wilderness or outdoors program(s) is available:

http://fop.fas.harvard.edu/icb/icb.do

A brief description of sustainability-related themes chosen for themed semesters, years, or first-year experiences:

Harvard College and the Office for Sustainability organizes a freshman think tank initiative for all incoming first year students. The program provides a sustainability-focused experience for first year students to come together to learn about sustainability and plan sustainability events and projects for the semester and year. The program kicks off each year with an environmentally-themed study break (the first of the new school year) where students learn about environmental groups/resources on campus and over 1400 reusable mugs are given away. Students must sign a pledge to use their new mug.

The website URL where information about the theme is available:

http://green.harvard.edu/greenedu

A brief description of program(s) through which students can learn sustainable life skills:

Our Green Living Programs organize a wide variety of sustainable living workshops, trainings and campaigns across Harvard's Schools targeted at undergraduate and graduate students.

The website URL where information about the sustainable life skills program(s) is available:

http://green.harvard.edu/programs/green-living

A brief description of sustainability-focused student employment opportunities:

The Office for Sustainability and many other departments provide student employment opportunities that engage students in programs and projects related to sustainability.

Additionally, all of Harvard's Green Living Program employee students to run and manage the peer to peer outreach efforts:

http://green.harvard.edu/programs/green-living

The website URL where information about the student employment opportuntities is available:

http://green.harvard.edu/about/employment

A brief description of graduation pledges through which students pledge to consider social and environmental responsibility in future job and other decisions:

n/a

The website URL where information about the graduation pledge program is available:

A brief description of other co-curricular sustainability programs and initiatives:

Harvard's Wintersession activities include sustainability programs and initiatives

The Office for Career Services provides a wide variety of education events and activities regarding sustainability-related careers

The Office for Sustainability organizes sustainability programs and initiatives that engage students in using the campus as a living laboratory, including student grant programs.

The website URL where information about other co-curricular sustainability programs and initiatives is available:

http://green.harvard.edu/

Outreach Materials and Publications

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution produces outreach materials and/or publications that foster sustainability learning and knowledge. The publications and outreach materials may include the following:

- A central sustainability website that consolidates information about the institution's sustainability efforts
- A sustainability newsletter
- Social media platforms (e.g. Facebook, Twitter, interactive blogs) that focus specifically on campus sustainability
- A vehicle to publish and disseminate student research on sustainability
- Building signage that highlights green building features
- Food service area signage and/or brochures that include information about sustainable food systems
- Signage on the grounds about sustainable groundskeeping and/or landscaping strategies employed
- A sustainability walking map or tour
- A guide for commuters about how to use alternative methods of transportation
- Navigation and educational tools for bicyclists and pedestrians (e.g. covering routes, inter-modal connections, policies, services, and safety)
- A guide for green living and incorporating sustainability into the residential experience
- Regular coverage of sustainability in the main student newspaper, either through a regular column or a reporter assigned to the sustainability beat
- Other

A single outreach material or publication that serves multiple purposes may be counted more than once. For example, a sustainability website that includes tools for bicyclists and pedestrians may be counted in both categories.

"---" *indicates that no data was submitted for this field*

Does the institution produce the following outreach materials and/or publications that foster sustainability learning and knowledge? :

	Yes or No
A central sustainability website that consolidates information about the institution's sustainability efforts	Yes

A sustainability newsletter	Yes
Social media platforms that focus specifically on campus sustainability	Yes
A vehicle to publish and disseminate student research on sustainability	Yes
Building signage that highlights green building features	Yes
Food service area signage and/or brochures that include information about sustainable food systems	Yes
Signage on the grounds about sustainable groundskeeping and/or landscaping strategies employed	Yes
A sustainability walking map or tour	Yes
A guide for commuters about how to use alternative methods of transportation	Yes
Navigation and educational tools for bicyclists and pedestrians	Yes
A guide for green living and incorporating sustainability into the residential experience	Yes
Regular coverage of sustainability in the main student newspaper, either through a regular column or a reporter assigned to the sustainability beat	Yes
Other sustainability publications or outreach materials not covered above	Yes

A brief description of the central sustainability website:

The Office for Sustainability manages the Sustainability @ Harvard website, Twitter, YouTube, Instagram, and Facebook accounts which aggregate and curate news, tips, case studies, tools and resources on energy, environment and sustainability across Harvard's 12 Schools and central administrative departments.

The website URL for the central sustainability website:

http://www.green.harvard.edu/

A brief description of the sustainability newsletter:

1. The Office for Sustainability sends out a monthly email newsletter that includes news and events, updates and green tips. View and example at:

http://us7.campaign-archive2.com/?u=91b1877540f9a306212f5ab2c&id=d3d8dc046e&e=815f22db67

2. The Harvard Center for the Environment also produces an Environment @Harvard newsletter twice a year:

http://environment.harvard.edu/news/current-issue

In addition the FAS Green Program and other School-based programs sends out monthly program updates/newsletters to their community which includes Harvard College.

The website URL for the sustainability newsletter:

http://us7.campaign-archive2.com/?u=91b1877540f9a306212f5ab2c&id=d3d8dc046e&e=815f22db67

A brief description of the social media platforms that focus specifically on campus sustainability:

The Office for Sustainability reaches nearly 28,000 followers via its social media platforms. OFS manages the Sustainability @ Harvard Twitter, YouTube, Instagram and Facebook accounts which aggregate and curate news, tips, case studies, tools and resources on energy, environment and sustainability across Harvard's 12 Schools and central administrative departments.

The website URL of the primary social media platform that focuses on sustainability:

https://twitter.com/GreenHarvard

A brief description of the vehicle to publish and disseminate student research on sustainability:

The Harvard Center for the Environment operates the website

http://www.environment.harvard.edu

to distribute information about student research.

In addition Harvard School websites and the official newspaper, the Harvard Gazette, and regularly post stories and articles about students' environmental research:

http://news.harvard.edu/gazette/section/science-n-health/environment/

The website URL for the vehicle to publish and disseminate student research on sustainability:

http://environment.harvard.edu/

A brief description of building signage that highlights green building features :

Educational signage and video screens throughout Harvard's LEED and green building projects describe green features.

The website URL for building signage that highlights green building features :

http://green.harvard.edu/theresource/

A brief description of food service area signage and/or brochures that include information about sustainable food systems:

Harvard Dining and the Food Literacy project posts education signage and resources about sustainably produced and local, organic food choices in dining halls.

There is a Food App on the general Harvard Mobile App that allows you to look up the nutritional value of the food in the dining halls.

The website URL for food service area signage and/or brochures that include information about sustainable food systems:

http://www.dining.harvard.edu/flp/nutrition.html

A brief description of signage on the grounds about sustainable groundskeeping and/or landscaping strategies:

Harvard Landscaping posts signage on Harvard grounds about the use of pesticide/herbicide free 100% organic landscaping.

The website URL for signage on the grounds about sustainable groundskeeping and/or landscaping strategies:

http://www.energyandfacilities.harvard.edu/facilities-services/landscape-maintenance

A brief description of the sustainability walking map or tour:

Two sustainability features are included in Harvard's official mobile tour. Sustainability campus tours are offered throughout the year to undergraduates and other community members.

The website URL of the sustainability walking map or tour:

http://www.harvard.edu/visitors/mobile-tour

A brief description of the guide for commuters about how to use alternative methods of transportation:

Harvard's CommuterChoice program distributes commuting choices guides at new employee orientation and regularly distributes the guides which also include a walking guide. New employee orientation every Monday details commuting options for all new Harvard employees. Freshman orientation packets outline transportation options for incoming students. Staff attend undergraduate and graduate student orientations & registrations throughout the year

The website URL for the guide for commuters about how to use alternative methods of transportation:

http://www.commuterchoice.harvard.edu/

A brief description of the navigation and educational tools for bicyclists and pedestrians:

Harvard's CommuterChoice program distributes commuting choices guides at new employee orientation and regularly distributes the guides which also include a walking guide. New employee orientation every Monday details commuting options for all new Harvard employees. Freshman orientation packets outline transportation options for incoming students. Staff attend undergraduate and graduate student orientations & registrations throughout the year

The website URL for navigation and educational tools for bicyclists and pedestrians:

http://www.transportation.harvard.edu/commuterchoice/bike

A brief description of the guide for green living and incorporating sustainability into the residential experience:

Harvard's Schools provide brochure and online guides and information to students about green living and how to take sustainable actions in their dorm room/housing.

Below is an example of a guide and outreach information produced by Harvard University Housing for their graduate student tenants:

http://green.harvard.edu/resident-action-list

The website URL for the guide for green living and incorporating sustainability into the residential experience:

http://green.harvard.edu/resident-action-list

A brief description of regular coverage of sustainability in the main student newspaper, either through a regular column or a reporter assigned to the sustainability beat:

The Crimson newspaper dedciates a student reporter to sustainability and regularly posts stories.

The website URL for regular coverage of sustainability in the main student newspaper, either through a regular column or a reporter assigned to the sustainability beat:

http://www.thecrimson.com/tag/Environment/

A brief description of another sustainability publication or outreach material not covered above (1st material):

Harvard Green Building Services produces a monthly Green Building Tip which is distributed via email.

The website URL for this material (1st material):

http://www.energyandfacilities.harvard.edu/green-building-resource/green-building-tools-resourc es/green-building-tips

Does the institution produce another sustainability publication or outreach material not covered above? (2nd material):

Yes

A brief description of this material (2nd material):

Harvard regularly produces and distributes sustainability related videos on its YouTube channel:

http://www.youtube.com/greenisthenewcrimson

The website URL for this material (2nd material):

http://www.youtube.com/user/GreenIsTheNewCrimson

Does the institution produce another sustainability publication or outreach material not covered above? (3rd material):

Yes

A brief description of this material (3rd material):

The Office for Sustainability publishes online case studies, posters, and how to's with tips and guides on how to live and work sustainably

The website URL for this material (3rd material):

http://green.harvard.edu/action/tools-resources

Does the institution produce another sustainability publication or outreach material not covered above? (4th material):

Yes

A brief description of this material (4th material):

The Green Labs program has developed an online green labs guide which provides research with green tips for their labs.

The website URL for this material (4th material):

http://green.harvard.edu/labs

Does the institution produce another sustainability publication or outreach material not covered above? (5th material):

Yes

A brief description of this material (5th material):

The Harvard Sustainability Impact Report is Harvard's first ever university-wide sustainability report. The report, available only online, was launched in 2012. The Report was developed to:
- Provide a baseline for future reporting and benchmarking by collecting and displaying sustainability performance data across our University.
- Display the breadth and depth of our community's commitment to sustainability in order to educate and hopefully inspire others inside and outside Harvard.
- Encourage an open and honest conversation about the challenges we face in implementing Harvard's sustainability goals so we can identify the solutions that will help us move forward.

The website URL for this material (5th material):

http://report.green.harvard.edu/

Does the institution produce another sustainability publication or outreach material not covered above? (6th material):

Yes

A brief description of this material (6th material):

The Green Office Program includes fact sheets and resources guides on its website for employees and the community to download and use while making their workspace more sustainable.

The website URL for this material (6th material):

http://green.harvard.edu/green-office

Does the institution produce another sustainability publication or outreach material not covered above? (7th material):

Yes

A brief description of this material (7th material):

Harvard posts publicly-available case studies for all of its LEED Certified projects online on our Green Building Resource website.

The website URL for this material (7th material):

http://green.harvard.edu/theresource

Does the institution produce another sustainability publication or outreach material not covered above? (8th material):

Yes

A brief description of this material (8th material):

A wide variety of sustainability-focused student groups maintain blogs where they post news and information:

http://www.garden.harvard.edu/?cat=262

http://gsdgreendesign.blogspot.com/

http://blogs.law.harvard.edu/foodpolicyinitiative/

http://harvardrep.wordpress.com/

http://www3.law.harvard.edu/orgs/foodlaw/

http://www.harvardundergraduatebeekeepers.com/

http://gsdbees.tumblr.com/

The website URL for this material (8th material):

http://www.harvardundergraduatebeekeepers.com/

Outreach Campaign

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution holds at least one sustainability-related outreach campaign directed at students that yields measurable, positive results in advancing sustainability. The sustainability-related outreach campaign may be conducted by the institution, a student organization, or students in a course.

Part 2

Institution holds at least one sustainability-related outreach campaign directed at employees that yields measurable, positive results in advancing sustainability. The sustainability-related outreach campaign may be conducted by the institution or an employee organization.

The campaign(s) reported for this credit could take the form of a competition (e.g. a residence hall conservation competition), a rating or certification program (e.g. a green labs or green office program), and/or a collective challenge (e.g. a campus-wide drive to achieve a specific sustainability target). A single campus-wide campaign may meet the criteria for both parts of this credit if educating students is a prime feature of the campaign and it is directed at both students and employees.

To measure if a campaign yields measurable, positive results, institutions should compare pre-campaign performance to performance during or after the campaign. The following impacts are not sufficient for this credit:

- Increased awareness
- Additional members of a mailing list or group

"---" *indicates that no data was submitted for this field*

Has the institution held at least one sustainability-related outreach campaign directed at students within the previous three years that has yielded measurable, positive results in advancing sustainability?:

Yes

Has the institution held at least one sustainability-related outreach campaign directed at employees within the previous three years that has yielded measurable, positive results in advancing sustainability?:

Yes

The name of the campaign (1st campaign):

Green Cup Competition

A brief description of the campaign (1st campaign):

For the last ten years, the twelve houses have competed in the Resource Efficiency Program's (REP's) Green Cup competition. In Green Cup competition, the houses are ranked based on energy and waste reductions as well as their ability to create a culture of sustainability through "eco-projects" and green house committee activities. The Green Cup competition is composed of three separate awards and one overall winner. The houses with best performance in the categories of Participation, Resource Conservation, and Green House Committee will each earn recognition and a cash prize, while the house with the best score overall will win the Green Cup trophy. The competition culminates with the Earth Day celebration and Green Cup award ceremony in April.

In addition, competitions for undergraduate and graduate students are organized and run by green living programs at Harvard Law School, Harvard Business School and Harvard Housing properties. First year students compete in a Green Goblet competition.

A brief description of the measured positive impact(s) of the campaign (1st campaign):

The total average electricity reduction across all 12 houses during the competition period (October 2012 - March 2013) was 3.83% and the winning house had a reduction of 13%. Last year (Oct 2011 - March 2012) the reduction was 4.3% (compared to a rolling 3 year baseline) and the winning house had an electricity reduction of over 16%.

The annual food waste audit conducted in all houses as part of this program showed a 21% drop since the previous spring, food waste is down 56% since 2005. Food waste in the fall audit was on par with the all time low (fall 2012 - 1.28 oz/person average, all-time-low fall 2011 - 1.22 oz/cap)

The aggregate recycling rate in all the houses (based on a snapshot waste audit) last year was 64%.

In the Resource Efficiency Program Recycling Challenge, the first participation event of the Green Cup 2014 Challenge participation soared to new heights with 80% of residents turning out in Adams, the winning House. Next came Cabot (75%) and Quincy (71%). The top spots were hard won with the top six Houses all rallying for over 50% participation each.

The website URL where information about the campaign is available (1st campaign):

http://green.harvard.edu/programs/undergraduate-resource-efficiency-program

The name of the campaign (2nd campaign):

Recycling Competition

A brief description of the campaign (2nd campaign):

The FAS Green Program and Office for Sustainability organizes a floor-by-floor recycling competitions in buildings that are fun, engaging way to increase recycling rates.

A brief description of the measured positive impact(s) of the campaign (2nd campaign):

Through educational events and "grading" occupants, the campaign results in measurable increase in the amount of recycling over the course of the competition.

For example, a competition at the 1414 Mass Ave building produced the following results:
The post competition audits showed that the hard work of the competition paid off; all of the buildings showed a decrease in the amount of recycling that ended up in the trash. The most improved was Barker Center, which went from 32% down to 25.5%, with CGIS as a close second, showing an improvement from 36% down to 31%. Littauer's recycling in the trash was down to 23%*, while 1414 Mass Ave was able to reduce their rate even further than last year, getting their already exceptional recycling rate down from 17% to 16.5%. The folks at University Hall were ultimately the best recyclers, bringing their incorrectly sorted recycling down from 20% to 16%.

The website URL where information about the campaign is available (2nd campaign):

http://green.harvard.edu/tools-resources/how/9-tips-running-successful-recycling-competition

A brief description of other outreach campaigns, including measured positive impacts:

Every summer the University conducts demand response outreach campaigns in which messages are sent to building managers and occupants on high demand days, encouraging them to take energy reduction actions. The result is a measurable decrease in energy use at those times, reducing energy demand Harvard is pulling from the grid.

The Green Office Program results in measurable reductions in resource use and energy use in office spaces across campus. The outreach campaign includes an educational website, resources, tips and tools for employees to use in creating resource reduction campaigns in their individual offices.

We regularly publish "how to's" on outreach campaigns and competitions that result in positive impacts:

http://green.harvard.edu/search?f[0]=field_facet_types%3AHow%20To&f[1]=facet_type%3AHow%20To

Employee Educators Program

Criteria

Institution administers or oversees an ongoing faculty/staff peer-to-peer sustainability outreach and education program.

In the program, employee sustainability educators are formally designated and receive formal training or participate in an institution-sponsored orientation. The institution offers financial or other support to the program.

This credit recognizes ongoing programs that engage employees on a regular basis. For example, employee educators may represent or be responsible for engaging workers in certain departments or buildings. Thus, a group of employees may be served (i.e. directly targeted) by a program even if not all of these employees avail themselves of the outreach and education offerings.

Training and/or professional development opportunities in sustainability for staff are excluded from this credit. These activities are covered in *EN 8: Staff Professional Development*.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Employee Orientation

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution covers sustainability topics in new employee orientation and/or in outreach and guidance materials distributed to new employees, including faculty and staff. The topics covered include multiple dimensions of sustainability (i.e. social, environmental and economic).

"---" *indicates that no data was submitted for this field*

The percentage of new employees that are offered orientation and/or outreach and guidance materials that cover sustainability topics:

100

A brief description of how sustainability is included in new employee orientation:

New employee orientation for all Harvard employees includes a 10 minute overview of sustainability at Harvard, including showing of an orientation video produced specifically for new employee orientation with a message from Harvard President Drew Faust:

http://youtu.be/OEXiEFZxLx4

.

In addition, new employees receive sustainability-related information in their welcome packets provided at the new employee orientation training.

The website URL where information about sustainability in new employee orientation is available:

http://youtu.be/OEXiEFZxLx4

Staff Professional Development

Responsible Party

JAclyn olsen
Assistant Director
Office for Sustainability

Criteria

Institution makes available training and/or other professional development opportunities in sustainability to all staff at least once per year.

Separate training opportunities for each department would count for this credit, as long as each staff member has an opportunity to learn about sustainability at least once per year. It is not necessary that each staff member attend such trainings; the credit is based on making training available to all staff.

This credit applies to staff members only; it does not include faculty members.

The following training opportunities are not sufficient for this credit:

- Specialized training for a small group of staff
- The opportunity to participate in an institutional sustainability committee or group

---

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Public Engagement

This subcategory seeks to recognize institutions that help catalyze sustainable communities through public engagement, community partnerships and service. Engagement in community problem-solving is fundamental to sustainability. By engaging with community members and organizations in the governmental, non-profit and for-profit sectors, institutions can help solve sustainability challenges. Community engagement can help students develop leadership skills while deepening their understandings of practical, real-world problems and the process of creating solutions. Institutions can contribute to their communities by harnessing their financial and academic resources to address community needs and by engaging community members in institutional decisions that affect them. In addition, institutions can contribute toward sustainability broadly through inter-campus collaboration, engagement with external networks and organizations, and public policy advocacy.

Credit
Community Partnerships
Inter-Campus Collaboration
Continuing Education
Community Service
Community Stakeholder Engagement
Participation in Public Policy
Trademark Licensing
Hospital Network

Community Partnerships

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has one or more formal partnership(s) with the local community, including school districts, government agencies, non-profit organizations, businesses and/or other entities, to work together to advance sustainability within the community.

Each partnership conforms to one of the following types:

Type of Partnership	Indicators
A. Supportive	• *Scope:* Addresses a sustainability topic or a specific aspect of sustainability (e.g. community garden, environmental remediation, community environmental health and education) • *Duration:* May be time-limited (short-term projects and events), multi-year, or ongoing • *Commitment:* Institutional involvement may include financial and/or staff support or may be limited to resource sharing and/or endorsement • *Governance:* Campus and community leaders or representatives are engaged in program/project development
B. Collaborative	• *Scope:* Addresses one or more sustainability challenge and may simultaneously support social equity and wellbeing, economic prosperity, and ecological health (e.g. a green jobs program in an economically disadvantaged neighborhood) • *Duration:* May be time-limited, multi-year, or ongoing • *Commitment:* Institution provides faculty/staff, financial, and/or material support • *Governance:* Campus and local community members are both engaged in program/project development, from agenda setting and planning to decision-making, implementation and review

C.Transformative	• *Scope:* Catalyzes community resiliency and local/regional sustainability by simultaneously supporting social equity and wellbeing, economic prosperity, and ecological health on a community or regional scale (e.g. “transition” projects and partnerships focused on community adaptation to climate change) • *Duration:* Is multi-year or ongoing and proposes or plans for institutionalized and systemic change • *Commitment:* Institution provides faculty/staff and financial or material support • *Governance:* Partnership has adopted a stakeholder engagement framework through which community members, vulnerable populations, faculty, staff, students and other stakeholders are engaged in program/project development, from agenda setting and planning to decision-making, implementation and review

An institution may have multiple partnerships of each type, however no single partnership may be both supportive and collaborative, collaborative and transformative, or supportive and transformative.

Recognizing the diversity of forms that community partnerships may take, it is not required that a partnership meet all of the criteria listed to be considered supportive or collaborative. A partnership must meet all of the criteria listed to be considered transformative, however. For further guidance in identifying community partnerships that meet the criteria for each type, see the Credit Example in the STARS Technical Manual.

This credit recognizes campus-community partnerships that advance sustainability in an explicit and participatory way. Participatory, community-based research and engaged scholarship around issues of sustainability may be included if it involves formal partnership(s). Although community service activities (e.g. academic service learning, co-curricular service learning and volunteer activities, Work-Study community service and paid community service internships) may involve local partnerships and contribute toward sustainability, they are not included in this credit. Community service is covered by *EN 12: Community Service*.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Inter-Campus Collaboration

Responsible Party

JAclyn olsen
Assistant Director
Office for Sustainability

Criteria

Institution collaborates with other colleges and universities to support and help build the campus sustainability community.

See the Credit Example in the STARS Technical Manual for guidance on identifying appropriate collaborations.

"---" *indicates that no data was submitted for this field*

Does the institution collaborate with other colleges and universities to support and help build the campus sustainability community?:

Yes

A brief summary of papers, guides, presentations, and other resources the institution has developed to share their sustainability experience with other institutions:

We publicly post all of our LEED submittals and case studies online to share our experience other colleges and universities.

We also publicly post on our website a wide variety of case studies, how-to's, green tips, and other resources about our programs, projects and initiatives so others can replicate them:

http://green.harvard.edu/action/tools-resources

We regularly present and develop resources for conferences. Recent examples include:
Sustainable Operations Summit,
AASHE,
GreenBuild,
NECSC, Sustainable Cities and Campuses Conference, Massachusetts
Sustainable Cities and Campuses Conference, Maryland
SEI Billion Dollar Green Fund Challenge Conference (hosted at Harvard)

The names of local, state/provincial, regional, national, or international campus sustainability organizations or consortia in which the institution participates and/or is a member:

Harvard is a charter signatory to the International Sustainable Campus Network (ISCN).

Harvard actively participates in the Sustainability Working Group for the Council of Ivy Presidents and the Harvard Office for Sustainability regularly meets with peers at other institutions as part of the Ivy Plus Sustainability Working Group to share best practices and seek common solutions to sustainability challenges.

Boston Green Ribbon Commission, Harvard's EVP is the Chair of the Higher Education Working Group and Harvard Office for Sustainability managed the activities of the Higher Education working group.

Sustainable Endowments Institute Billion Dollar Green Fund - Harvard is a Charter Member

Harvard represents the higher ed sector on the Cambridge Climate Protection Action Committee and is a founding signatory of the Cambridge Community Compact for a Sustainable Future.

A member of New England Campus Sustainability Consortium

A brief summary of additional ways the institution collaborates with other campuses to advance sustainability :

Harvard has co-hosted regional and international events targeted at sharing information, resources and strategies with other campuses and universities. These include:
1. Co-hosting a regional green labs symposium for regional higher education and health care sectors
2. Hosting a regional climate preparedness summit
3. Hosting the international ISCN conference with MIT in Cambridge, MA in 2014

In addition to our work with US Universities, the Office for Sustainability hosted visitors from Universities through-out the world, including Jordan, Tokyo, Finland, Canada, Korea, Indonesia, and the United Kingdom

We also host building tours for area colleges and professionals.

The website URL where information about cross-campus collaboration is available:

http://green.harvard.edu/commitment/external-partnerships

Continuing Education

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution offers continuing education courses that address sustainability.

Courses that address sustainability include continuing education sustainability courses and continuing education courses that include sustainability. Courses that can be taken for academic credit are not included in this credit. They are covered by the Curriculum subcategory.

Part 2

Institution has at least one sustainability-themed certificate program through its continuing education or extension department.

Degree-granting programs (e.g. programs that confer Baccalaureate, Masters, and Associates degrees) and certificates that are part of academic degree programs are not included in this credit. They are covered in the Curriculum subcategory.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Community Service

Criteria

Part 1

Institution engages its student body in community service, as measured by the percentage of students who participate in community service.

Part 2

Institution engages students in community service, as measured by the average hours contributed per full-time student per year.

Institutions may exclude non-credit, continuing education, and/or part-time students from this credit.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Community Stakeholder Engagement

Criteria

Institution has adopted a framework for community stakeholder engagement in governance, strategy and operations. The framework includes:

> 1) Policies and procedures that ensure community stakeholder engagement is applied systematically and regularly across the institution's activities (e.g. planning and development efforts, capital investment projects, and/or other activities and decisions that affect the broader community)
>
> And
>
> 2) Established practices to identify and engage relevant community stakeholders, including any vulnerable or underrepresented groups.

Frameworks adopted by entities of which the institution is part (e.g. government or university system) may count for this credit as long as the policies apply to and are followed by the institution.

This credit does not include the engagement of internal campus stakeholders (e.g. students, faculty and staff); internal stakeholder engagement is covered in *PA 3: Governance*.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Participation in Public Policy

Criteria

Institution advocates for national, state/provincial, or local public policies that support campus sustainability or that otherwise advance sustainability.

The policy advocacy must be done by the institution, not by students or a student group. This credit acknowledges institutions that advocate for policy changes and legislation to advance sustainability broadly. Advocacy efforts that are made exclusively to advance the institution's interests or projects may not be counted. For example, advocating for government funding for campus sustainability may be counted, whereas lobbying for the institution to receive funds that have already been appropriated may not.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Trademark Licensing

Criteria

Institution is a member of the Fair Labor Association (FLA) and/or the Worker Rights Consortium (WRC).

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Hospital Network

Criteria

Institution’s affiliated hospital or health system is a member of the Global Green and Healthy Hospitals Network, the Healthier Hospitals Initiative and/or Practice Greenhealth.

This credit includes hospitals and health systems that are formally affiliated with a higher education institution (sometimes called “university hospitals”). Other types of health care providers (e.g. insurers through which an institution obtains health care for its employees) are not included.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Operations

Air & Climate

This subcategory seeks to recognize institutions that are measuring and reducing their greenhouse gas and air pollutant emissions. Global climate change is having myriad negative impacts throughout the world, including increased frequency and potency of extreme weather events, sea level rise, species extinction, water shortages, declining agricultural production, and spread of diseases. The impacts are particularly pronounced for low-income communities and countries. In addition, institutions that inventory and take steps to reduce their air pollutant emissions can positively impact the health of the campus community, as well as the health of their local communities and regions.

From the institution:

Harvard has adopted a comprehensive climate change commitment -- a long term goal to reduce emissions at the maximum practical rate and a short term goal to reduce greenhouse gas emissions 30% by 2016 from a 2006 baseline, including growth.

Credit
Greenhouse Gas Emissions
Outdoor Air Quality

Greenhouse Gas Emissions

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has conducted a publicly available greenhouse gas (GHG) emissions inventory that includes, at minimum, Scope 1 and Scope 2 GHG emissions and may also include Scope 3 GHG emissions. The inventory may be validated internally by campus personnel who are independent of the GHG accounting and reporting process and/or verified by an independent, external third party.

Part 2

Institution reduced its adjusted net Scope 1 and Scope 2 GHG emissions per weighted campus user compared to a baseline.

Part 3

Institution's annual adjusted net Scope 1 and Scope 2 GHG emissions are less than the minimum performance threshold of 0.02 metric tons of carbon dioxide equivalent (MtCO2e) per gross square foot (0.002 MtCO2e per gross square metre) of floor area.

Performance for Part 3 of this credit is assessed using EUI-adjusted floor area, a figure that accounts for significant differences in energy use intensity (EUI) between types of building space.

For this credit, the following carbon offsets may be counted:

1. Institution-catalyzed carbon offsets (popularly known as "local offsets")
2. Carbon sequestration due to land that the institution manages specifically for sequestration (as documented in policies, land management plans or the equivalent)
3. Carbon storage from on-site composting
4. Third-party verified purchased carbon offsets

Purchased Renewable Energy Certificates (RECs) that are either Green-e Energy certified or meet Green-e Energy's technical requirements and are verified as such by a third party may be counted as zero emissions energy for purposes of Scope 2 GHG accounting.

Purchased carbon offsets and RECs that have not been third-party verified do not count.

Institutions that have sold or transferred emissions reductions, e.g. in the form of verified emissions reductions (VERs), may not count those reductions toward this credit.

Submission Note:

IMPORTANT NOTE FOR CAMPUS USERS DATA:

Due to limitations in data reporting we are not able to access the following breakdown of data for all of Harvard's 12 Schools so we reported full-time employee and student totals.
1. Number of residential students
2. Number of residential employees
3. Number of in-patient hospital beds
4. Full-time equivalent of distance education students

"---" *indicates that no data was submitted for this field*

Does the institution's GHG emissions inventory include all Scope 1 and Scope 2 GHG emissions?:

Yes

Does the institution's GHG emissions inventory include all Scope 3 GHG emissions from any of the following categories?:

	Yes or No
Business travel	No
Commuting	No
Purchased goods and services	No
Capital goods	No
Fuel- and energy-related activities not included in Scope 1 or Scope 2	No
Waste generated in operations	No

Does the institution's GHG emissions inventory include Scope 3 emissions from other categories?:

No

A brief description of the methodology and/or tool used to complete the GHG emissions inventory:

A comprehensive GHG emissions inventory methodology and a Greenhouse Gas Information Management System has been developed for tracking GHG emissions University-wide in a consistent format. The Inventory represents the full breadth of the University's GHG footprint in North America and a modified version of the Climate Registry Protocol as its methodology. The inventory covers more than 28 million square feet of space and reports on all of the critical Kyoto protocol gases from both direct (Scope 1) and indirect (Scope 2) sources.

Harvard has begun a pilot process for collecting and tracking Scope 3 emissions but they are not formally included in the inventory yet.

Has the GHG emissions inventory been validated internally by personnel who are independent of the GHG accounting and reporting process and/or verified by an independent, external third party?:

No

A brief description of the internal and/or external verification process:

A portion of the inventory is applicable to the Massachusetts Global Warming Solutions Act mandatory GHG program for Scope 1 emissions. This subset of the University-wide GHG inventory is verified every three years by an independent 3rd party and certified to the Massachusetts Department of Environmental Protection. The most recent verification certified reporting year 2013. External auditor performs site visit to review physical emission sources, utility meters, data collection, management, and reporting processes, and to interview key program personal. For complete information, see Massachusetts 310 CMR 7.71 Greenhouse Gas Reporting Program.

Scope 1 and Scope 2 GHG emissions::

	Performance Year	Baseline Year
Scope 1 GHG emissions from stationary combustion	88,000 *Metric Tons of CO2 Equivalent*	104,000 *Metric Tons of CO2 Equivalent*
Scope 1 GHG emissions from other sources	3,900 *Metric Tons of CO2 Equivalent*	13,000 *Metric Tons of CO2 Equivalent*
Scope 2 GHG emissions from purchased electricity	103,000 *Metric Tons of CO2 Equivalent*	133,000 *Metric Tons of CO2 Equivalent*
Scope 2 GHG emissions from other sources	28,000 *Metric Tons of CO2 Equivalent*	30,000 *Metric Tons of CO2 Equivalent*

Figures needed to determine total carbon offsets::

	Performance Year	Baseline Year
Institution-catalyzed carbon offsets generated	0 *Metric Tons of CO2 Equivalent*	0 *Metric Tons of CO2 Equivalent*
Carbon sequestration due to land that the institution manages specifically for sequestration	0 *Metric Tons of CO2 Equivalent*	0 *Metric Tons of CO2 Equivalent*
Carbon storage from on-site composting	0 *Metric Tons of CO2 Equivalent*	0 *Metric Tons of CO2 Equivalent*

Third-party verified carbon offsets purchased	0 *Metric Tons of CO2 Equivalent*	0 *Metric Tons of CO2 Equivalent*

A brief description of the institution-catalyzed carbon offsets program:

Harvard's GHG reduction strategy specifically states that the institution should explore, prioritize and invest in all on-campus opportunities for reducing energy and greenhouse gas emissions before pursuing and purchasing offsets. In line with this strategy, up to this point, Harvard has prioritized emissions reductions through on-campus efficiencies in energy supply and demand reductions. However, Harvard had begun an internal review process for exploring offset opportunities through complementary mechanisms but will not pursue any kind of offsets until all other avenues for reducing GHG emissions have been explored.

A brief description of the carbon sequestration program and reporting protocol used:

n/a

A brief description of the composting and carbon storage program:

n/a

A brief description of the purchased carbon offsets, including third party verifier(s) and contract timeframes:

n/a

Figures needed to determine "Weighted Campus Users"::

	Performance Year	Baseline Year
Number of residential students	0	0
Number of residential employees	0	0
Number of in-patient hospital beds	0	0
Full-time equivalent enrollment	34,254	29,837
Full-time equivalent of employees	16,159	14,555
Full-time equivalent of distance education students	0	0

Start and end dates of the performance year and baseline year (or three-year periods):

	Start Date	End Date
Performance Year	July 1, 2013	June 30, 2014
Baseline Year	July 1, 2005	June 30, 2006

A brief description of when and why the GHG emissions baseline was adopted:

Baseline chosen for STARS reporting aligns with publicly stated greenhouse gas reduction commitment

Gross floor area of building space, performance year:

28,000,000 *Square Feet*

Floor area of energy intensive building space, performance year:

	Floor Area
Laboratory space	5,400,000 *Square Feet*
Healthcare space	118,000 *Square Feet*
Other energy intensive space	240,000 *Square Feet*

Scope 3 GHG emissions, performance year::

	Emissions
Business travel	0 *Metric Tons of CO2 Equivalent*
Commuting	0 *Metric Tons of CO2 Equivalent*
Purchased goods and services	0 *Metric Tons of CO2 Equivalent*
Capital goods	0 *Metric Tons of CO2 Equivalent*
Fuel- and energy-related activities not included in Scope 1 or Scope 2	0 *Metric Tons of CO2 Equivalent*

Waste generated in operations	0 *Metric Tons of CO2 Equivalent*
Other categories (please specify below)	0 *Metric Tons of CO2 Equivalent*

A brief description of the sources included in Scope 3 GHG emissions from "other categories":

Harvard has begun a pilot process for collecting, analyzing, and tracking Scope 3 emissions but they are not formally included in the inventory yet.

A copy of the most recent GHG emissions inventory:

The website URL where the GHG emissions inventory is posted:

http://ehs.harvard.edu/news/hara

A brief description of the institution’s GHG emissions reduction initiatives, including efforts made during the previous three years:

The University has reduced GHG emissions 21% including over 3 million square feet of growth, 32% excluding growth. This progress to date is due to strong vision and leadership exemplified by President Faust and the Deans, who aligned the University toward a common goal. A clear strategic framework and comprehensive University-wide implementation plan were developed through an unprecedented level of collaboration among Harvard’s Schools and administrative departments. The plan is focused on creating an economically viable and replicable model for how large institutions can reduce emissions and save money.

The plan is focused on:
1. Energy and Emissions Tracking, Planning, and Implementation
2. Transitioning to a Cleaner Energy Supply
3. Policies and Tools to Drive Change including Green Revolving Fund, Life Cycle Costing, Green Building Standards, Temperature Policy, Energy Conservation Strategy etc...
4. Integrating Research and Teaching With On-Campus Challenges
5. Organizational Alignment and Occupant Engagement

Learn more:

http://green.harvard.edu/topics/energy-emissions/greenhouse-gas-reduction-goal

Outdoor Air Quality

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has adopted policies or guidelines to improve outdoor air quality and minimize air pollutant emissions from mobile sources. Policies and/or guidelines may include, but are not limited to, prohibiting vehicle idling, restrictions on the use of powered lawn care equipment, and other strategies for minimizing mobile emissions.

Policies adopted by entities of which the institution is part (e.g. government or university system) may count for Part 1 of this credit as long as the policies apply to and are followed by the institution.

Part 2

Institution has completed an inventory of significant air emissions from stationary sources on campus. Significant emissions include nitrogen oxides (NO_x), sulfur oxides (SO_x), and other standard categories of air emissions identified in environmental permits held by the institution, international conventions, and/or national laws or regulations.

"---" *indicates that no data was submitted for this field*

Does the institution have policies and/or guidelines in place to improve outdoor air quality and minimize air pollutant emissions from mobile sources?:

Yes

A brief description of the policies and/or guidelines to improve outdoor air quality and minimize air pollutant emissions from mobile sources:

1. Compliance with EPA and MassDEP air permit programs.
2. Campus Services Transportation programs/initiatives to decrease mobile emissions from fleet.
3. Commuter Choice programs to promote sustainable transportation, reduction in SOV programs
4. HU Police Department policy to reduce emissions from idling

Has the institution completed an inventory of significant air emissions from stationary sources on campus?:

Yes

A brief description of the methodology(ies) the institution used to complete its air emissions inventory:

Compliance with EPA and MassDEP air permit programs.

Weight of the following categories of air emissions from stationary sources::

	Weight of Emissions
Nitrogen oxides (NOx)	125 *Tons*
Sulfur oxides (SOx)	5 *Tons*
Carbon monoxide (CO)	26 *Tons*
Particulate matter (PM)	8 *Tons*
Ozone (O3)	1 *Tons*
Lead (Pb)	0 *Tons*
Hazardous air pollutants (HAPs)	5 *Tons*
Ozone-depleting compounds (ODCs)	1 *Tons*
Other standard categories of air emissions identified in permits and/or regulations	0 *Tons*

A brief description of the institution’s initiatives to minimize air pollutant emissions from stationary sources, including efforts made during the previous three years:

Air pollutant emissions from stationary sources are targeted under Harvard's greenhouse gas reduction strategy and energy efficiency planning. Examples of projects include boiler upgrades, installation of cogeneration units, and fuel switching.

The website URL where information about the institution’s outdoor air quality policies, guidelines or inventory is available:

http://ehs.harvard.edu/programs/air-emission-sources

Buildings

This subcategory seeks to recognize institutions that are taking steps to improve the sustainability performance of their buildings. Buildings are generally the largest user of energy and the largest source of greenhouse gas emissions on campuses. Buildings also use significant amounts of potable water. Institutions can design, build, and maintain buildings in ways that provide a safe and healthy indoor environment for inhabitants while simultaneously mitigating the building's impact on the outdoor environment.

From the institution:

Harvard is a green building leader with more LEED project certifications than any higher education institution in the world according to the USGBC.

Our community is also focused on reducing building energy consumption and making our buildings more energy efficient through commissioning and energy audits. The majority of campus space has undergone energy audits and over 1,000 energy conservation measures have been implemented.

Harvard's comprehensive University-wide Green Building Standards for capital projects, renovations and building system upgrades $100,000 and above require a smart design process incorporating life cycle costing, integrated design, energy modeling when applicable and other elements that ensure all sustainable design and operations opportunities are vetted and that performance requirements are achieved in a cost-effective manner.

Credit
Building Operations and Maintenance
Building Design and Construction
Indoor Air Quality

Building Operations and Maintenance

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution owns and operates buildings that are:

1) Certified under a green building rating system for existing buildings, e.g. LEED® for Existing Buildings: Operations & Maintenance (O&M)

And/or

2) Operated and maintained in accordance with formally adopted sustainable operations and maintenance guidelines and policies that cover all of the following:

- Impacts on the surrounding site
- Energy consumption
- Building-level energy metering
- Usage of environmentally preferable materials
- Indoor environmental quality
- Water consumption
- Building-level water metering

Building space that meets multiple criteria listed above should not be double-counted.

"---" *indicates that no data was submitted for this field*

Does the institution have any building space certified under the following green building rating systems for existing buildings?:

	Yes or No
LEED for Existing Buildings or another 4-tier rating system used by an Established Green Building Council (GBC)	Yes
The DGNB system, Green Star Performance, or another 3-tier GBC rating system	No

BREEAM-In Use, CASBEE for Existing Building, or another 5-tier GBC rating system	No
Other non-GBC rating systems (e.g. BOMA BESt, Green Globes)	No

A brief description of the green building rating system(s) used and/or a list or sample of certified buildings and ratings:

Harvard has more LEED certified building projects than any higher education institution in the world according to the USGBC. The list of certfied buildings and case studies are available at:

http://www.energyandfacilities.harvard.edu/green-building-resource/leed-case-studies

Total floor area of eligible building space (operations and maintenance):

26,281,208 *Square Feet*

Floor area of building space that is certified at each level under a 4-tier rating system for existing buildings used by an Established Green Building Council::

	Certified Floor Area
Minimum Level (e.g. LEED Certified)	---
3rd Highest Level (e.g. LEED Silver)	57,869 *Square Feet*
2nd Highest Level (e.g. LEED Gold)	6,932 *Square Feet*
Highest Achievable Level (e.g. LEED Platinum)	44,041 *Square Feet*

Floor area of building space that is certified at each level under a 3-tier rating system for existing buildings used by an Established Green Building Council::

	Certified Floor Area
Minimum Level	---
Mid-Level	---

Highest Achievable Level	---

Floor area of building space that is certified at each level under a 5-tier rating system for existing buildings used by an Established Green Building Council::

	Certified Floor Area
Minimum Level	---
4th Highest Level	---
Mid-Level	---
2nd Highest Level	---
Highest Achievable Level	---

Floor area of building space that is certified at any level under other green building rating systems for existing buildings:

0 *Square Feet*

Floor area of building space that is maintained in accordance with formally adopted sustainable building operations and maintenance guidelines or policies, but NOT certified:

26,172,366 *Square Feet*

A copy of the sustainable building operations and maintenance guidelines or policies:

2014 Harvard Green Building Standards_12-1-14.pdf

The date the guidelines or policies were formally adopted:

Jan. 1, 2007

A brief description of the sustainable building operations and maintenance program and/or a list or sample of buildings covered:

All Harvard owned properties and renovations are regulated by the Harvard Green Building Standards and included in the university-wide goal to reduce greenhouse gas emissions. In addition, building managers routinely energy audit and must plan for and implement energy conservation measures. Many of our buildings are also undergoing commissioning and retro-commissioning to ensure they operating properly.

A brief description of how the institution ensures compliance with sustainable building operation and maintenance guidelines and policies:

Compliance with the Green Building Standards is reviewed as part of Harvard's larger capital project review and approval process.

The website URL where information about the institution’s certified buildings and/or sustainable operations and maintenance guidelines or policies is available:

http://green.harvard.edu/topics/green-buildings/green-building-standards

Building Design and Construction

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution-owned buildings that were constructed or underwent major renovations in the previous five years are:

1) Certified under a green building rating system for new construction and major renovations (e.g. the LEED® for New Construction and Major Renovations, LEED for Commercial Interiors, LEED for Healthcare, and/or LEED for Core and Shell Green Building Rating Systems)

2) Certified Living under the Living Building Challenge (LBC)

And/or

3) Designed and built in accordance with formally adopted green building guidelines and policies that cover all of the following topics:

- Impacts on the surrounding site
- Energy consumption
- Building-level energy metering
- Usage of environmentally preferable materials
- Indoor environmental quality
- Water consumption
- Building-level water metering

Building space that meets multiple criteria listed above should not be double-counted.

"---" *indicates that no data was submitted for this field*

Does the institution have any building space certified under the following green building rating systems for new construction and major renovations?:

	Yes or No
LEED or another 4-tier rating system used by an Established Green Building Council (GBC)	Yes
The DGNB system, Green Star, or another 3-tier GBC rating system	No

BREEAM, CASBEE, or another 5-tier GBC rating system	No
The Living Building Challenge	No
Other non-GBC rating systems (e.g. BOMA BESt, Green Globes)	No

A brief description of the green building rating system(s) used and/or a list of certified buildings and ratings:

Harvard University has more LEED certification than any other higher education institution in the world according to the US Green Building Council. As of January 2015, Harvard has 120 LEED projects – 97 certified and 23 registered projects.

All LEED certified buildings and case studies are listed at:

http://www.energyandfacilities.harvard.edu/green-building-resource/leed-case-studies

.

Total floor area of eligible building space (design and construction):

2,697,230 *Square Feet*

Floor area of building space that is certified at each level under a 4-tier rating system for new construction and major renovations used by an Established Green Building Council::

	Certified Floor Area
Minimum Level (e.g. LEED Certified)	27,318 *Square Feet*
3rd Highest Level (e.g. LEED Silver)	264,281 *Square Feet*
2nd Highest Level (e.g. LEED Gold)	1,126,839 *Square Feet*
Highest Achievable Level (e.g. LEED Platinum)	459,544 *Square Feet*

Floor area of building space that is certified at each level under a 3-tier rating system for new construction and major renovations used by an Established Green Building Council::

	Certified Floor Area
Minimum Level	---

Mid-Level	---
Highest Achievable Level	---

Floor area of building space that is certified at each level under a 5-tier rating system for new construction and major renovations used by an Established Green Building Council::

	Certified Floor Area
Minimum Level	---
4th Highest Level	---
Mid-Level	---
2nd Highest Level	---
Highest Achievable Level	---

Floor area of building space certified Living under the Living Building Challenge:

Floor area of building space that is certified at any level under other green building rating systems for new construction and major renovations:

Floor area of building space that was designed and constructed in accordance with green building policies or guidelines but NOT certified:

819,248 *Square Feet*

A copy of the guidelines or policies :

2014 Harvard Green Building Standards_12-1-14.pdf

The date the guidelines or policies were adopted:

Jan. 1, 2007

A brief description of the green building guidelines or policies and/or a list or sample of buildings covered:

Harvard's comprehensive Green Building Standards apply to all capital projects, renovations and building system upgrades $100,000 and above.

The Harvard Green Building Standards were last updated in 2014, building upon the 2007 Green Building Guidelines and 2009 Green Building Standards. The 2014 version of the Standards include healthy material requirements for the disclosure of health and environmental impacts of products that are used on campus in order to help Harvard assess opportunities to understand the community’s exposure to potential toxins. They also include requirements for analyzing the feasibility of Net-Zero and Living Building Challenge certification for major capital projects and special considerations for laboratories and data centers, the most energy-intensive spaces on campus. Additional updates include a requirement for LEED v4 Gold certification, energy reduction targets beyond ASHRAE 90.1-2010, and revisions to Measurement and Verification standards that are used to assess the effectiveness and performance of energy and mechanical systems

In addition to these updated requirements and recommendations, the Standards require:
Integrated design goal-setting charrettes with all key stakeholders
Multiple iterations of energy models
Life cycle cost analysis

Prescriptive requirements such as aggressive energy and water reduction targets.
To support successful implementation of the Standards, Harvard has developed a set of tools and resources including: The Green Building Resource knowledge sharing website with LEED case studies and documentation; a University-specific Life Cycle Cost Calculator, Green Revolving Fund, and in-house Green Building Services consultant services.

A brief description of how the institution ensures compliance with green building design and construction guidelines and policies:

Compliance with the Green Building Standards is reviewed as part of Harvard's larger capital project review and approval process.

The website URL where information about the institution’s certified buildings and/or green building design and construction guidelines or policies is available:

http://www.energyandfacilities.harvard.edu/green-building-resource

Indoor Air Quality

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has an indoor air quality (IAQ) management program that includes regular auditing or monitoring, a mechanism for occupants to register complaints, and action plans to implement any corrective measures required in response to audits, monitoring or complaints.

Policies and plans adopted by entities of which the institution is part (e.g. government or university system) may count for this credit as long as the policies apply to and are followed by the institution.

"---" *indicates that no data was submitted for this field*

Floor area of building space covered by an indoor air quality (IAQ) management program that meets the criteria for this credit:

28,000,000 *Square Feet*

Gross floor area of building space:

28,000,000 *Square Feet*

A brief description of the institution's indoor air quality program(s):

The Harvard University Indoor Air Quality (IAQ) Program establishes guidelines and best practices to assist building managers in maintaining good indoor environmental quality. The goal is to operate buildings in a manner that meets established performance standards regarding ventilation, temperature, relative humidity, air quality, odor, noise and lighting. Environmental Health and Safety provides technical assistance and training to building mangers and staff on related topics and aids building managers responding to IAQ problems.

The website URL where information about the institution's indoor air quality program(s) is available:

http://www.ehs.harvard.edu/programs/indoor-air-quality-iaq

Dining Services

This subcategory seeks to recognize institutions that are supporting a sustainable food system. Modern industrial food production often has deleterious environmental and social impacts. Pesticides and fertilizers used in agriculture can contaminate ground and surface water and soil, which can in turn have potentially dangerous impacts on wildlife and human health. The production of animal-derived foods often subjects animals to inhumane treatment and animal products have a higher per-calorie environmental intensity than plant-based foods. Additionally, farm workers are often directly exposed to dangerous pesticides, subjected to harsh working conditions, and paid substandard wages. Furthermore, food is often transported long distance to institutions, producing greenhouse gas emissions and other pollution, as well as undermining the resiliency of local communities.

Institutions can use their purchasing power to require transparency from their distributors and find out where the food comes from, how it was produced, and how far it traveled. Institutions can use their food purchases to support their local economies; encourage safe, environmentally-friendly and humane farming methods; and help eliminate unsafe working conditions and alleviate poverty for farmers. These actions help reduce environmental impacts, preserve regional farmland, improve local food security, and support fair and resilient food systems.

Please note that while dining services can also play an important role in conserving energy and water, reducing waste, and purchasing environmentally preferable materials other than food, STARS measures these impacts across the institution instead of by department; therefore, the benefits of these actions are captured in the Energy, Water, Waste, and Purchasing subcategories, respectively.

From the institution:

Harvard is committed to purchasing and operational practices and menu choices that sustain the health and well-being of the environment, communities, and the people producing and eating food.

Credit
Food and Beverage Purchasing
Low Impact Dining

Food and Beverage Purchasing

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution’s dining services purchase food and beverages that meet at least one of the following criteria:

• Local and community-based

And/or

• Third party verified to be ecologically sound, fair and/or humane

Food and beverage purchases that meet both criteria listed above (e.g. local community-based products that are Certified Organic) should not be double-counted.

Local community- based products:

- Are sourced from local community-based producers (directly or through distributors)
- Contain raw ingredients (excluding water) that are third party verified and/or locally harvested and produced (e.g. bread made with Organic flour or local honey) and
- Exclude products from Concentrated Animal Feeding Operations (CAFOs), products that have minimal nutritional value (e.g. soda, chewing gum, candies made predominantly from sweeteners), and products from producers that have been convicted of one or more labor law violations within the previous three years

Products that are not local and community-based must be third party verified to count. Recognized third party standards and certifications for food and beverages are outlined in the STARS Technical Manual. Institutions located outside the U.S. and Canada may use additional third party certifications to identify ecologically sound, fair and humane products, provided the certifications are reported in “Notes about this submission”.

Part 1 of this credit includes food and beverage purchases for on-campus dining operations and catering services operated by the institution or the institution’s primary dining services contractor (e.g. Aramark, Bon Appétit Management Company, Chartwells, Sodexo). On-site franchises, convenience stores, vending services, and concessions are excluded from Part 1.

Part 2

Institution’s on-site franchises, convenience stores, vending services, and/or concessions purchase food and beverages that are third party verified and/or locally sourced (i.e. meet the criteria outlined in Part 1).

"---" *indicates that no data was submitted for this field*

Percentage of dining services food and beverage expenditures that are local and community-based and/or third party verified:

32

A copy of an inventory, list or sample of sustainable food and beverage purchases:

An inventory, list or sample of sustainable food and beverage purchases:

BA CHICKEN MURRAY'S ALL NATURAL WHOLE
DA COD CHOWDER PIECES 25#CS
DA FISH CLAM LITTLENECK FARMED
DA FISH CLAM STEAMER SFT SHL
DA FISH CLAMS IQF ST. OURS
DA FISH CLAMS MAHOGANY 42# BAG
DA FISH LOBSTER LIVE WHOLE
DA FISH LOBSTER LIVE WHOLE 1 1/2LB
DA FISH LOBSTER MEAT C/K
DA FISH LOBSTER MEAT MXD FRSH
DA FISH LOBSTER MEAT WILD C/K FZ
DA FISH MUSSEL CULTURED
DA FISH PERCH OCEAN FRESH 2-4Z
DA FISH POLLOCK FRESH SKINLESS
DA FISH SALMON BNLS SK ON FRSH
DA FISH SALMON SKLS 5 OZ
DA FISH SALMON SUSTAINABLE FARMED
DA FISH SCALLOPS DRY SEA 20/30
DA FISH SWORDFISH PORTION SKLS 5 OZ
DA FISH SWORDFISH PRTN 6Z FZ
DA FISH SWORDFISH SKLS 6 OZ PTN (EA)
DA FISH SWORDFISH TENDERS
DA FISH WILD MSC ATL COD LOINS
DA POLLACK PIECES WILD IQF 30# NC
DA SCALLOPS SEA WILD GMRI DRY 10/20
DC FISH HAKE FRESH
DC FISH SCALLOPS PIECES WILD
FB TOFU (OG)
HB BEV MILK STNFLD ORG HOMOG 1/2 GAL
HB MILK RICE PLAIN 12/32OZ (OG)
HB MILK SOY PLAIN (OG) 6/64 OZ
HB MILK SOY PLAIN ORG
HB MILK SOY VANILLA (OG) 6/64 OZ
KA VEG ONIONS RED FRESH (OG)
KA VEG SQUASH ACORN
KA VEG SQUASH BUTTERNUT WHOLE
KA VEG SQUASH DELICATA EACH(L)

KA VEG TOMATO BACK YARD BEAUTY
KB VEG BEETS DICED
KB VEG FIELD GREENS (OG)
KB VEG ONIONS PEELED (OG)
KB VEG SQUASH ACORN HLVD & CLN
KB VEG SQUASH BLUE HUBBARD (L)
KB VEG SQUASH BUTTERCUP DICED
KB VEG SQUASH BUTTERNUT CT PLD
KB VEG SQUASH DELICATA (L)
KB VEG SQUASH GA CANDY RST (L)
KB VEG SQUASH LONG ISLAND CHEESE (L)
KB VEG TURNIPS DICED
LA SAUCE TOMATO MARINARA (OG)
LA SAUCE TOMATO MARINARA SPAGHETTI (OG)
NA APPLE EARLY LOCAL MAC 120CT
NA APPLES MACINTOSH LOCAL 120
NA FRUIT APPLES CORTLAND 100CT
NA FRUIT APPLES GALA LOCAL 125CT
NA FRUIT APPLES HONEYCRISP LOCAL
NA FRUIT APPLES MACOUN LOCAL
NA FRUIT BANANAS FAIR TRD (OG)
NA FRUIT NECTARINE LOCAL
NA FRUIT PEACHES LOCAL
NA FRUIT PEAR BOSC LOCAL 20#
NA FRUIT PEARS LOCAL BART
NC BEV JUICE NN PINE ORG GUAVA
PA BLUEBERRIES WILD MAINE FZ
QA CEREAL AMAZON FLAKES (OG)
QA CEREAL HEMP GRANOLA (OG)
QA CEREAL OPTIMUM BRKFST (OG)
QD VEGENAISE 6/32OZ VEGAN MAYONNAISE
QD VINEGAR BALSAMIC (OG)
QF FRUIT CRANBERRIES DRY LOCAL
QF GRAIN COUSCOUS (OG) 10#
QF GRAIN QUINOA (OG)
QF PEAS CHICK DRIED (OG)
RA COFFEE PEETS GAIA ORGANIC
RA COFFEE SBC HOUSE BL FT ORG
RA TEA BAGS RED ROOIBOS ORGAN
RB TEA ICED TAZO ORG GRN (OG)
RB TEA ICED TAZO ORGANIC (OG)
SA SPREAD PEANUT BUTTER WHL (OG)
WA BEER PEAKS ORGANIC FALL SUMMIT 4/6PK

Does the institution wish to pursue Part 2 of this credit (food and beverage expenditures for on-site franchises, convenience stores, vending services, or concessions)?:

No

Percentage of on-site franchise, convenience store, vending services, and concessions food and beverage purchases that are local and community-based and/or third party verified:

A copy of an inventory, list or sample of on-site franchise, convenience store, vending machine, and/or concessions food and beverage purchases that are sustainably produced:

An inventory, list or sample of on-site franchise, convenience store, vending machine, and/or concessions food and beverage purchases that are sustainably produced:

All of Harvard's on-site dining vendors or franchises have robust local, community-based food programs that are incorporated into their recipes and offerings, often using ingredients from farmer's markets and local farmers/sources.

A brief description of the sustainable food and beverage purchasing program:

Harvard University Dining Services has adopted purchasing and operational practices and menu choices that sustain the health and well-being of the environment, communities, and the people producing and eating food.

Harvard Dining Services has a comprehensive sustainable food and beverage purchasing program that highlights local products and partnerships with local farmers. Their new Catch of the Day program, a partnership with local regional fishermen is a perfect example. They also feature seasonally appropriate ingredients and products/food from local farmers.

A brief description of the methodology used to track/inventory sustainable food and beverage purchases:

We use our FoodPro menu management system to identify local vendors/suppliers and/or products that are designated local. This allows us to quickly identify purchases.

Total annual food and beverage expenditures:

14,703,600 *US/Canadian $*

Which of the following food service providers are present on campus and included in the total food and beverage expenditure figures?:

	Present?	Included?
Dining operations and catering services operated by the institution	Yes	Yes
Dining operations and catering services operated by a contractor	Yes	Yes

Franchises	Yes	No
Convenience stores	No	No
Vending services	No	No
Concessions	Yes	No

Has the institution achieved the following?:

	Yes or No
Fair Trade Campus, College or University status	No
Certification under the Green Seal Standard for Restaurants and Food Services (GS-46)	No
Marine Stewardship Council (MSC) certification	No
Signatory of the Real Food Campus Commitment (U.S.)	No

A brief description of other sustainable restaurant and food service standards that the institution's dining services operations are certified under:

All undergraduate dining locations and dining locations at Harvard Business School, Harvard School of Public Health, Harvard Law School are Green Restaurant Certified:

http://dinegreen.com/customers/restaurant_guide2.asp?keyword=Harvard

Due to restrictions that MSC places for a large institutional buyer like Harvard, the University has created and launched an innovative sustainable seafood purchasing program with the help of National Geographic Fellow Barton Seaver to promote and purchase local, sustainably caught seafood. The program has the following criteria for sustainability:

- Certified by a recognized resource
- Locally/domestically sourced
- An abundant species
- Where appropriate, off-cuts used to ensure no waste of fish

Students are currently running the Real Food Campus calculator at Harvard.

The website URL where information about the institution's sustainable food and beverage purchasing efforts is available:

http://www.dining.harvard.edu/about_huds/sustainability.html

Low Impact Dining

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Conventionally produced animal products comprise less than 30 percent of the institution's total dining services food purchases.

Conventionally produced animal products include all food products that contain animal derived (i.e. meat, fish, egg, dairy) ingredients that have not been verified to be sustainably produced. Sustainably produced animal products have been either:

- Third party verified to be ecologically sound and/or humane (see *OP 6: Food and Beverage Purchasing*)

  Or

- Verified by the institution to be both ecologically sound and humane (e.g. "Pasture Raised", "Grass Fed" or "Humanely Raised") through a relationship with a local producer

Part 2

Institution:

- Offers diverse, complete-protein vegan options at all meals in at least one dining facility on campus

  And

- Provides labels and/or signage that distinguishes between vegan, vegetarian (not vegan), and other items

This credit includes on-campus dining operations and catering services operated by the institution or the institution's primary dining services contractor. On-site franchises, convenience stores, vending machines, and concessions should be excluded to the extent feasible.

"---" *indicates that no data was submitted for this field*

Percentage of total dining services food purchases comprised of conventionally produced animal products:

18.50

A brief description of the methodology used to track/inventory expenditures on animal products:

HUDS uses the FoodPro menu management system to produce monthly and ad hoc reports that are shared with all Dining senior management.

Does the institution offer diverse, complete-protein vegan dining options at all meals in at least one dining facility on campus?:

Yes

Does the institution provide labels and/or signage that distinguishes between vegan, vegetarian (not vegan), and other items?:

Yes

Are the vegan options accessible to all members of the campus community?:

Yes

A brief description of the vegan dining program, including availability, sample menus, signage and any promotional activities (e.g. "Meatless Mondays"):

Every meal includes vegan options – from items available on request at the grill to salad bar items. Entrees, soups and sides are also sometimes available. We worked with a chef from an area vegan restaurant to develop new menu options and provide education to students; we also worked with the American Humane Society to host a plant-based diet cooking class for our own chefs and others from area schools.

A brief description of other efforts the institution has made to reduce the impact of its animal-derived food purchases:

We worked with a chef from an area vegan restaurant to develop new menu options and provide education to students; we also worked with the American Humane Society to host a plant-based diet cooking class for our own chefs and others from area schools.

The website URL where information about where information about the vegan dining program is available:

http://www.dining.harvard.edu/vegvgn

Annual dining services expenditures on food:

13,064,000 *US/Canadian $*

Annual dining services expenditures on conventionally produced animal products:

2,413,500 *US/Canadian $*

Annual dining services expenditures on sustainably produced animal products:

7,800 *US/Canadian $*

Energy

This subcategory seeks to recognize institutions that are reducing their energy consumption through conservation and efficiency, and switching to cleaner and renewable sources of energy such as solar, wind, geothermal, and low-impact hydropower. For most institutions, energy consumption is the largest source of greenhouse gas emissions, which cause global climate change. Global climate change is having myriad negative impacts throughout the world, including increased frequency and potency of extreme weather events, sea level rise, species extinction, water shortages, declining agricultural production, ocean acidification, and spread of diseases. The impacts are particularly pronounced for vulnerable and poor communities and countries. In addition to causing global climate change, energy generation from fossil fuels, especially coal, produces air pollutants such as sulfur dioxide, nitrogen oxides, mercury, dioxins, arsenic, cadmium and lead. These pollutants contribute to acid rain as well as health problems such as heart and respiratory diseases and cancer. Coal mining and oil and gas drilling can also damage environmentally and/or culturally significant ecosystems. Nuclear power creates highly toxic and long-lasting radioactive waste. Large-scale hydropower projects flood habitats and disrupt fish migration and can involve the relocation of entire communities.

Implementing conservation measures and switching to renewable sources of energy can help institutions save money and protect them from utility rate volatility. Renewable energy may be generated locally and allow campuses to support local economic development. Furthermore, institutions can help shape markets by creating demand for cleaner, renewable sources of energy.

From the institution:

Harvard has adopted a comprehensive climate change commitment -- a long term goal to reduce emissions at the maximum practical rate and a short term goal to reduce greenhouse gas emissions 30% by 2016 from a 2006 baseline, including growth.

Credit
Building Energy Consumption
Clean and Renewable Energy

Building Energy Consumption

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has reduced its total building energy consumption per gross square foot/metre of floor area compared to a baseline.

Part 2

Institution’s annual building energy consumption is less than the minimum performance threshold of 28 Btu per gross square foot (2.6 Btu per gross square metre) of floor area per degree day.

Performance for Part 2 of this credit is assessed using EUI-adjusted floor area, a figure that accounts for significant differences in energy use intensity (EUI) between types of building space.

"---" *indicates that no data was submitted for this field*

Total building energy consumption, all sources (transportation fuels excluded):

	Performance Year	Baseline Year
Total building energy consumption	3,223,000 *MMBtu*	3,300,000 *MMBtu*

Purchased electricity and steam:

	Performance Year	Baseline Year
Grid-purchased electricity	1,103,000 *MMBtu*	1,173,000 *MMBtu*
District steam/hot water	323,000 *MMBtu*	354,000 *MMBtu*

Gross floor area of building space::

	Performance Year	Baseline Year

Gross floor area	28,000,000 *Gross Square Feet*	21,586,000 *Gross Square Feet*

Floor area of energy intensive space, performance year::

	Floor Area
Laboratory space	5,400,000 *Square Feet*
Healthcare space	118,000 *Square Feet*
Other energy intensive space	

Degree days, performance year (base 65 °F / 18 °C)::

	Degree Days
Heating degree days	5,858
Cooling degree days	897

Source-site ratios::

	Source-Site Ratio (1.0 - 5.0; see help icon above)
Grid-purchased electricity	3.14
District steam/hot water	1.20

Start and end dates of the performance year and baseline year (or 3-year periods)::

	Start Date	End Date
Performance Year	July 1, 2013	June 30, 2014
Baseline Year	July 1, 2005	June 30, 2006

A brief description of when and why the building energy consumption baseline was adopted:

Baseline chosen for STARS reporting aligns with publicly stated greenhouse gas reduction commitment

A brief description of any building temperature standards employed by the institution:

The Harvard Temperature Policy was developed and adopted by stakeholders and facilities leaders representing all of Harvard's Schools and administrative departments. This university-wide policy provides a framework to assist building managers and occupants in achieving a healthy, productive, and safe working environment while reducing energy costs and greenhouse gas emissions to the lowest practicable level.

http://green.harvard.edu/topics/energy-emissions/temperature-policy

A brief description of any light emitting diode (LED) lighting employed by the institution:

New construction projects nearly always feature some form of LED lighting, but many retrofits, typically PAR30 downlighting, have been installed as well. Increasingly, building managers are replacing older bulbs with new LED bulbs. For the last two years, Harvard collaborated with Philips and NStar to dramatically reduce energy use in dorms and graduate housing by distributing thousands of energy-efficient LED light bulbs to incoming freshman and graduate students. The bulbs, which were also provided to Harvard employees and affiliates at a highly discounted price, use 80 percent less energy than conventional bulbs and can last up to 20 years.

Additionally, all garages and parking lots have undergone a complete LED conversion in 2014.

Article about the LED hand-outs:

http://news.harvard.edu/gazette/story/2013/07/reducing-the-juice/

Article about use of LEDs in the new art museum:

http://magazine.harvardartmuseums.org/article/2014/02/18/lighting-way

Articles about LED conversion:

http://green.harvard.edu/tools-resources/case-study/carpenter-center-lighting-upgrade

http://green.harvard.edu/tools-resources/case-study/hsph-building-1-led-retrofit http://green.harvard.edu/news/dunster-dining-hall-installs-led-lighting

A brief description of any occupancy and/or vacancy sensors employed by the institution:

Most building on campus feature WattStopper occupancy controls to shut of lighting and setback HVAC/ventilation setpoints when non-occupied.

A brief description of any passive solar heating employed by the institution:

The are five locations that have solar hot water systems installed including a freshman dorm. For a full list visit:

http://green.harvard.edu/topics/energy-emissions/renewable-energy

.

For more information:

http://news.harvard.edu/gazette/story/2010/10/creating-power-by-the-yard/

A brief description of any ground-source heat pumps employed by the institution:

The are eight locations/buildings on campus that have ground source heat pumps installed. For a list visit:

http://green.harvard.edu/topics/energy-emissions/renewable-energy

Five standing-column wells have been installed in Radcliffe Yard to provide heating and cooling for the renovated classroom building, Byerly Hall. In 2012, the system was connected to a second building:

The pumps draw well water from a depth of 1500 feet and run it through pipes that lead to fan coil units in each space. As a cost-effective and more efficient measure, Fay House was connected to the five standing column wells already in place for Byerly Hall. Heat exchangers and four additional heat pumps were also installed. The new system separates the water circulating in the ground from that in the buildings, thus ensuring a balanced load between the wells and preventing contaminants like iron particles from clogging the mechanical equipment.

Harvard engineering students conducted a study to determine if the expansion was feasible:

http://www.seas.harvard.edu/news/2011/05/digging-geothermal-energy

A brief description of any cogeneration technologies employed by the institution:

A 5 MW back pressure turbine generates electricity from steam produced on-site at the Blackstone Steam Plan. An additional 7MW cogeneration until is being installed in 2015. Five smaller cogeneration units (~75 kW each) are located across campus, two of which are in athletics facilities to heat swimming pools.

A brief description of any building recommissioning or retrofit program employed by the institution:

As part of Harvard's climate strategy. Many Schools and departments are undergoing multi-year commissioning and recommissioning. Here are two examples:

At the Faculty of Arts and Sciences Laboratory for Integrated Science and Engineering (LISE) building an ongoing retro-commissioning project has resulted in over $3.15 million in cumulative savings since 2009. The facilities team monitors over 3,400 data points from equipment such as air handling units, and chilled and hot water pumps. Reductions in airflow have had greatest impact, while additional actions like identifying leaks that are wasting energy have also contributed.

At Harvard Business School, an ongoing commissioning project, underway since 2008, has covered 14 buildings, yielding more than $320,000 in savings that have contributed to a 3.6 percent reduction in greenhouse gas emissions. The simple payback (when the costs are made up for by the savings) for the projects they have implemented is well under two years (1.51 years).

At the newly renovated Harvard Art Museums a post-completion commissioning project will continually evaluate and verify the performance of the building’s mechanical systems, while also identifying new opportunities for operational efficiency.

Additionally, the Green Building Standards have the following policy and requirements regarding post-construction Optimization:

"Project Closeout" marks the formal transition between the construction and operation phases in the building lifecycle. To ensure a smooth transition it's essential that Building Managers, Operators, and Stewards are equipped with the information they will need to optimally care for and maintain the building.

To capture critical project data and prepare projects for optimal operational excellence, Harvard has identified various levels of Closeout Documentation / Operations and Maintenance Readiness for projects depending on their scope of work. The requirements are captured Harvard's Green Building Standards.

Project teams and Project Managers should submit all closeout documentation in accordance with the appropriate Asset Management Program. Example documentation turnover may consist of:

O&M Manuals
As-built drawings
Updated Sequences of Operations
The Commissioning System Manual
Additional Training materials
Final project Energy Model with input/output summary report

http://www.energyandfacilities.harvard.edu/green-building-resource/green-building-tools-resourc es/post-construction-optimization

A brief description of any energy metering and management systems employed by the institution:

Anyone with a Harvard ID and pin, including all students, faculty, and staff, have access to EnergyWitness, an online system that provides meter data for all buildings on campus. Some facilities are capable of providing near-real time interval data as well.

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Additional Training materials
Final project Energy Model with input/output summary report

http://www.energyandfacilities.harvard.edu/green-building-resource/green-building-tools-resourc

es/post-construction-optimization

A brief description of the institution's program to replace energy-consuming appliances, equipment and systems with high efficiency alternatives:

In partnership with local utilities Harvard's Schools and departments are regularly replacing appliances with high efficiency alternatives across the campus through the use of incentives and during all construction and renovation projects.

A brief description of any energy-efficient landscape design initiatives employed by the institution:

In addition to typical landscaping irrigation reduction practices employed on all Harvard capital projects affecting exterior environments, recent projects include graywater and rainwater collection serving landscaping and toilets in the Stone Hall dormitory, a review and upgrade of irrigation systems at Harvard Medical School, and rainwater capture at the recently opened LEED Gold Harvard Art Museum.

A brief description of any vending machine sensors, lightless machines, or LED-lit machines employed by the institution:

Harvard Law School installed Vending Misers and Snack Misers on all their cold beverage and non-perishable snack machines. The devices turn machines on and off based on activity as well as internal cooling cycles, conserving energy by not over-cooling and shutting off lights and displays when machines are not in use. HLS predicts the 20 devices installed will save 3.4 metric tons of carbon dioxide equivalents and $1,440 each year.

A brief description of other energy conservation and efficiency initiatives employed by the institution:

As part of Harvard's energy management strategy in place since 2008 the following initiatives have been employes:
- All energy intensive space has been energy audited
- Energy conservation planning and measures have been incorporated into the five year capital planning process, and Schools report annually on energy conservation efforts
- Harvard Green Revolving Loan Fund provides funding for energy conservation projects across campus
- Schools and individual buildings are conducting ongoing commissioning projects to identify opportunities to further reduce energy use.
- As a result over 1,300 energy efficiency measures have been implemented

The website URL where information about the institution’s energy conservation and efficiency initiatives is available:

http://green.harvard.edu/topics/energy-emissions

Clean and Renewable Energy

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution supports the development and use of clean and renewable energy sources, using any one or combination of the following options.

Option 1:	Generating electricity from clean and renewable energy sources on campus and retaining or retiring the rights to the environmental attributes of such electricity. (In other words, if the institution has sold Renewable Energy Credits for the clean and renewable energy it generated, it may not claim such energy here.) The on-site renewable energy generating devices may be owned and/or maintained by another party as long as the institution has contractual rights to the associated environmental attributes.
Option 2:	Using renewable sources for non-electric, on-site energy generation, such as biomass for heating.
Option 3:	Catalyzing the development of off-site clean and renewable energy sources (e.g. an off-campus wind farm that was designed and built to supply electricity to the institution) and retaining the environmental attributes of that energy.
Option 4:	Purchasing the environmental attributes of electricity in the form of Renewable Energy Certificates (RECs) or other similar renewable energy products that are either Green-e Energy certified or meet Green-e Energy's technical requirements and are verified as such by a third party, or purchasing renewable electricity through the institution's electric utility through a certified green power purchasing option.

Since this credit is intended to recognize institutions that are actively supporting the development and use of clean and renewable energy, neither the electric grid mix for the region in which the institution is located nor the grid mix reported by the electric utility that serves the institution count for this credit.

The following renewable systems are eligible for this credit:

- Concentrated solar thermal
- Geothermal systems that generate electricity
- Low-impact hydroelectric power
- Solar photovoltaic
- Wave and tidal power

- Wind

Biofuels from the following sources are eligible:

- Agricultural crops
- Agricultural waste
- Animal waste
- Landfill gas
- Untreated wood waste
- Other organic waste

Technologies that reduce the amount of energy used but do not generate renewable energy do not count for this credit. For example, daylighting, passive solar design, and ground-source heat pumps are not counted in this credit. The benefits of such strategies, as well as improved efficiencies achieved through using cogeneration technologies, are captured by *OP 1: Greenhouse Gas Emissions* and *OP 8: Building Energy Consumption*.

Transportation fuels, which are covered by *OP 1: Greenhouse Gas Emissions* and *OP 18: Campus Fleet*, are not included in this credit.

Submission Note:

Harvard has several solar PV projects on site; the RECs are retired for meeting the University's requirements under the MA Renewable Portfolio Standard.

"---" *indicates that no data was submitted for this field*

Clean and renewable energy from the following sources::

	Performance Year
Option 1: Clean and renewable electricity generated on-site during the performance year and for which the institution retains or has retired the associated environmental attributes	0 *MMBtu*
Option 2: Non-electric renewable energy generated on-site	0 *MMBtu*
Option 3: Clean and renewable electricity generated by off-site projects that the institution catalyzed and for which the institution retains or has retired the associated environmental attributes	0 *MMBtu*

Option 4: Purchased third-party certified RECs and similar renewable energy products (including renewable electricity purchased through a certified green power purchasing option)	183,660 *MMBtu*

Total energy consumption, performance year:

3,223,000 *MMBtu*

A brief description of on-site renewable electricity generating devices :

Harvard’s Schools and administrative departments have installed 30 renewable and alternative energy systems on campus and on University-owned property. The alternative energy installations (such as solar thermal and geothermal) reduce Harvard fuel purchases and therefore reduce GHG emissions. They include cogeneration units, solar PV, wind, geothermal and solar hot water installations.

A full list of on-site renewable energy installations is available at:

http://green.harvard.edu/topics/energy-emissions/renewable-energy

A brief description of on-site renewable non-electric energy devices:

A full list of on-site renewable energy installations is available at:

http://green.harvard.edu/topics/energy-emissions/renewable-energy

There are five solar hot water installations on campus; the largest is coupled with heat recovery from Harvard’s steam tunnels and produces much of the hot water for the freshman houses in Harvard Yard (that project alone projected to provide up to 60% of domestic hot water needs for all building in Harvard Yard). In addition, eight ground source heat pumps use geothermal energy for heating and cooling several buildings, and the Harvard Forest has a waste wood burning unit.

A brief description of off-site, institution-catalyzed, renewable electricity generating devices:

As part of a 15 year agreement entered into in 2009, Harvard purchases 50% of the electricity output of the 26MW Stetson II wind farm in Maine. See this article re: the purchase:

http://news.harvard.edu/gazette/story/2009/11/harvard-to-become-largest-institutional-buyer-of-

wind-power-in-new-england/

More info on Stetson II:

http://wind.sunedison.com/projects/stetson/

A 600 kW solar PV array on Harvard-owned property is located off-campus in Watertown, MA

A brief description of the RECs and/or similar renewable energy products:

Harvard purchases both the RECs and the energy from above-mentioned Stetson II wind installation. Harvard also purchases RECs from hydro, landfill gas, waste-to-energy and other wind installations to meet its requirements under the Massachusetts Renewable Portfolio Standard and for LEED requirements. It does not currently account for the renewable energy and REC purchases within the greenhouse gas emissions inventory.

The website URL where information about the institution's renewable energy sources is available:

http://green.harvard.edu/topics/energy-emissions/renewable-energy

Grounds

This subcategory seeks to recognize institutions that plan and maintain their grounds with sustainability in mind. Beautiful and welcoming campus grounds can be planned, planted, and maintained in any region while minimizing the use of toxic chemicals, protecting wildlife habitat, and conserving water and resources.

From the institution:

Harvard recognizes that the way we operate our campus has an impact on natural resources and the surrounding environment. Throughout the University we are focused on improving institutional practices to increase efficiency and reduce our environmental footprint. Our activities are designed to promote health, productivity and safety of the community by enhancing diversity and health of local ecosystems. The highlight of Harvard's grounds and landscaping program is our organic landscaping program.

Credit
Landscape Management
Biodiversity

Landscape Management

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution’s grounds include areas that are managed at one or more of the following levels:

1) Managed in accordance with an Integrated Pest Management (IPM) Plan

2) Managed in accordance with a sustainable landscape management program

And/or

3) Organic, certified and/or protected

The level at which an area of grounds is managed may be determined as outlined in the table below:

Management Level	Standards and/or Certifications Required
1) IPM Plan	IPM plan calls for: • Using least-toxic chemical pesticides, • Minimum use of chemicals, and • Use of chemicals only in targeted locations and only for targeted species

2) Sustainable Landscape Management Program	The program includes formally adopted guidelines, policies and/or practices that cover all of the following: • Integrated pest management (see above) • Plant stewardship - protecting and using existing vegetation (e.g. through the use of a tree care plan), using native and ecologically appropriate plants, and controlling and managing invasive species • Soil stewardship - organic soils management practices that restore and/or maintain a natural nutrient cycle and limit the use of inorganic fertilizers and chemicals • Use of environmentally preferable materials - utilizing reused, recycled and local and sustainably produced landscape materials • Hydrology and water use - restoring and/or maintaining the integrity of the natural hydrology by promoting water infiltration, minimizing or eliminating the use of potable water for irrigation, and protecting/restoring riparian, wetland, and shoreline habitats and lost streams • Materials management and waste minimization - composting and/or mulching waste from groundskeeping, including grass trimmings • Snow and ice management (if applicable) - implementing technologies or strategies to reduce the environmental impacts of snow and ice removal
3) Organic, Certified and/or Protected	Protected areas and land that is: • Maintained in accordance with an organic land care standard or sustainable landscape management program that has eliminated the use of inorganic fertilizers and chemical pesticides, fungicides and herbicides in favor of ecologically preferable materials • Certified Organic • Certified under the Forest Stewardship Council (FSC) Forest Management standard • Certified under the Sustainable Sites Initiative™ (SITES™) and/or • Managed specifically for carbon sequestration (as documented in policies, land management plans or the equivalent)

Land that meets multiple criteria should not be double-counted. An area of grounds that does not meet the standards specified for a particular management level should be reported at the next appropriate level for which it does meet the standards. For example, a landscape management program that includes an IPM plan and meets some, but not all, of the other standards listed for a sustainable landscape management plan should be reported at level 1 (IPM Plan).

Submission Note:

We need further guidance on how to treat research arboretum and managed research forests. For the purposes of reporting above, Harvard's two protected areas were not included in the landscaped areas because of lack of clarity. This submission covers all acreage on campus managed by Harvard Campus Services and vendors on Harvard's Cambridge, Boston and Allston campuses.

"---" *indicates that no data was submitted for this field*

Figures required to calculate the total area of managed grounds::

	Area
Total campus area	580 *Acres*
Footprint of the institution's buildings	403 *Acres*
Area of undeveloped land, excluding any protected areas	0 *Acres*

Area of managed grounds that is::

	Area
Managed in accordance with an Integrated Pest Management (IPM) Plan	0 *Acres*
Managed in accordance with a sustainable landscape management program that includes an IPM plan and otherwise meets the criteria outlined	84 *Acres*
Managed organically, third party certified and/or protected	93 *Acres*

A copy of the IPM plan:

The IPM plan :

Harvard Campus Services manages campus grounds with a fully organic landscaping program that uses zero herbicides, pesticides, or chemicals and creates compost tea as a fertilizer to promote healthy grass and grounds. All other landscaping vendors have agreed to provide services that meet the standards of the Campus Services organic program.

1. Identify pest and moisture stressed before treatment.
2. Formulate grass seed mixtures for different environmental conditions.
3. Utilize only organic products
4. Work with designers to place plant material in appropriate environments.

5. Monitor irrigation usage by core sampling soils and manually adjusting in response to environmental changes.

In the first year of use on Harvard Yard, the use of organic practices reduced the need for irrigation by 30%, or over 2,000,000 gallons per year, in part due to the development of deeper root growth permitting less frequent watering.

A brief summary of the institution’s approach to sustainable landscape management:

Harvard has a goal to maintain at least 75% of the University's landscaped areas with a an organic landscaping program by 2020 (includes all land, including protected areas) and has committed to developing Sustainable Landscaping Standards that all vendors must comply with. Currently, Harvard Campus Services manages the majority of campus grounds with a fully organic landscaping program that uses zero herbicides, pesticides, or chemicals and creates compost tea as a fertilizer to promote healthy grass and grounds. All other landscaping vendors are already providing or have agreed to provide services that meet the standards of the Campus Services organic program.

1. Identify pest and moisture stressed before treatment.
2. Formulate grass seed mixtures for different environmental conditions.
3. Utilize only organic products
4. Work with designers to place plant material in appropriate environments.
5. Monitor irrigation usage by core sampling soils and manually adjusting in response to environmental changes.

In the first year of use on Harvard Yard, the use of organic practices reduced the need for irrigation by 30%, or over 2,000,000 gallons per year, in part due to the development of deeper root growth permitting less frequent watering.

A brief description of how the institution protects and uses existing vegetation, uses native and ecologically appropriate plants, and controls and manages invasive species:

Designers use this practice when designing new landscapes. Replacement plants are prioritized for native planting. The new quad for instance is entirely native plants and all new plants will be native.

At the LEED Platinum 46 Blackstone Street, an irrigation free, organic landscape was developed in a courtyard that was previously a parking lot. Primarily composed of ornamental grasses that are designed to grow roughly six inches to a foot in height, this area provides a home for a family of rabbits who appear to prefer the tall grasses for both food and shelter.

According to Harvard Landscape and Business Support Manager Wayne Carbone, the maintenance plan "includes mowing these areas three to four times annually, followed each time by an application of nutrient rich compost tea." The mowing helps to "reduce the tendency of the grass to go to seed while encouraging deeper root growth, thus minimizing the need for watering", an important trait for landscapes designed to survive without irrigation.

A brief description of the institution’s landscape materials management and waste minimization policies and practices:

1. All landscape waste is composted and reapplied to the landscape system in forms or compost teas, compost, loam and mulch
2. When possible the landscape group mulch mows the turf areas.

A brief description of the institution’s organic soils management practices:

Restoring and maintaining the natural nutrient cycling system is the heart of any organic landscape program. The benefits of this approach include improved nutrient and moisture availability and retention, disease suppression, aeration, and degradation of harmful pollutants achieved through non-chemical or synthetic methods.

Nutrient Retention: beneficial organisms keep valuable nutrients in the proper root zone. Bacteria and fungi also prevent leaching; a process that removes nitrogen and other nutrients from the soil. Preventing this material from contaminating the water table is another important benefit.

Nutrient Availability: the symbiotic relationship between fungi and roots helps plants filter needed micronutrients from the soil. Protozoa feed on bacteria and fungi, excreting nitrogen in a form easily absorbed by plants. An organic program focuses on building up the components needed to optimize nitrogen and nutrient cycling.

Moisture Retention: organic matter retains water in the root zone long enough to be taken up by plants, dramatically reducing overall water use. Irrigation needs were reduced by 33% on our organic test plots in 2008.

Pest and Disease Control: beneficial nematodes and fungi protect the roots of plants from potentially harmful organisms always present in the soil.

Aeration: organisms aerate and give structure to the soil by creating air holes and drain pockets. This process reduces compaction and maximizes water availability to the root zone.

Degradation of Pollutants: properly managed soil includes organisms that consume a wide-range of pollutants across a variety of environmental conditions.

A brief description of the institution’s use of environmentally preferable materials in landscaping and grounds management:

Choosing the proper plants and placing them in optimum areas is vital to building a sustainable landscape. Plants need good soils and adequate natural sunlight to flourish. They also need a spot where their natural size and shape will be uninhibited. Considerations of plant size, color, and suitability to the surroundings should include anticipated interaction with people as well as existing and future plants

Proper pruning and installation of any landscape is essential. The following are a few techniques for ensuring the landscape gets a good start.

A comprehensive soil analysis is needed to determine the baseline biological requirements.
Plants should always be transported and handled carefully to avoid damage.

Plants should be installed following the American National Standard for transplanting of trees, also known as ANSI A300.

Careful pruning of inner and outer foliage encourages a natural growth pattern, increases photosynthesis, enhances the health of the plant, and reduces wind resistance.

A brief description of how the institution restores and/or maintains the integrity of the natural hydrology of the campus:

Organic matter retains water in the root zone long enough to be taken up by plants, dramatically reducing overall water use. Irrigation needs were reduced by 33% on our organic test plots in 2008.

A brief description of how the institution reduces the environmental impacts of snow and ice removal (if applicable):

Harvard prioritizes strategies to reduce environmental impact of snow and ice removal including:
1. Purchase equipment to minimize over spray of ice melt products.
2.Utilize ice melt products less impactful to plant material.
3. No salt and reduced use of ice melt chemicals.
4. Divinity School uses KCl (potassium chloride). Clean walkways of deicers when possible.
4. Green Building Tip dedicated to deicing:

http://createsend.com/t/y-00698B8D8AF60228

A brief description of any certified and/or protected areas:

We need further guidance on how to treat research Arboretum and managed research forests. For the purposes of reporting above, Harvard's two protected areas were not included in the landscaped areas because of lack of clarity. This submission covers all acreage on campus managed by Harvard Campus Services and vendors on Harvard's Cambridge, Boston and Allston campuses.

Harvard has two protected areas:

Harvard Arnold Arboretum: Established in 1872 and planned and designed in collaboration with Frederick Law Olmsted, the Arnold Arboretum is a National Historic Landmark and one of the best preserved of Olmsted's landscapes. Founded as a public-private partnership between the City of Boston and Harvard University, the Arnold Arboretum is a unique blend of respected research institution and beloved public park in Boston's Emerald Necklace.
Occupying 281 acres, the Arboretum's living collection of trees, shrubs, and woody vines is recognized as one of the most comprehensive and best documented of its kind in the world. The living collection is supported by comprehensive curatorial documentation, herbaria containing more than 1.3 million specimens, extensive library and archival holdings, and a 43,000-square-foot state-of-the-art research center. These facilities and holdings, along with 75 full-time staff, provide the basis for research and education by Harvard faculty and students. It's free and open to the public.

Harvard Forest: From a center comprised of 3,750 acres of land, research facilities, and the Fisher Museum, the scientists, students, and collaborators at the Forest explore topics ranging from conservation and environmental change to land-use history and the ways in which physical, biological and human systems interact to change our earth.■

Since 1988, the Harvard Forest has been a Long-Term Ecological Research Site, funded by the National Science Foundation to conduct integrated, long-term studies of forest dynamics. Since 2011, the Harvard Forest has been the Northeast Core site for the National Ecological Observatory Network.

Is the institution recognized by the Arbor Day Foundation's Tree Campus USA program (if applicable)?:

No

The website URL where information about the institution’s sustainable landscape management programs and practices is available:

http://www.energyandfacilities.harvard.edu/facilities-services/landscape-maintenance

Biodiversity

Criteria

The institution conducts one or both of the following:

- An assessment to identify endangered and vulnerable species (including migratory species) with habitats on institution-owned or -managed land

  And/or

- An assessment to identify environmentally sensitive areas on institution-owned or -managed land

The institution has plans or programs in place to protect or positively affect the species, habitats and/or environmentally sensitive areas identified.

Assessments conducted and programs adopted by other entities (e.g. government, university system, NGO) may count for this credit as long as the assessments and programs apply to and are followed by the institution.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Purchasing

This subcategory seeks to recognize institutions that are using their purchasing power to help build a sustainable economy. Collectively, colleges and universities spend many billions of dollars on goods and services annually. Each purchasing decision represents an opportunity for institutions to choose environmentally and socially preferable products and services and support companies with strong commitments to sustainability.

Credit
Electronics Purchasing
Cleaning Products Purchasing
Office Paper Purchasing
Inclusive and Local Purchasing
Life Cycle Cost Analysis
Guidelines for Business Partners

Electronics Purchasing

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has an institution-wide stated preference to purchase computers and/or other electronic products that are EPEAT registered or meet similar multi-criteria sustainability standards for electronic products. This can take the form of purchasing policies, guidelines, or directives.

Policies and directives adopted by entities of which the institution is part (e.g. government or university system) may count for this credit as long as the policies apply to and are followed by the institution.

Part 2

Institution purchases EPEAT registered products for desktop and notebook/laptop computers, displays, thin clients, televisions and imaging equipment.

This credit does not include servers, mobile devices such as tablets and smartphones, or specialized equipment for which no EPEAT certified products are available.

Submission Note:

This data represents purchasing data from Harvard University Information Technology.

"---" *indicates that no data was submitted for this field*

Does the institution have an institution-wide stated preference to purchase computers and/or other electronic products that are EPEAT registered or meet similar multi-criteria sustainability standards for electronic products?:

Yes

A copy of the electronics purchasing policy, directive, or guidelines:

The electronics purchasing policy, directive, or guidelines :

The Harvard Sustainable Purchasing Guidelines include a clearly stated preference for purchasing EPEAT certified electronics products.

A brief description of steps the institution has taken to ensure that the purchasing policy, directives, or guidelines are followed:

Personal computers and laptops available for purchase by departments and indviduals through Harvard preferred vendor contracts are ENERGY STAR and EPEAT Gold or Silver rated.

Does the institution wish to pursue to pursue Part 2 of this credit (expenditures on EPEAT registered electronics)?:

Yes

Expenditures on EPEAT registered desktop and laptop computers, displays, thin clients, televisions, and imaging equipment::

	Expenditure Per Level
EPEAT Bronze	0 *US/Canadian $*
EPEAT Silver	129,505 *US/Canadian $*
EPEAT Gold	10,817,832 *US/Canadian $*

Total expenditures on desktop and laptop computers, displays, thin clients, televisions, and imaging equipment:

10,947,337 *US/Canadian $*

The website URL where information about the institution's electronics purchasing policy, directive, or guidelines is available:

http://green.harvard.edu/topics/it

Cleaning Products Purchasing

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has an institution-wide stated preference to purchase cleaning and janitorial products that are Green Seal™ or UL Environment (EcoLogo)™ certified and/or meet similar multi-criteria sustainability standards for cleaning and janitorial products. This can take the form of purchasing policies, guidelines, or directives.

Policies and directives adopted by entities of which the institution is part (e.g. government or the university system) may count for this credit as long as the policies apply to and are followed by the institution.

Part 2

Institution's main cleaning or housekeeping department(s) and/or contractor(s) purchase Green Seal or UL Environment (EcoLogo) certified cleaning and janitorial products.

Cleaning and janitorial products include, at minimum:

- Cleaning/degreasing agents
- General-purpose, bathroom, glass, and carpet cleaners
- Biologically-active cleaning products (enzymatic and microbial products)
- Floor-care products, e.g. floor finish and floor finish strippers
- Hand cleaners
- Sanitary paper products, e.g. toilet tissue, facial tissue, paper towels, napkins, and placemats
- Plastic film products (e.g. garbage bags/liners)
- Laundry care products including powder, liquid or pre-measured dosage laundry detergents, stain removers and dryer sheets
- Specialty surface cleaning products and odor removers, including but not limited to: boat cleaning products; deck and outdoor furniture cleaning products; graffiti removers; metal cleaning products; motor vehicle (automotive/tire/wheel) cleaning products; motor vehicle windshield washing fluid; optical lens cleaning products; oven cleaning products; upholstery cleaning products; and other cleaning products sold for specific specialty uses

Submission Note:

The majority of the non-certified product is disinfectant or other products for which Green Seal does not have a certification category.

"---" *indicates that no data was submitted for this field*

Does the institution have an institution-wide stated preference to purchase third party certified cleaning and janitorial products?:

Yes

A copy of the green cleaning product purchasing policy, directive, or guidelines:

The green cleaning product purchasing policy, directive, or guidelines:

Harvard Campus Services recognizes Green Seal™, the EPA's Design for the Environment, Environmental Choice's EcoLogo and the European Union's Ecolabel for its green cleaning products. In March of 2011, Harvard FMO Custodial Services became Green Seal™ (GS-42) certified. Green Seal™ is a non-profit organization that certifies products and services which meet rigorous environmental safety standards. Supervisors can only order from an order sheet that has environmentally preferred products listed. If any other product is requested, approval is required by the Operations Manger or Associate Director. Suppliers are not permitted to sell any of these products without such approval.

A brief description of steps the institution has taken to ensure that the purchasing policy, directives, or guidelines are followed:

Harvard Campus Services recognizes Green Seal™, the EPA's Design for the Environment, Environmental Choice's EcoLogo and the European Union's Ecolabel for its green cleaning products.

In March of 2011, Harvard FMO Custodial Services became Green Seal™ (GS-42) certified. Green Seal™ is a non-profit organization that certifies products and services which meet rigorous environmental safety standards

Supervisors can only order from an order sheet that has environmentally preferred products listed. If any other product is requested, approval is required by the Operations Manger or Associate Director. Suppliers are not permitted to sell any of these products without such approval.

Does the institution wish to pursue Part 2 of this credit (expenditures on cleaning and janitorial products)?:

Yes

Expenditures on Green Seal and/or UL Environment (EcoLogo) certified cleaning and janitorial products:

1,100,000 *US/Canadian $*

Total expenditures on cleaning and janitorial products:

1,320,000 *US/Canadian $*

Has the institution's main cleaning or housekeeping department(s) and/or contractor(s) adopted a Green Seal or ISSA certified low-impact, ecological ("green") cleaning program?:

Yes

A brief description of the institution's low-impact, ecological cleaning program:

Harvard Campus Services -- Harvard's in-house cleaning department -- recognizes Green Seal™, the EPA's Design for the Environment, Environmental Choice's EcoLogo and the European Union's Ecolabel for its green cleaning products. In March of 2011, Harvard FMO Custodial Services became Green Seal™ (GS-42) certified. Green Seal™ is a non-profit organization that certifies products and services which meet rigorous environmental safety standards. Supervisors can only order from an order sheet that has environmentally preferred products listed. If any other product is requested, approval is required by the Operations Manger or Associate Director. Suppliers are not permitted to sell any of these products without such approval.

A copy of the sections of the cleaning contract(s) that reference certified green products:

The sections of the cleaning contract(s) that reference certified green products:

Harvard's primary cleaning department is in-house so there's no contract to reference. Harvard Campus Services recognizes Green Seal™, the EPA's Design for the Environment, Environmental Choice's EcoLogo and the European Union's Ecolabel for its green cleaning products. In March of 2011, Harvard FMO Custodial Services became Green Seal™ (GS-42) certified. Green Seal™ is a non-profit organization that certifies products and services which meet rigorous environmental safety standards. Supervisors can only order from an order sheet that has environmentally preferred products listed. If any other product is requested, approval is required by the Operations Manger or Associate Director. Suppliers are not permitted to sell any of these products without such approval.

The website URL where information about the institution's green cleaning initiatives is available:

http://www.energyandfacilities.harvard.edu/facilities-services/custodial-cleaning

Office Paper Purchasing

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has an institution-wide stated preference to purchase office paper that has recycled content, is certified by the Forest Stewardship Council (FSC), and/or is certified to meet similar multi-criteria sustainability standards for paper. This can take the form of purchasing policies, guidelines, or directives.

Policies and directives adopted by entities of which the institution is part (e.g. government or the university system) may count for this credit as long as the policies apply to and are followed by the institution.

Part 2

Institution purchases office paper with post-consumer recycled, agricultural residue, and/or FSC certified content.

Submission Note:

Data is reported by Harvard Strategic Procurement and represents purchasing from Harvard's preferred office supply vendor.

"---" *indicates that no data was submitted for this field*

Does the institution have an institution-wide stated preference to purchase office paper that has recycled content and/or is certified to meet multi-criteria sustainability standards for paper?:

Yes

A copy of the paper purchasing policy, directive or guidelines:

The paper purchasing policy, directive or guidelines:

According to Harvard's Sustainable Purchasing Guidelines: Post consumer recycled content should be maximized in purchased products whenever possible. Thirty percent post consumer waste recycled paper should be used for all applications, as appropriate. Buy recycled content office products (as marked) with special attention to recycled ink and toner cartridges. 30% Post Consumer Recycled office paper under the current office supply agreement is priced the same as virgin fiber office paper. Some Schools including Harvard Business School and Divinity School have a specific policy to purchase at least 30% recycled paper for all paper purchases.

A brief description of steps the institution has taken to ensure that the purchasing policy, directives, or guidelines are followed :

Post consumer recycled content should be maximized in purchased products whenever possible. Thirty percent post consumer waste recycled paper should be used for all applications, as appropriate. Buy recycled content office products (as marked) with special attention to recycled ink and toner cartridges. 30% Post Consumer Recycled office paper under the current office supply agreement is priced competitvely verses virgin fiber office paper.

Does the institution wish to pursue Part 2 of this credit (expenditures on office paper)?:

Yes

Expenditures on office paper with the following levels of post-consumer recycled, agricultural residue, and/or FSC certified content::

	Expenditure Per Level
10-29 percent	1,034 *US/Canadian $*
30-49 percent	256,953 *US/Canadian $*
50-69 percent	75,114 *US/Canadian $*
70-89 percent (or FSC Mix label)	40 *US/Canadian $*
90-100 percent (or FSC Recycled label)	81,645 *US/Canadian $*

Total expenditures on office paper :

675,679 *US/Canadian $*

The website URL where information about the paper purchasing policy, directive, or guidelines is available:

http://www.procurement.harvard.edu/secure/pdf/sustainable_purchasing_guidelines.pdf

Inclusive and Local Purchasing

Criteria

Part 1

Institution has an institution-wide stated intent to support disadvantaged businesses, social enterprises, and/or local community-based businesses.

Support could take the form of giving preference during RFP processes, conducting targeted outreach to these businesses about opportunities to work with the institution, and/or other efforts to increase purchases made from such businesses.

Part 2

Institution makes purchases from companies that include disadvantaged businesses, social enterprises and/or local community-based businesses.

Purchases that meet multiple criteria listed above should not be double counted. Food and beverage purchases, which are covered by *OP 6: Food and Beverage Purchasing* and *OP 7: Low Impact Dining*, are not included in this credit.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Life Cycle Cost Analysis

Criteria

Institution employs Life Cycle Cost Analysis (LCCA) as a matter of policy and practice when evaluating energy- and water-using products and systems. Practices may include structuring RFPs so that vendors compete on the basis of lowest total cost of ownership (TCO) in addition to (or instead of) purchase price.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Guidelines for Business Partners

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has and acts on policies, guidelines and/or agreements that set expectations about the social and environmental responsibility of its business partners. The policies, guidelines and/or agreements require new and/or existing vendors and contractors and/or franchisees to adhere to:

1) Minimum environmental standards and practices defined by the institution, for example as outlined by the institution’s sustainability policies

And/or

2) Minimum standards and practices governing employee wages, benefits, working conditions and rights that are consistent with fundamental International Labor Organization (ILO) conventions.

All enterprises with employees on-site as part of regular campus operations (e.g. contractors and franchisees) and other standing and/or formal business relationships (e.g. regular vendors and contracted services) are included.

Businesses that produce and/or sell licensed articles bearing the institution’s trademarked logo (“licensees”) are not included. They are covered in *EN 15: Trademark Licensing*.

The credit acknowledges institutional engagement in selecting its business partners and guiding them toward sustainability. Policies, guidelines or practices of the businesses themselves do not count for this credit in the absence of institutional selection criteria and/or guidance. Requiring compliance with existing legislation does not count on its own, but may be included as part of broader requirements that meet the criteria outlined above.

Policies adopted by entities of which the institution is part (e.g. government or university system) may count for this credit as long as the policies apply to and are followed by the institution.

"---" *indicates that no data was submitted for this field*

How many of the institution’s business partners are covered by policies, guidelines and/or agreements that require adherence to minimum environmental standards?:

All

How many of the institution’s business partners are covered by policies, guidelines and/or agreements that require adherence to minimum standards governing employee wages, benefits, working conditions and rights?:

All

A copy of the policies, guidelines, and/or agreements with the institution's business partners (or a representative sample):

The policies, guidelines, and/or agreements with the institution's business partners (or a representative sample):

Vendors that sign on to a University-wide Master agreement must agree to the following clause regarding social/environmental responsibility: “Environmentally Preferable Purchasing. If germane to the transaction herein contemplated, Customer and Vendor shall work jointly to develop and implement programs for Harvard that support EPP (as defined hereafter). “EPP” is defined as the practice of buying products and/or services that have a lesser or reduced impact on the environment and human health, when compared to competing products or services that serve the same purpose. To this end, Vendor shall: (i) provide an extensive selection of green products and ensure that products offered meet the appropriate criteria and (ii) work with Customer, on behalf of Harvard, to identify new green products as they become available and to actively market those products to Customer, on behalf of Harvard.”

A brief description of programs and strategies institution has implemented to ensure that the guidelines are followed, including a brief description of instances when the guidelines have changed purchasing behavior, if applicable:

Vendors that sign on to a University-wide Master agreement must agree to the following clause regarding social/environmental responsibility: “Environmentally Preferable Purchasing. If germane to the transaction herein contemplated, Customer and Vendor shall work jointly to develop and implement programs for Harvard that support EPP (as defined hereafter). “EPP” is defined as the practice of buying products and/or services that have a lesser or reduced impact on the environment and human health, when compared to competing products or services that serve the same purpose. To this end, Vendor shall: (i) provide an extensive selection of green products and ensure that products offered meet the appropriate criteria and (ii) work with Customer, on behalf of Harvard, to identify new green products as they become available and to actively market those products to Customer, on behalf of Harvard.”

The website URL where information about the institution’s guidelines for its business partners is available:

http://www.procurement.harvard.edu/

Transportation

This subcategory seeks to recognize institutions that are moving toward sustainable transportation systems. Transportation is a major source of greenhouse gas emissions and other pollutants that contribute to health problems such as heart and respiratory diseases and cancer. Due to disproportionate exposure, these health impacts are frequently more pronounced in low-income communities next to major transportation corridors. In addition, the extraction, production, and global distribution of fuels for transportation can damage environmentally and/or culturally significant ecosystems and may financially benefit hostile and/or oppressive governments.

At the same time, campuses can reap benefits from modeling sustainable transportation systems. Bicycling and walking provide human health benefits and mitigate the need for large areas of paved surface, which can help campuses to better manage storm water. Institutions may realize cost savings and help support local economies by reducing their dependency on petroleum-based fuels for transportation.

From the institution:

Harvard is committed to providing our students, staff and faculty with opportunities to travel to and between campuses as efficiently as possible. Providing alternatives to driving is not just about reducing greenhouse gas emissions and our impact on the environment, it’s also about promoting healthier travel options. The CommuterChoice Program (Cambridge/Allston) and MASCO (Longwood) provide employees with benefits and programs that encourage transit use, bicycling, walking and carpooling.

Credit
Campus Fleet
Student Commute Modal Split
Employee Commute Modal Split
Support for Sustainable Transportation

Campus Fleet

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution supports alternative fuel and power technology by including in its motorized vehicle fleet vehicles that are:

A. Gasoline-electric hybrid

B. Diesel-electric hybrid

C. Plug-in hybrid

D. 100 percent electric

E. Fueled with Compressed Natural Gas (CNG)

F. Hydrogen fueled

G. Fueled with B20 or higher biofuel for more than 4 months of the year

And/or

H. Fueled with locally produced, low-level (e.g. B5) biofuel for more than 4 months of the year (e.g. fuel contains cooking oil recovered and recycled on campus or in the local community)

For this credit, the institution’s motorized fleet includes all cars, carts, trucks, tractors, buses and similar vehicles used for transporting people and/or goods, including both leased vehicles and vehicles that are institution-owned and operated. Heavy construction equipment (e.g. excavators and pavers), maintenance equipment (e.g. lawn-mowers and leaf blowers), and demonstration/test vehicles used for educational purposes are not included in this credit.

Vehicles that meet multiple criteria (e.g. hybrid vehicles fueled with biofuel) should not be double-counted.

"---" *indicates that no data was submitted for this field*

Total number of vehicles in the institution’s fleet :

256

Number of vehicles in the institution's fleet that are::

	Number of Vehicles

Gasoline-electric, non-plug-in hybrid	11
Diesel-electric, non-plug-in hybrid	0
Plug-in hybrid	0
100 percent electric	7
Fueled with compressed natural gas (CNG)	0
Hydrogen fueled	0
Fueled with B20 or higher biofuel for more than 4 months of the year	92
Fueled with locally produced, low-level (e.g. B5) biofuel for more than 4 months of the year	0

A brief description of the institution’s efforts to support alternative fuel and power technology in its motorized fleet:

The Harvard Sustainability Plan sets a commitment to develop a University-wide plan by 2016 for reducing campus fleet and shuttle emissions, including the ongoing purchase and support of alternative fuel and power technology for its fleet.

Harvard continues to explore innovative power technology. See this example of Harvard Mail Services working with a local start-up to convert a van to a hybrid electric powertrain:

http://green.harvard.edu/news/your-mail-just-got-little-bit-greener

In 2013, Harvard University Police Department converted their entire fleet of marked police cars to hybrids:

http://news.harvard.edu/gazette/story/2013/04/conservations-siren-song/

The website URL where information about the institution's support for alternative fuel and power technology is available:

http://www.transportation.harvard.edu/fleet-management

Student Commute Modal Split

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution's students commute to and from campus using more sustainable commuting options such as walking, bicycling, vanpooling or carpooling, taking public transportation, riding motorcycles or scooters, riding a campus shuttle, or a combination of these options.

Students who live on campus should be included in the calculation based on how they get to and from their classes.

"---" *indicates that no data was submitted for this field*

Total percentage of students that use more sustainable commuting options:

99

The percentage of students that use each of the following modes as their primary means of transportation to get to and from campus::

	Percentage (0-100)
Commute with only the driver in the vehicle (excluding motorcycles and scooters)	1
Walk, bicycle, or use other non-motorized means	99
Vanpool or carpool	1
Take a campus shuttle or public transportation	99
Use a motorcycle, scooter or moped	1

A brief description of the method(s) used to gather data about student commuting:

The data in this answer is based on our undergraduate population. Harvard is an urban campus and 99% of undergraduates live on campus and don't commute. For those that live on campus we do not track student commuting trends, however due to the density of our urban campus 99% of our students take shuttles, walk, or bike to class. There is no comprehensive survey of commuting trends that covers all graduate students.

The website URL where information about sustainable transportation for students is available:

http://www.commuterchoice.harvard.edu/

Employee Commute Modal Split

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution's employees (faculty, staff, and administrators) get to and from campus using more sustainable commuting options such as walking, bicycling, vanpooling or carpooling, taking public transportation, riding motorcycles or scooters, riding a campus shuttle, telecommuting, or a combination of these options.

Employees who live on campus should be included in the calculation based on how they get to and from their workplace.

Submission Note:

Note the data above covers employee and graduate student commute data for Harvard's primary Cambridge and Allston campuses for 2014 (the last year reported).

"---" *indicates that no data was submitted for this field*

Total percentage of the institution’s employees that use more sustainable commuting options:

87.30

The percentage of the institution's employees that use each of the following modes as their primary means of transportation to and from campus::

	Percentage (0-100)
Commute with only the driver in the vehicle (excluding motorcycles and scooters)	12.70
Walk, bicycle, or use other non-motorized means	40.10
Vanpool or carpool	3
Take a campus shuttle or public transportation	40.50

Use a motorcycle, scooter or moped	0
Telecommute for 50 percent or more of their regular work hours	3.40

A brief description of the method(s) used to gather data about employee commuting:

Stratified random sample survey

The website URL where information about sustainable transportation for employees is available:

http://www.commuterchoice.harvard.edu/

Support for Sustainable Transportation

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

The institution demonstrates its support for active (i.e. non-motorized) transportation on campus in one or more of the following ways:

Option A: Institution:

- Provides secure bicycle storage (not including office space), shower facilities, and lockers for bicycle commuters. The storage, shower facilities and lockers are co-located in at least one building/location that is accessible to all commuters.
- Provides short-term bicycle parking (e.g. racks) within 50 ft (15 m) of all occupied, non-residential buildings and makes long-term bicycle storage available within 330 ft (100 m) of all residence halls (if applicable).
- Has a “complete streets” or bicycle accommodation policy (or adheres to a local community policy) and/or has a continuous network of dedicated bicycle and pedestrian paths and lanes that connects all occupied buildings and at least one inter-modal transportation node (i.e. transit stop or station)

And/or

- Has a bicycle-sharing program or participates in a local bicycle-sharing program

Option B: Institution is certified as a Bicycle Friendly University (at any level) by the League of American Bicyclists (U.S.) or under a similar third party certification for non-motorized transportation.

Part 2

Institution has implemented one or more of the following strategies to encourage more sustainable modes of transportation and reduce the impact of student and employee commuting. The institution:

- Offers free or reduced price transit passes and/or operates a free campus shuttle for commuters. The transit passes may be offered by the institution itself, through the larger university system of which the institution is a part, or through a regional program provided by a government agency.
- Offers a guaranteed return trip (GRT) program to regular users of alternative modes of transportation
- Participates in a car/vanpool or ride sharing program and/or offers reduced parking fees or preferential parking for car/vanpoolers
- Participates in a car sharing program, such as a commercial car-sharing program, one administered by the institution, or one administered by a regional organization
- Has one or more Level 2 or Level 3 electric vehicle recharging stations that are accessible to student and employee commuters
- Offers a telecommuting program for employees, either as a matter of policy or as standard practice
- Offers a condensed work week option for employees, either as a matter of policy or as standard practice
- Has incentives or programs to encourage employees to live close to campus

- Other strategies

"---" *indicates that no data was submitted for this field*

Does the institution provide secure bicycle storage (not including office space), shower facilities, and lockers for bicycle commuters?:

Yes

A brief description of the facilities for bicycle commuters:

The University has designated areas for indoor bike storage, showers and lockers including covered bike parking and secure bike shelters. All general athletic facilities are open for use by any employee or student for a nominal fee.

Does the institution provide short-term bicycle parking (e.g. racks) within 50 ft (15 m) of all occupied, non-residential buildings and make long-term bicycle storage available within 330 ft (100 m) of all residence halls (if applicable)?:

Yes

A brief description of the bicycle parking and storage facilities:

Bicycle parking and storage is provided at a majority of non-residential buildings.

Does the institution have a “complete streets” or bicycle accommodation policy (or adhere to a local community policy) and/or have a continuous network of dedicated bicycle and pedestrian paths and lanes?:

Yes

A brief description of the bicycle/pedestrian policy and/or network:

The bicycle and pedestrian network at Harvard University includes many local streets and paths under local and state jurisdiction. Within that context, Harvard adheres to the complete streets guidelines of the appropriate jurisdiction, including the design and implementation of new bike facilities on public ways and within the campus environment as part of University-sponsored projects. On campus, existing the existing bike network is organized to respect important pedestrian zones, while providing connectivity between designated bike parking areas and adjacent public bike networks.

Does the institution have a bicycle-sharing program or participate in a local bicycle-sharing program?:

Yes

A brief description of the bicycle sharing program:

Harvard is a major sponsor of the Boston-area Hubway bike share system which includes over 2,000 bicycles. Harvard sponsors 12 stations on its Cambridge, Allston and Longwood campuses and provides a discount on membership to all Harvard affiliates. In 2014, Harvard employee and student Hubway bike share members took over 100,000 trips, riding over 130,000 miles. Harvard provides all affiliates with discounted membership.

Harvard students and staff also manage four campus-based bicycle share programs: Crimson Bikes, HLS Read and Ride Bikeshare which was encorporated into Crimson Bikes this year, the Harvard Positive Spin and the CommuterChoice departmental bike share system which allows faculty, staff and students to check out bikes throughout the day.

The Crimson Bikes bike share program provides three bike stations full of over 30 bikes to students and staff throughout campus. The Harvard Law School Read and Ride Bike Share program provides four bikes to the community for sharing. Lastly, the Departmental Bike program run by Commuter Choice provides bikes to departments for sharing. This includes over 30 bikes.

Is the institution certified as a Bicycle Friendly University by the League of American Bicyclists (U.S.) or under a similar third party certification covering non-motorized transportation?:

Yes

A brief description of the certification, including date certified and level:

In 2014, Harvard was named as a Gold Level certified Bicycle Friendly University, the highest ranking University in New England and the Ivy League. This follows a Silver level certification in 2013.

http://green.harvard.edu/news/harvard-community-pedals-its-way-gold

Does the institution offer free or reduced price transit passes and/or operate a free campus shuttle for commuters?:

Yes

A brief description of the mass transit program(s), (s), including availability, participation levels, and specifics about discounts or subsidies offered (including pre-tax options):

Faculty and staff are eligible for a 50% subsidy for Massachusetts Bay Transit Authority (MBTA) bus, subway, commuter rail and boat monthly passes. Graduate students may be eligible for an MBTA Semester pass offered through individual schools at a reduced rate. Harvard offers a free shuttle with numerous vehicles and routes throughout our campuses. Real time shuttle trackers can be accessed at

shuttle.harvard.edu

Does the institution offer a guaranteed return trip (GRT) program to regular users of alternative modes of transportation?:

Yes

A brief description of the GRT program:

Yes. An Emergency Ride Home program is offered through MassRides to all benefits eligible employees that use alternative transportation.

Does the institution participate in a car/vanpool or ride sharing program and/or offer reduced parking fees or preferential parking for car/vanpoolers?:

Yes

A brief description of the carpool/vanpool program:

Commuters that commute to work with a colleague either four or five days/week can save from 50%-75% on an annual parking permit. Vanpools park free at Harvard and participating employees receive 50% off the cost of their vanpool on a pre-tax basis.

Does the institution participate in a car sharing program, such as a commercial car-sharing program, one administered by the institution, or one administered by a regional organization?:

Yes

A brief description of the car sharing program:

Harvard has 36 Zipcar locations on campus, including 6 new Zipcar One>Way locations. Staff memberships are $25 which include $25 driving credit, student memberships are $15 and include $15 driving credit and departmental accounts offer no cost memberships.

Does the institution have one or more Level 2 or Level 3 electric vehicle recharging stations that are accessible to student and employee commuters?:

Yes

A brief description of the electric vehicle recharging stations:

Harvard University’s Transportation Services Department has installed 26 Level 2 EV charging stations in eleven locations across the campus.

http://green.harvard.edu/tools-resources/green-tip/recharge-harvards-electric-vehicle-charging-

stations

Does the institution offer a telecommuting program for employees as a matter of policy or as standard practice?:

Yes

A brief description of the telecommuting program:

Telecommuting is offered through the Office of Work/Life

Does the institution offer a condensed work week option for employees as a matter of policy or as standard practice?:

Yes

A brief description of the condensed work week program:

Condensed work weeks are offered through the Office of Work/Life

Does the institution have incentives or programs to encourage employees to live close to campus?:

Yes

A brief description of the incentives or programs to encourage employees to live close to campus:

Offered through Harvard University Housing and the Office of Faculty Development and Diversity

Does the institution have other incentives or programs to encourage more sustainable modes of transportation and reduce the impact of student and employee commuting?:

Yes

A brief description of other sustainable transportation initiatives and programs:

Harvard offers a bike commuter benefit that allows bicycle commuters to receive up to $20/month at a maximum of $240/year for the costs associated with bicycle purchase, improvement, repair and storage. The CommuterChoice program also offers discounted bicycle helmets for $10.

The website URL where information about the institution’s sustainable transportation program(s) is available:

http://www.transportation.harvard.edu/commuterchoice

Waste

This subcategory seeks to recognize institutions that are moving toward zero waste by reducing, reusing, recycling, and composting. These actions mitigate the need to extract virgin materials, such as trees and metals. It generally takes less energy and water to make a product with recycled material than with virgin resources. Reducing waste generation also reduces the flow of waste to incinerators and landfills which produce greenhouse gas emissions, can contaminate air and groundwater supplies, and tend to have disproportionate negative impacts on low-income communities. Waste reduction and diversion also save institutions costly landfill and hauling service fees. In addition, waste reduction campaigns can engage the entire campus community in contributing to a tangible sustainability goal.

From the institution:

Harvard's Sustainability Plan includes a goal to reduce waste per capita 50% by 2020 from a 2006 baseline, with the aspirational goal of becoming a zero-waste campus.

Credit
Waste Minimization
Waste Diversion
Construction and Demolition Waste Diversion
Hazardous Waste Management

Waste Minimization

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has implemented source reduction strategies to reduce the total amount of waste generated (materials diverted + materials disposed) per weighted campus user compared to a baseline.

Part 2

Institution's total annual waste generation (materials diverted and disposed) is less than the minimum performance threshold of 0.45 tons (0.41 tonnes) per weighted campus user.

This credit includes on-campus dining services operated by the institution or the institution's primary on-site contractor.

Total waste generation includes all materials that the institution discards, intends to discard or is required to discard (e.g. materials recycled, composted, donated, re-sold and disposed of as trash) except construction, demolition, electronic, hazardous, special (e.g. coal ash), universal and non-regulated chemical waste, which are covered in *OP 24: Construction and Demolition Waste Diversion* and *OP 25: Hazardous Waste Management.*

Submission Note:

NOTE, we do not track exact tonnage of materials reused or donated at this time but in 2013 it was estimated to be nearly 600 tons.

IMPORTANT NOTE FOR CAMPUS USERS DATA:

Due to limitations in data reporting we are not able to access the following breakdown of data for all of Harvard's 12 Schools so we reported full-time employee and student totals.
1. Number of residential students
2. Number of residential employees
3. Number of in-patient hospital beds
4. Full-time equivalent of distance education students

"---" *indicates that no data was submitted for this field*

Waste generated::

	Performance Year	Baseline Year

Materials recycled	4,829 *Tons*	3,734 *Tons*
Materials composted	2,755 *Tons*	3,735 *Tons*
Materials reused, donated or re-sold	413 *Tons*	293 *Tons*
Materials disposed in a solid waste landfill or incinerator	6,847 *Tons*	9,098 *Tons*

Figures needed to determine "Weighted Campus Users”::

	Performance Year	Baseline Year
Number of residential students	0	0
Number of residential employees	0	0
Number of in-patient hospital beds	0	0
Full-time equivalent enrollment	34,254	29,837
Full-time equivalent of employees	16,159	14,555
Full-time equivalent of distance education students	0	0

Start and end dates of the performance year and baseline year (or three-year periods):

	Start Date	End Date
Performance Year	July 1, 2013	June 30, 2014
Baseline Year	July 1, 2005	June 30, 2006

A brief description of when and why the waste generation baseline was adopted:

The waste generation baseline for AASHE was adopted to align with the publicly stated baseline for Harvard's waste reduction goal as stated in the Harvard Sustainability Plan

A brief description of any (non-food) waste audits employed by the institution:

Waste audits are regularly conducted by Harvard Schools and departments in office spaces, dorms and other spaces to assess the composition of materials in the trash. These audits are performed by Harvard Waste and Recycling team in partnership with students and staff. Results are posted publicly and used to inform outreach efforts.

A brief description of any institutional procurement policies designed to prevent waste:

The Harvard Sustainable Purchasing Guidelines have several recommendations to reduce waste during procurement including:

Packaging should be reusable, recyclable or compostable, if possible. Use vendors that eliminate packaging or use the minimum amount necessary for product protection.

Consolidate orders; minimize campus deliveries and transportation distances when possible.

When possible, vendors should be encouraged to remove waste, debris, packaging or used products in the same vehicle with which they are delivering purchased equipment or goods.

A brief description of any surplus department or formal office supplies exchange program that facilitates reuse of materials:

Harvard manages a Recycling and Surplus Center, free to anyone on a first-come, first-served basis that includes surplus furniture, supplies and equipment donated by school departments and offices.

Harvard also organizes Freecycles throughout the year across campus to encourage exchange of unwanted office supplies and surplus materials. In addition, we maintain an online Reuse List where the community can post unwanted items for reuse.

Additionally, in 2013 Harvard launched a Labs Reuse List online for the laboratory community to encourage the trade, reuse, and sharing of working laboratory equipment and supplies for Cambridge, Longwood, and affiliated locations.

In addition, surplus materials are often donated to community and non-profit organizations. In Fiscal Year 2011 alone the surplus program donated over 2.5 million dollars worth of products to over 200 charities. Harvard also partners with the LABBB's "School to Work" vocational training program to train autistic students of high school age to sort, refurbish and re-sell computers, clothing and books.

A brief description of the institution's efforts to make materials available online by default rather than printing them:

The process that Harvard Admissions Office undergoes to evaluate candidates is entirely online.

The Harvard course catalogue is available only online.

The Harvard directory is available entirely online.

As of 2015, the study card system (in which students register for classes) will be entirely online.

In addition, many Harvard departments and offices have eliminated paper processing, moving systems online, including financial departments.

A brief description of any limits on paper and ink consumption employed by the institution:

There is a charge for printing to discourage unnecessary printing at computer labs and in libraries.

Additionally, double siding is set as a default for all public computers

A brief description of any programs employed by the institution to reduce residence hall move-in/move-out waste:

Harvard Recycling, Harvard Housing, and individual Schools/departments provides donation stations in designated areas across campus that allow students and tenants to donate reusable items they don't need anymore during move-out including unwanted furniture and other materials.

The Office for Sustainability manages a centralized move-out reuse website with instructions and an interactive map of all donation station locations. In addition, the peer-to-peer student green living programs run education and outreach campaigns around reuse and reducing waste. This includes a program at Harvard Athletics to reduce waste and reuse stuff during locker room clean-outs.

The donated material is sorted and then the majority is used by Harvard Habitat for Humanity for the annual fall Stuff Sale when they sell the reused stuff back to incoming students, with all proceeds going to their cause.

A brief description of any other (non-food) waste minimization strategies employed by the institution:

A staff member has partnered with our office supply vendor to provide reused interoffice memos rather than buying new ones (there is a prompt that appears when someone tries to buy a new envelope).

The Harvard Surplus Center provides gently used office equipment to offices on campus and community non-profits.

A brief description of any food waste audits employed by the institution:

Waste audits are regularly conducted by Harvard Schools and departments in office spaces, dorms and other spaces to assess the composition of materials in the trash, including food waste. These audits are performed by Harvard Waste and Recycling team in partnership with students and staff. Results are posted publicly and used to inform outreach efforts.

A brief description of any programs and/or practices to track and reduce pre-consumer food waste in the form of kitchen food waste, prep waste and spoilage:

All dining locations have instituted programs to reduce prep waste and food waste, including back of the house composting and donation. The culinary support group cooks large batches of food using fresh ingredients to support all dining hall locations, increasing efficiency.

A brief description of programs and/or practices to track and reduce post-consumer food waste:

Student peer-to-peer "Clean Your Plate" campaigns are organized ever year to discourage food waste and encourage students to take only what they need to eat. These campaigns and other efforts have reduced food waste in undergraduate dining halls by 46% since Spring 2005.

A brief description of the institution's provision of reusable and/or third party certified compostable to-go containers for to-go food and beverage items (in conjunction with a composting program):

There is a reusable to-go container program in place at four retail dining locations across Harvard's campus.

A brief description of the institution's provision of reusable service ware for “dine in” meals and reusable and/or third party certified compostable service ware for to-go meals (in conjunction with a composting program):

Reusable service ware is provided at all undergraduate dining halls and other retail dining locations. Third party compostable service ware for to go meals are also provided at dining and retail facilities across campus as part of the University's composting and waste reduction program. In addition, catering provides third party catering products. Harvard Dining Services has launched a reusable to-go container in several retail dining locations.

A brief description of any discounts offered to customers who use reusable containers (e.g. mugs) instead of disposable or compostable containers in to-go food service operations:

Dining locations across Harvard's campus and Schools provide discounts for use of reusable cups and mugs, the amount varies by location.

In addition, Harvard Dining runs a reusable take-away container program for its retail locations, allowing diners to use a reusable container and bring it back to be washed and reused by Dining Services.

A brief description of other dining services waste minimization programs and initiatives:

DISHWARE AND ECO-FRIENDLY INCENTIVES
Reusable dishware
Recyclable disposables
Compostable disposables
No styrofoam
Reusable mug and water bottle program, with discount for refill in retail operations

FOOD COMPOSTING AND WASTE DIVERSION
All residential dining halls compost pre- and post-consumer waste
Multiple Retail operations compost: Chauhaus, Northwest Cafe, HKS Cafe, Dudley, Cronkhite, CGIS
Annual tonnage of compost (pre- and post-consumer combined): 26,500 pounds of waste weekly, yielding approximately 583 tons annually
Salvageable, perishable food is donated to area food banks

RECYCLING OF TRADITIONAL MATERIALS
Recycle all materials
Percentage of recyclable waste diverted from traditional disposal: 59 %

The website URL where information about the institution’s waste minimization initiatives is available:

http://green.harvard.edu/topics/waste

Waste Diversion

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution diverts materials from the landfill or incinerator by recycling, composting, reusing, donating, or re-selling.

This credit includes on-campus dining services operated by the institution or the institution's primary on-site contractor.

This credit does not include construction, demolition, electronic, hazardous, special (e.g. coal ash), universal and non-regulated chemical waste, which are covered in *OP 24: Construction and Demolition Waste Diversion* and *OP 25: Hazardous Waste Management*.

"---" *indicates that no data was submitted for this field*

Materials diverted from the solid waste landfill or incinerator:

8,174 *Tons*

Materials disposed in a solid waste landfill or incinerator :

6,847 *Tons*

A brief description of programs, policies, infrastructure investments, outreach efforts, and/or other factors that contributed to the diversion rate, including efforts made during the previous three years:

Harvard has a comprehensive waste reduction and reuse initiatives and investments in place throughout the university. Harvard's waste goal is to reduce waste per capita 50% by 2020, from a 2006 baseline, and focus on minimizing, or the responsible and ethical recycling and disposing of, hazardous and electronic materials. These include:
1. Singlestream recycling
2. Front of the house and back of the house composting
3. E-waste program
4. Surplus and reuse programs including annual move-out donation boxes that contribute to the annual Habitat for Humanity Stuff Sale raises over $80,000 annually for the charity.
5. Freecycle and reuse events or stuff swaps throughout the year, including lab-oriented freecycle to promote safe re-use of lab supplies.
6. Online reuse lists
7. Fashion swapaganzas to reuse clothing
8. Reusable container program at several dining locations
9. Bottle filling stations to reduce plastic bottle use
10. Zero waste event activities during major events like Commencement and football games, and for smaller department-level events as well
11. BioGreen 360 in-vessel composter at Harvard Law School

Harvard manages a Recycling and Surplus Center, free to anyone on a first-come, first-served basis that includes surplus furniture, supplies and equipment donated by school departments and offices.

In addition, surplus materials are often donated to community and non-profit organizations. In Fiscal Year 2011 alone the surplus program donated over 2.5 million dollars worth of products to over 200 charities. Harvard also partners with the LABBB's "School to Work" vocational training program to train autistic students of high school age to sort, refurbish and re-sell computers, clothing and books.

A brief description of any food donation programs employed by the institution:

Food collection and donation through Greater Boston Food Bank, Second Helpings, and numerous local food shelters or pantries

A brief description of any pre-consumer food waste composting program employed by the institution:

All Harvard University Dining Services residential locations but one collect pre-and post-consumer compost. All catering pre-consumer waste is composted. 6 of 13 retail locations compost.

In 2012, Harvard Recycling installed a BioGreen 360 in-vessel composter at Harvard Law School. The unit receives 1,000 pounds of food scraps daily and through microbial activity and electric heat, evaporates and breaks down the scraps to about 100 pounds of sterile pellets.

A brief description of any post-consumer food waste composting program employed by the institution:

Harvard has adopted widespread composting practices at all its Schools that extend from landscaping to food waste from dorms, events and office buildings.

In 2014, Harvard students launched a pilot composting program for freshmen undergraduate dorms. The program was conceived of and is managed by students:

http://green.harvard.edu/news/residential-composting-comes-harvard-yard

As a result of the new program food waste in the freshman dorms is down 20%:

http://green.harvard.edu/news/food-waste-down-twenty-percent-yard

School-wide composting collection is in place at Harvard Divinity School, Harvard Law School, Harvard Graduate School of Education and the Harvard School of Public Health. Composting is available in many other locations depending on location and building.

All Harvard University Dining Services residential dining locations but one collect pre-and post-consumer compost. 6 of 13 retail locations compost.

Harvard University Dining Service and other caterers on campus have also installed Somat food pulper systems which grind food scraps, flush them from kitchens and dishrooms, spin out 85% of the water for recycling and deposit the dried pulp into containers for compost collection. This process densifies and de-waters the food scraps, saving water and making compost collection more efficient.

Does the institution include the following materials in its waste diversion efforts?:

	Yes or No
Paper, plastics, glass, metals, and other recyclable containers	Yes
Food donations	Yes
Food for animals	Yes
Food composting	Yes
Cooking oil	Yes
Plant materials composting	Yes
Animal bedding composting	No
Batteries	Yes
Light bulbs	Yes
Toner/ink-jet cartridges	Yes
White goods (i.e. appliances)	Yes
Laboratory equipment	Yes
Furniture	Yes
Residence hall move-in/move-out waste	Yes
Scrap metal	Yes

Pallets	Yes
Motor oil	Yes
Tires	Yes

Other materials that the institution includes in its waste diversion efforts:

Harvard's labs have launched innovative recycling programs targeted at very specific laboratory waste including styrofoam and silver film. This diverts these hard to recycle materials from the landfill.

Harvard Schools and departments have launched Terracycle collection centers throughout campus to recycle and upcycle difficult-to-recycle packaging and products and repurpose the material into affordable, innovative products.

Through Harvard’s preferred vendor, WB Mason, recycling ink and toner cartridges is free! All makes and models of cartridges are accepted. WB Mason picks up the empty toners and send them to a local recycling company that re-purposes the toner.

Construction and Demolition Waste Diversion

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution diverts non-hazardous construction and demolition waste from the landfill and/or incinerator.

Soil and organic debris from excavating or clearing the site do not count for this credit.

"---" *indicates that no data was submitted for this field*

Construction and demolition materials recycled, donated, or otherwise recovered:

49,189 *Tons*

Construction and demolition materials landfilled or incinerated :

3,010 *Tons*

A brief description of programs, policies, infrastructure investments, outreach efforts, and/or other factors that contributed to the diversion rate for construction and demolition waste:

The 2014 Harvard Green Building Standards require all Tier I and Tier II projects on campus (new buildings, major renovations, or tenant fitouts) to meet a 90% diversion rate as calculated via the LEED rating systems. Considering all projects tracked, our university diversion rate is 94.2% since metrics began.

Hazardous Waste Management

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has strategies in place to safely dispose of all hazardous, special (e.g. coal ash), universal, and non-regulated chemical waste and seeks to minimize the presence of these materials on campus.

Part 2

Institution has a program in place to recycle, reuse, and/or refurbish electronic waste generated by the institution and/or its students. Institution takes measures to ensure that the electronic waste is recycled responsibly, for example by using a recycler certified under the e-Stewards and/or R2 standards.

Submission Note:

For information on e-waste visit:
http://green.harvard.edu/topics/waste/recycling

"---" *indicates that no data was submitted for this field*

Does the institution have strategies in place to safely dispose of all hazardous, special (e.g. coal ash), universal, and non-regulated chemical waste and seek to minimize the presence of these materials on campus?:

Yes

A brief description of steps taken to reduce hazardous, special (e.g. coal ash), universal, and non-regulated chemical waste:

The generation of hazardous waste is dependent on the type of research being conducted at the University. We work to minimize the generation of waste through encouraging researchers to only purchase the chemicals needed for their work. All wastes generated in the lab are managed through a central waste disposal contract that ensures waste are properly managed while being collected and disposed of at pre-approved facilities. Harvard Environmental Health and Safety manages an extensive Hazardous Waste Management and Disposal program. Hazardous wastes are generated in many different University operations. These include lab research, building operations and maintenance and construction projects. To ensure that the University is operating to protect the safety and health of employees and students and to protect the environment the proper management of hazardous wastes is critical. Proper management of wastes includes: correctly identifying wastes; storing wastes properly; performing required weekly inspections; and ensuring that all storage time limits are met. For more information visit:

http://www.uos.harvard.edu/ehs/environmental/hazardous_waste.shtml

A brief description of how the institution safely disposes of hazardous, universal, and non-regulated chemical waste:

Hazardous wastes are generated in many different University operations. These include lab research, building operations and maintenance and construction projects. To ensure that the University is operating to protect the safety and health of employees and students and to protect the environment the proper management of hazardous wastes is critical. Proper management of wastes includes: correctly identifying wastes; storing wastes properly; performing required weekly inspections; and ensuring that all storage time limits are met. For more details on disposal visit:

http://www.uos.harvard.edu/ehs/environmental/hazardous_waste.shtml

A brief description of any significant hazardous material release incidents during the previous three years, including volume, impact and response/remediation:

None

A brief description of any inventory system employed by the institution to facilitate the reuse or redistribution of laboratory chemicals:

The University maintains chemical inventory systems for some of our campuses. These systems are primarily used to gather information to provide emergency first responders with initial hazard information. Some systems also support appropriate communication of risks to researchers. Prior to lab moves or chemical cleanouts, a lab or departmental representative may “advertise” availability of usable chemicals (usually first within the department and, sometimes, more broadly to the campus). Other researchers are invited to review and take unwanted and unexpired chemicals that meet their needs. Our sustainability teams are partnering with labs and the Environmental Health and Safety Department to continue to reduce the purchase of excess chemicals and supplies and to share unused materials in order to minimize waste generation across the university. In addition, Harvard has also launched a Labs Reuse List -- a “Craigs List” for laboratory supplies and equipment (other than hazardous materials).

Does the institution have or participate in a program to responsibly recycle, reuse, and/or refurbish all electronic waste generated by the institution?:

Yes

Does the institution have or participate in a program to responsibly recycle, reuse, and/or refurbish electronic waste generated by students?:

Yes

A brief description of the electronic waste recycling program(s):

Surplus or obsolete computers and other electronic devices ("e-waste") as well as hard drives, thumb drives, CD's, DVD's, photographic slides, transparencies, and tapes of all kinds ("e-media") generated at Harvard University must be discarded properly. Harvard Recycling Services advocates reuse as the best and highest disposition policy. When no reuse or re-sale is possible for e-waste, recycling is necessary. Recycling is always required for e-media.

E-waste, or "electronic waste," can also be recycled easily at Harvard. Recycling e-waste ensures that hazardous and toxic materials are disposed of properly. Clear, blue, e-waste collection tubes can be found in 50 locations across campus.

This program encourages the Harvard community to recycle smaller, handheld e-waste including: Light bulbs, batteries, PDAs and cell phones, chargers and adapters, electrical cords, and CDs.

For large e-waste please consider reusing or re-selling. When no reuse or re-sale is feasible proper recycling disposal can be arranged for.

Comprehensive guidelines available from Harvard's Facilities Maintenance Operations:

http://energyandfacilities.harvard.edu/sites/energyandfacilities.harvard.edu/files/computers_e-

waste_e-media.pdf

A brief description of steps taken to ensure that e-waste is recycled responsibly, workers' basic safety is protected, and environmental standards are met:

Harvard Recycling partners with Environmental Health and Safety to ensure health and safety regulations are met. It is our policy to recycle e-waste and all other commodities generated by the Harvard campus for which local markets exist. State and federal laws, including 310 CMR 19.017 (requiring recycling of CRT monitors) and 40 CRF part 273 (requiring recycling of rechargeable batteries, contained in every computer) also require that we recycle certain e-wastes. In addition to complying with environmental regulations, e-waste generators must protect confidential information.

The website URL where information about the institution's hazardous and electronic-waste recycling programs is available:

http://www.ehs.harvard.edu/programs/chemical-waste

Water

This subcategory seeks to recognize institutions that are conserving water, making efforts to protect water quality and treating water as a resource rather than a waste product. Pumping, delivering, and treating water is a major driver of energy consumption, so institutions can help reduce energy use and the greenhouse gas emissions associated with energy generation by conserving water. Likewise, conservation, water recycling and reuse, and effective rainwater management practices are important in maintaining and protecting finite groundwater supplies. Water conservation and effective rainwater and wastewater management also reduce the need for effluent discharge into local surface water supplies, which helps improve the health of local water ecosystems.

From the institution:

Harvard's Sustainability Plan includes a goal to reduce University-wide water use 30% by 2020 from a 2006 baseline, including process, irrigation, and potable water usage.

Credit
Water Use
Rainwater Management
Wastewater Management

Water Use

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has reduced its potable water use per weighted campus user compared to a baseline.

Part 2

Institution has reduced its potable water use per gross square foot/metre of floor area compared to a baseline.

Part 3

Institution has reduced its total water use (potable + non-potable) per acre/hectare of vegetated grounds compared to a baseline.

Submission Note:

NOTE for WATER USE: We can not distinguish between potable and non-potable right now so we reported total for both.

IMPORTANT NOTE FOR CAMPUS USERS DATA:

Due to limitations in data reporting we are not able to access the following breakdown of data for all of Harvard's 12 Schools so we reported full-time employee and student totals.
1. Number of residential students
2. Number of residential employees
3. Number of in-patient hospital beds
4. Full-time equivalent of distance education students

"---" *indicates that no data was submitted for this field*

Level of water risk for the institution’s main campus:

High

Total water use::

	Performance Year	Baseline Year

Total water use	555,760,176 *Gallons*	703,257,898 *Gallons*

Potable water use::

	Performance Year	Baseline Year
Potable water use	555,760,176 *Gallons*	703,257,898 *Gallons*

Figures needed to determine "Weighted Campus Users"::

	Performance Year	Baseline Year
Number of residential students	0	0
Number of residential employees	0	0
Number of in-patient hospital beds	0	0
Full-time equivalent enrollment	34,254	29,837
Full-time equivalent of employees	16,159	14,555
Full-time equivalent of distance education students	0	0

Gross floor area of building space::

	Performance Year	Baseline Year
Gross floor area	28,000,000 *Square Feet*	21,586,000 *Square Feet*

Area of vegetated grounds::

	Performance Year	Baseline Year
Vegetated grounds	430 *Acres*	430 *Acres*

Start and end dates of the performance year and baseline year (or three-year periods):

	Start Date	End Date

Performance Year	July 1, 2013	June 30, 2014
Baseline Year	July 1, 2005	June 30, 2006

A brief description of when and why the water use baseline was adopted:

Water use baseline chosen for AASHE aligns with public water use goal that was adopted in Harvard Sustainability Plan

Water recycled/reused on campus, performance year:

Recycled/reused water withdrawn from off-campus sources, performance year:

A brief description of any water recovery and reuse systems employed by the institution:

Several buildings use non-potable water for other purposes. Examples include: 5 Cowperthwaite St. and Wasserstein Hall capture ground and roof water to be utilize for irrigation. The Sherman Fairchild Building uses re-captured “gray” water from laboratory processes on-site for toilet flushing.

The gray water system used at 5 Cowperthwaite -a 32,800 gallon tank collects storm water from the roof for use in irrigation.

In addition, the renovation of Harvard's historic Houses (undergraduate dorms) include raintwater recapture and storage tanks that use the harvested rainwater for toilets and irrigations. The newly renovated Harvard Art Museums also include a large rainwater recovery and reuse system.

A brief description of any water metering and management systems employed by the institution:

All buildings employ some form of water metering. All buildings on campus are metered individually with respect to water/sewer consumption. Some projects include separate metering for irrigation, kitchen, boiler, DHW, and other end-uses.

A brief description of any building retrofit practices employed by the institution, e.g. to install high efficiency plumbing fixtures and fittings:

Harvard University's Green Building Standards require compliance with LEED credits concerning low-flow fixtures for a minimum 35% reduction in water use below EPAct 1992 baselines

In addition, many of the campuses buildings, residential spaces have undergone updates to replace older fixtures with high efficiency fixtures and fittings.

A brief description of any policies or programs employed by the institution to replace appliances, equipment and systems with water-efficient alternatives:

Harvard University's Green Building Standards require Energy Star appliances for all categories of equipment rated. n addition, many of the campuses buildings, residential spaces have undergone updates to replace older fixtures with high efficiency fixtures and fittings.

A brief description of any water-efficient landscape design practices employed by the institution (e.g. xeriscaping):

Harvard University implements and encourages green roofs, and smart irrigation across campus

A brief description of any weather-informed irrigation technologies employed by the institution:

Multiple landscapes on campus include weather-controlled irrigation systems. The Business School, for instance, has an irrigation system that adjust by weather sensors. This system works by monitoring soil moisture levels, wind and temperature fluctuations. This system will adjust the water output automatically.

Around 75 % of the system throughout campus are controlled by rain sensor. The sensor will automatically turn the irrigation controllers off after a predetermined amount of rainfall (typically .75 - 1"), then turn back on after a 24 - 48 hour dry out period.

A brief description of other water conservation and efficiency strategies employed by the institution:

Harvard has a goal to reduce University-wide water use 30% by 2020, from a 2006 baseline

The website URL where information about the institution’s water conservation and efficiency initiatives is available:

http://green.harvard.edu/topics/water

Rainwater Management

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution uses Low Impact Development (LID) practices as a matter of policy or standard practice to reduce rainwater/stormwater runoff volume and improve outgoing water quality for new construction, major renovation, and other projects that increase paved surface area on campus or otherwise significantly change the campus grounds.

The policy, plan, and/or strategies cover the entire campus. While the specific strategies or practices adopted may vary depending on project type and location, this credit is reserved for institutions that mitigate rainwater runoff impacts consistently during new construction. Implementing a strategy or strategies for only one new development project is not sufficient for Part 1 of this credit.

Part 2

Institution has adopted a rainwater/stormwater management policy, plan, and/or strategies that mitigate the rainwater runoff impacts of ongoing campus operations and treat rainwater as a resource rather than as a waste product.

The policy, plan, and/or strategies address both the quantity and quality (or contamination level) of rainwater runoff through the use of green infrastructure. Though specific practices adopted may vary across the campus, the policy, plan, and/or strategies cover the entire institution. Implementing strategies for only one building or area of campus is not sufficient for Part 2 of this credit.

Policies adopted by entities of which the institution is part (e.g. state government or the university system) may count for both parts of this credit as long as the policies apply to and are followed by the institution.

Submission Note:

Additional URLs with information on stormwater/rainwater management:

http://green.harvard.edu/sites/green.harvard.edu/files/2014%20Harvard%20Green%20Building%20Standards_12-1-14.pdf

http://www.ehs.harvard.edu/sites/ehs.harvard.edu/files/construction_safety_stormwater_management_exhibit.pdf

"---" *indicates that no data was submitted for this field*

Does the institution use Low Impact Development (LID) practices as a matter of policy or standard practice to reduce rainwater/stormwater runoff volume and improve outgoing water quality for new construction, major renovation, and other projects?:

Yes

A brief description of the institution’s Low Impact Development (LID) practices:

Harvard requires that all large construction and renovation projects receive LEED Gold certification at a minimum which often include requirements for LID practices.

In addition, Harvard Green Building Standards recommend that new construction and major renovation projects incorporate green infrastructure and low impact development strategies into the site design in order to manage on-site 100% of the total volume of runoff calculated for the 95th percentile rainfall event for the site

Has the institution adopted a rainwater/stormwater management policy, plan, or strategies that mitigate the rainwater runoff impacts of ongoing campus operations through the use of green infrastructure? :

Yes

A brief description of the institution’s rainwater/stormwater management policy, plan, and/or strategies for ongoing campus operations:

The Harvard University stormwater program managed by Environmental Health & Safety provides best practices to Schools and administrative departments in order to help to reduce or eliminate runoff impacts:

http://www.ehs.harvard.edu/programs/stormwater-management

Harvard Environmental Health & Safety has a Construction Safety Stormwater policy that applies to contractors and subcontractors:

http://www.ehs.harvard.edu/sites/ehs.harvard.edu/files/construction_safety_stormwater_managemen

t_exhibit.pdf

A brief description of any rainwater harvesting employed by the institution:

Rainwater harvesting is employed by Harvard in many buildings, including undergraduate housing and the new Harvard Art Museums. The rainwater is stored in underground cisterns and reused for toilets and irrigation. The first two construction/renovation projects in Harvard's historic House Renewal (undergraduate dorms) have stormwater retention systems that recapture stormwater for use in irrigation and/or toilets.

For example, at the Harvard Art Museums an innovative water-recovery system collects rainwater from the museums and neighboring Carpenter Center and diverts it to a 10,000-gallon underground cistern. The reclaimed water, which otherwise would be discharged to the surrounding storm sewers at a daily rate of 21,600 gallons, is instead used for irrigation, gray water in toilets, and to recharge the underground water table

Rainwater harvested directly and stored/used by the institution, performance year:

A brief description of any rainwater filtering systems employed by the institution to treat water prior to release:

Where feasible for existing locations and renovation projects, stormwater runoff is collected and reused or infiltrated to recharge the ground water. Harvard has utilized a variety of natural filtration technologies such as bioswales, infiltration ponds, and green roofs that help to remove solids from stormwater runoff. Additionally, new buildings such as Tata Hall are designed to minimize hardscapes and include engineered filtration technologies to remove sediments and phosphorous.

A brief description of any living or vegetated roofs on campus:

Several buildings on campus have green roofs. Harvard Law School’s Wasserstein Hall, Caspersen Student Center, Clinical Wing building (WCC) has two green vegetated roofs. A green roof has been installed on the roof of Batten Hall, which houses the Harvard Innovation Lab. The roof on Harvard Business School's Shad Hall is a living roof covering 5,200 sq-ft, planted with 9000 perennials. Additionally, Harvard Housing's Garden Street property has a green roof and roof garden.

A brief description of any porous (i.e. permeable) paving employed by the institution:

The parking lot of At the LEED Platinum 46 Blackstone Street has porous paving. The original site was a 100% impervious parking lot. 658 tons of asphalt were removed and recycled. These pavers have recycled content and are expected to reduce stormwater runoff by over 37%.

A brief description of any downspout disconnection employed by the institution:

Renovation projects often include stormwater reuse or infiltration installations which replace the conventional roof to sewer infrastructure. Instead of directing downspouts to the ground or directly to stormwater system, the rainwater is directed to collection tanks (cisterns) and is used for irrigation and grey water purposes.

A brief description of any rain gardens on campus:

At the LEED Platinum 46 Blackstone Street, an irrigation free, organic landscape was developed in a courtyard that was previously a parking lot. Primarily composed of ornamental grasses that are designed to grow roughly six inches to a foot in height, this area provides a home for a family of rabbits who appear to prefer the tall grasses for both food and shelter.

A brief description of any stormwater retention and/or detention ponds employed by the institution:

The LEED Platinum 46 Blackstone Street has a retention pond alongside the parking lot. Sand bed at the bottom of the pond filters solids out of the stormwater so that they are not carried into the soil. The bioretention pond also creates habitat for urban animal species.

A brief description of any bioswales on campus (vegetated, compost or stone):

A bioswale, or bioretention system at 46 Blackstone, filters stormwater runoff from the adjacent 25,000 square foot parking lot through the site to prevent contamination of the Charles River. This system filters stormwater and allows it to naturally infiltrate into the soil. Microorganisms in the soil digest oils and greases in runoff, preventing these contaminants' entry into water bodies. Plants take up phosphorous to prevent eutrophication.

A brief description of any other rainwater management technologies or strategies employed by the institution:

The campus is in a constant state of construction and renovation and those projects provide Harvard with excellent opportunities to evaluate and install cutting edge stormwater treatment technologies. Harvard EHS and sustainability personnel are involved in the design projects from the start which allows Harvard to select technologies that will not only be effective at reducing the impact of stormwater on the environment, but that will also be maintainable and sustainable.

The website URL where information about the institution's rainwater management initiatives, plan or policy is available:

http://www.ehs.harvard.edu/programs/stormwater-management

Wastewater Management

Criteria

Institution's wastewater is handled naturally on campus or in the local community. Natural wastewater systems include, but are not limited to, constructed treatment wetlands and Living Machines. To count, wastewater must be treated to secondary or tertiary standards prior to release to water bodies.

This credit recognizes natural handling of the water discharged by the institution. On-site recycling/reuse of greywater and/or blackwater is recognized in *OP 26: Water Use*.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Planning & Administration

Coordination, Planning & Governance

This subcategory seeks to recognize colleges and universities that are institutionalizing sustainability by dedicating resources to sustainability coordination, developing plans to move toward sustainability, and engaging students, staff and faculty in governance. Staff and other resources help an institution organize, implement, and publicize sustainability initiatives. These resources provide the infrastructure that fosters sustainability within an institution. Sustainability planning affords an institution the opportunity to clarify its vision of a sustainable future, establish priorities and help guide budgeting and decision making. Strategic planning and internal stakeholder engagement in governance are important steps in making sustainability a campus priority and may help advocates implement changes to achieve sustainability goals.

From the institution:

In 2014, Harvard announced the creation of a University-wide Sustainability Plan. The Harvard Sustainability Plan is the University's roadmap for building and operating a healthier, more sustainable campus community.

The Plan aligns Harvard's decentralized campus around a holistic vision and sets clear University-wide goals and priorities in the areas of emissions and energy, campus operations, nature and ecosystems, health and well-being, and culture and learning. It also encourages students, faculty, and staff to continue piloting sustainability solutions throughout the University by using Harvard's cutting-edge research and teaching to tackle real-world challenges on campus.

More at: www.green.harvard.edu/plan

Credit
Sustainability Coordination
Sustainability Planning
Governance

Sustainability Coordination

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has at least one sustainability committee, office, and/or officer tasked by the administration or board of trustees to advise on and implement policies and programs related to sustainability on campus. The committee, office, and/or officer focus on sustainability broadly (i.e. not just one sustainability issue, such as climate change) and cover the entire institution.

An institution that has multiple committees, offices and/or staff with responsibility for subsets of the institution (e.g. schools or departments) may earn points for this credit if it has a mechanism for broad sustainability coordination for the entire campus (e.g. a coordinating committee or the equivalent). A committee, office, and/or officer that focuses on just one department or school within the institution does not count for this credit in the absence of institution-wide coordination.

"---" *indicates that no data was submitted for this field*

Does the institution have at least one sustainability committee, office, and/or officer that focuses on sustainability broadly and covers the entire institution?:

Yes

A brief description of the activities and substantive accomplishments of the committee(s), office(s), and/or officer(s) during the previous three years:

This is just a small selection of some of the selected accomplishments in the last three years:
- University-wide Sustainability Plan developed (2014):

www.green.harvard.edu/plan

- Revised Green Building Standards released
- New GreenIT and Green Labs policies developed
- Quadrennial GHG reduction progress review undertaken
- Climate Preparedness planning launched
- Student Grants distributed
- Green Revolving Fund updates to policy to make the Fund more accessible and to incentivize Schools/units to undertake more innovative projects.
- Student and green team leadership groups launched
- Sustainability incorporated into University employee recognition program
- External partnerships with local cities/business launched and fostered

- Regional Green Labs Symposium hosted
- Co-hosted international sustainability (ISCN) conference

Does the institution have at least one sustainability committee?:

Yes

The charter or mission statement of the committee(s) or a brief description of each committee's purview and activities:

1. University-wide Sustainability and Energy Management Council with senior representation from each of the 10 Schools and VP units, representing key areas (Facilities, Financial Deans, IT, HR, Administration, etc.) meets bi-monthly to share best practices, and review and approve new policies.

2. Council of Student Sustainability Leaders, a committee comprised of over a dozen student leaders from each Harvard undergrad and grad schools that advise the Office for Sustainability on strategy and policy.

3. Greenhouse Gas (GHG) Reduction Goal Executive Committee: The GHG Reduction Goal Executive Committee meets frequently (monthly to quarterly) to oversee the implementation of Harvard's GHG Reduction Goal.

4. Green Team Leaders Network is comprised of staff members across all twelve schools and administrative units who lead green teams efforts at their respective schools. Green Team Leaders gather four times a year to share best practices, build professional knowledge in the field, and hone their skills for leading green teams

Members of each committee, including affiliations and role (e.g. staff, student, or faculty):

A full list of members for all the committees is available at:

http://green.harvard.edu/commitment/governance

The website URL where information about the sustainability committee(s) is available:

http://green.harvard.edu/commitment/governance

Does the institution have at least one sustainability office that includes more than 1 full-time equivalent (FTE) employee?:

Yes

A brief description of each sustainability office:

The Office for Sustainability (OFS) was formally established in 2008, growing out of a faculty/staff initiative, which had been in place since 2001.

The mission of OFS is to support Harvard’s research and teaching mission by bringing the university together to set and achieve goals for a healthier, more efficient and sustainable future.

The team is led by Heather Henriksen and comprised of more than ten employees who partner with the University's 12 Schools and dozens of central administrative departments to create real and lasting change.

Full-time equivalent (FTE) of people employed in the sustainability office(s):

17

The website URL where information about the sustainability office(s) is available:

http://green.harvard.edu/about

Does the institution have at least one sustainability officer?:

Yes

Name and title of each sustainability officer:

Heather Henriksen

A brief description of each sustainability officer position:

The Director oversees a team of sustainability professionals that work across more than 12 Schools and administrative departments to set and achieve Harvard’s university-wide sustainability goals. She manages working groups and committees that leverage the unique knowledge of students, faculty and staff to develop innovative and replicable models for cost-effective and lasting environmental change. Heather also coordinates external sustainability partnerships with higher education peers, businesses and government agencies.

The website URL where information about the sustainability officer(s) is available:

http://green.harvard.edu/bio/heather-henriksen

Sustainability Planning

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has current and formal plans to advance sustainability. The plan(s) cover one or more of the following areas:

- Curriculum
- Research (or other scholarship appropriate for the institution)
- Campus Engagement
- Public Engagement
- Air & Climate
- Buildings
- Dining Services/Food
- Energy
- Grounds
- Purchasing
- Transportation
- Waste
- Water
- Diversity & Affordability
- Health, Wellbeing & Work
- Investment
- Other

The plan(s) may include measurable objectives with corresponding strategies and timeframes to achieve the objectives.

The criteria may be met by any combination of formally adopted plans, for example:

- Strategic plan or equivalent guiding document
- Campus master plan or physical campus plan
- Sustainability plan
- Climate action plan
- Human resources strategic plan
- Diversity plan

For institutions that are a part of a larger system, plans developed at the system level are eligible for this credit.

Does the institution have current and formal plans to advance sustainability in the following areas? Do the plans include measurable objectives?:

	Current and Formal Plans (Yes or No)	Measurable Objectives (Yes or No)
Curriculum	Yes	No
Research (or other scholarship)	Yes	No
Campus Engagement	Yes	Yes
Public Engagement	No	No
Air and Climate	Yes	Yes
Buildings	Yes	Yes
Dining Services/Food	Yes	Yes
Energy	Yes	Yes
Grounds	Yes	Yes
Purchasing	Yes	Yes
Transportation	Yes	Yes
Waste	Yes	Yes
Water	Yes	Yes
Diversity and Affordability	Yes	Yes
Health, Wellbeing and Work	Yes	Yes
Investment	Yes	No

Other	Yes	Yes

A brief description of the plan(s) to advance sustainability in Curriculum:

The Harvard Sustainability Plan states that we will use our campus as a living laboratory for developing the next generation of sustainability solutions, and we will strengthen and cultivate a “One Harvard” culture across our Schools and departments that embraces environmental sustainability as an integral part of our academic work, our institutional practices, and our daily lives.

The measurable objectives, strategies and timeframes included in the Curriculum plan(s):

Support the creation of new sustainability-related curricula, programming, and cross-disciplinary opportunities by fostering collaboration with the Harvard University Center for the Environment, Center for Global Health and the Environment, and other environmental initiatives on campus.

Translate research and teaching into practice on Harvard’s campuses by facilitating collaborations to pilot and launch innovative solutions to sustainability challenges.

Foster a new generation of environmental leaders by providing mentoring, networking, and professional development opportunities that prepare undergraduate and graduate students with the insight and foresight to safeguard our environment in the years and decades to come.

Accountable parties, offices or departments for the Curriculum plan(s):

Harvard Center for the Environment

A brief description of the plan(s) to advance sustainability in Research (or other scholarship):

The Harvard Sustainability Plan states that we will use our campus as a living laboratory for developing the next generation of sustainability solutions, and we will strengthen and cultivate a “One Harvard” culture across our Schools and departments that embraces environmental sustainability as an integral part of our academic work, our institutional practices, and our daily lives.

The measurable objectives, strategies and timeframes included in the Research plan(s):

Translate research and teaching into practice on Harvard’s campuses by facilitating collaborations to pilot and launch innovative solutions to sustainability challenges.

Support the creation of new sustainability-related curricula, programming, and cross-disciplinary opportunities by fostering collaboration with the Harvard University Center for the Environment, Center for Global Health and the Environment, and other environmental initiatives on campus.

Accountable parties, offices or departments for the Research plan(s):

Harvard Center for the Environment
Provost Office

A brief description of the plan(s) to advance Campus Engagement around sustainability:

The Harvard Sustainability Plan states that we will use our campus as a living laboratory for developing the next generation of sustainability solutions, and we will strengthen and cultivate a “One Harvard” culture across our Schools and departments that embraces environmental sustainability as an integral part of our academic work, our institutional practices, and our daily lives.

The measurable objectives, strategies and timeframes included in the Campus Engagement plan:

Increase staff participation in the Harvard Green Office Program by at least 30% by 2020 from a 2014 baseline.

Maintain and continuously improve programs and resources that drive sustainability action among students, faculty, staff, and alumni.

Recognize and reward sustainability accomplishments University-wide and at all Schools annually, including at the Harvard Heroes ceremony and the Harvard Green Carpet Awards.

Accountable parties, offices or departments for the Campus Engagement plan(s):

Harvard Office for Sustainability
Harvard Green Teams
Harvard Human Resources
Individual Schools and department HR departments and sustainability programs

A brief description of the plan(s) to advance Public Engagement around sustainability:

Confronting the global challenges of climate change and environmental sustainability requires a response across disciplines and across sectors. In addition to collaborating with other higher education institutions, Harvard is partnering with government, non-profit organizations, and private business to identify solutions and shared opportunities that will lead to lasting change.

The measurable objectives, strategies and timeframes included in the Public Engagement plan(s):

Cultivate and lead external partnerships, in higher education and beyond, that help inform Harvard’s efforts and amplify our local and global impact.

Accountable parties, offices or departments for the Public Engagement plan(s):

Harvard Office for Sustainability

A brief description of the plan(s) to advance sustainability in Air and Climate:

We have a special role and a special responsibility to confront the challenge of climate change by reducing campus greenhouse gas emissions by the maximum practicable rate. Reducing energy and emissions remains one of the University's top priorities, and we will continue to meet this challenge through best-in-class innovations in energy efficiency, energy management, and renewable energy.

The measurable objectives, strategies and timeframes included in the Air and Climate plan(s):

In 2008, Harvard established a long-term commitment to reduce greenhouse gas emissions based on the best available science and set a short-term goal to reduce University-wide greenhouse gas emissions 30% by 2016 from a 2006 baseline, including growth.

In 2016, the University will develop new greenhouse gas emissions and energy reduction goals based on the recommendations of a planned Task Force composed of students, faculty, and staff. This Plan will be updated at that time to reflect the University's new goals.

Conduct a University-wide on-site renewable energy study to inform goal setting by the 2016 Greenhouse Gas Reduction Goal Review Task

Develop standards for climate preparedness and campus resilience that apply to new and existing building design and critical infrastructure by 2016.

Develop a University-wide Climate Preparedness and Campus Resilience Plan by 2020.

Accountable parties, offices or departments for the Air and Climate plan(s):

Harvard Campus Services
Harvard Executive Vice President
Harvard GHG Executive Committee
Harvard Office for Sustainability
Individual Schools and departments

A brief description of the plan(s) to advance sustainability in Buildings:

We will aim to have a restorative impact on the surrounding environment and our community of students, faculty, and staff by developing and operating Harvard's campuses to conserve resources, reduce pollution, and enhance personal well-being.

The measurable objectives, strategies and timeframes included in the Buildings plan(s):

Maintain University-wide compliance with the Harvard University Green Building Standards, reviewed annually and revised every four years.

The 2014 version of the Standards include healthy material requirements for the disclosure of health and environmental impacts of products that are used on campus in order to help Harvard assess opportunities to understand the community's exposure to potential toxins. They also include requirements for analyzing the feasibility of Net-Zero and Living Building Challenge certification for major capital projects and special considerations for laboratories and data centers, the most energy-intensive spaces on campus. Additional updates include a requirement for LEED v4 Gold certification, energy reduction targets beyond ASHRAE 90.1-2010, and revisions to Measurement and Verification standards that are used to assess the effectiveness and performance of energy and mechanical systems

In addition to these updated requirements and recommendations, the Standards require:

Integrated design goal-setting charrettes with all key stakeholders
Multiple iterations of energy models
Life cycle cost analysis
Prescriptive requirements such as aggressive energy and water reduction targets.

Accountable parties, offices or departments for the Buildings plan(s):

Harvard Planning and Project Management
Harvard Green Building Services
Individual Schools and departments

A brief description of the plan(s) to advance sustainability in Dining Services/Food:

We are committed to purchasing and operational practices and menu choices that sustain the health and well-being of the environment, communities, and the people producing and eating food.

The measurable objectives, strategies and timeframes included in the Dining Services/Food plan(s):

Develop Sustainable and Healthful Food Standards that include Green Restaurant Association certification, and achieve University-wide compliance by 2020.

Accountable parties, offices or departments for the Dining Services/Food plan(s):

Harvard Dining Services

A brief description of the plan(s) to advance sustainability in Energy:

We have a special role and a special responsibility to confront the challenge of climate change by reducing campus greenhouse gas emissions by the maximum practicable rate. Reducing energy and emissions remains one of the University's top priorities, and we will continue to meet this challenge through best-in-class innovations in energy efficiency, energy management, and renewable energy.

The measurable objectives, strategies and timeframes included in the Energy plan(s):

Identify and implement net present value positive energy conservation measures in our buildings as part of the five-year capital planning

Conduct a University-wide on-site renewable energy study to inform goal setting by the 2016 Greenhouse Gas Reduction Goal Review Task

Assess energy use by building and space type to inform goal setting by the 2016 Greenhouse Gas Reduction Goal Review Task Force.

Accountable parties, offices or departments for the Energy plan(s):

Harvard Campus Services
Schools and departments

A brief description of the plan(s) to advance sustainability in Grounds:

Our campuses are part of a larger, interconnected ecosystem, and the actions we take will have ripple effects through the natural environment. Harvard will protect and enhance the ecosystems and green spaces our University owns, manages, or impacts, in order to enhance regional biodiversity and personal well-being.

The measurable objectives, strategies and timeframes included in the Grounds plan(s):

Maintain at least 75% of the University's landscaped areas with an organic landscaping program by 2020.

Achieve University-wide compliance with the Harvard University Sustainable Landscaping Standards by 2020.

Design landscapes and choose plant species that are likely to be robust to future environmental change, ensure appropriate levels of biodiversity and green or open space, and support stormwater reduction and passive stormwater filtration.

Accountable parties, offices or departments for the Grounds plan(s):

Harvard Campus Services
Individual Schools and departments

A brief description of the plan(s) to advance sustainability in Purchasing:

Harvard University Sustainability Guidelines have been created to reduce the environmental impact of purchasing decisions and ensure they are aligned with
University-wide sustainability goals, including the Greenhouse Gas Reduction Goal, by buying goods and services from manufacturers and suppliers committed to protecting the environment. "Green" purchasing minimizes negative environmental and social effects through the use of environmentally friendly products. General principles include: minimizing the consumption of non replaceable natural resources, using environmentally friendly products and processes, minimizing waste including packaging and waste generated by the eventual disposal of the product and maximizing the reuse and recycling of material.

The measurable objectives, strategies and timeframes included in the Purchasing plan(s):

Develop University-wide standards for targeted environmentally preferred products by 2018.

Require all major vendors to report on progress in meeting Harvard standards and specified third-party environmental certifications, and demonstrate their commitment to sustainability through corporate responsibility reporting, by 2016.

Require all vendors, as appropriate, to comply with applicable Harvard sustainability goals and standards by 2020, and encourage vendors to align their practices with all sustainability commitments.

Accountable parties, offices or departments for the Purchasing plan(s):

Harvard Strategic Procurement

A brief description of the plan(s) to advance sustainability in Transportation:

Harvard is committed to developing programs, resources and initiatives that build better connectivity between campuses and provide our community with alternatives to driving and encourage a safe, healthy lifestyle. Harvard is a major supporter of the Hubway regional bike share program – supporting the installation of 12 stations in Cambridge and Boston, and providing discounted membership to all Harvard affiliates.

The measurable objectives, strategies and timeframes included in the Transportation plan(s):

Develop a University-wide plan by 2016 for reducing campus fleet and shuttle emissions.

Maintain and continuously improve sustainable transportation opportunities, programs, and incentives for Harvard affiliates.

Increase the bikeability and safety of the streets in and around Harvard’s campuses, and seek to achieve gold-level Bicycle Friendly University status from the League of American Bicyclists by 2020.

Accountable parties, offices or departments for the Transportation plan(s):

Harvard Commuter Choice
Harvard Transportation and Parking

A brief description of the plan(s) to advance sustainability in Waste:

Harvard’s extensive waste reduction initiatives include freecycle events and donation stations, single-stream recycling, construction and demolition waste diversion, composting, and electronic waste collection areas. Where possible we focus on prioritizing the reduction of waste most harmful to people and the environment.

The measurable objectives, strategies and timeframes included in the Waste plan(s):

Reduce waste per capita 50% by 2020 from a 2006 baseline, with the aspirational goal of becoming a zero-waste campus.

Reduce the amount of electronic waste generated per capita by 2020.

Recycle or dispose of hazardous and electronic materials in a responsible and ethical manner, with a priority to minimize the use of hazardous materials, as appropriate.

Accountable parties, offices or departments for the Waste plan(s):

Harvard Recycling and Waste Management

A brief description of the plan(s) to advance sustainability in Water:

Innovative water conservation technology and landscaping techniques are reducing water use on campus.

The measurable objectives, strategies and timeframes included in the Water plan(s):

Reduce University-wide water use 30% by 2020 from a 2006 baseline, including process, irrigation, and potable water usage.

Accountable parties, offices or departments for the Water plan(s):

Harvard Campus Services
Schools and departments
Harvard Office for Sustainability

A brief description of the plan(s) to advance Diversity and Affordability:

DIVERSITY: Harvard University is committed to selecting faculty and staff without discrimination against individuals on the basis of race, color, sex, gender identity, sexual orientation, religion, creed, national origin, ancestry, age, veteran status, disability unrelated to job requirements, genetic information, military service, or other protected status. The President and Fellows of Harvard College call upon every member of the University involved in recruitment, hiring, and promotions to exert their best efforts to achieve the goals set forth in the current affirmative action plan. The President and Fellows call upon every member of the University to engage wholeheartedly in the effort to ensure a wholly nondiscriminatory process of recruiting, hiring, and promoting women, members of minority groups, qualified individuals with disabilities, and disabled and other covered veterans at all levels of employment throughout the University. Harvard also expects that outside agencies with which it contracts will comply with all applicable antidiscrimination laws.

AFFORDABILITY:

Admission to Harvard College is need-blind, meaning your financial need will not impede your chances of admission. Aid is based entirely on need, not merit.

The measurable objectives, strategies and timeframes included in the Diversity and Affordability plan(s):

Diversity:

The focus of this work is to instill the campus community with an understanding of: 1) the centrality, importance and complexity of inclusive excellence in our academic and administrative endeavors, 2) the benefits of diverse learning and working environments, and 3) the meaning and significance of equal opportunity and equity outreach efforts.

Harvard College Affordability:

A lack of financial resources or need for financial aid are not impediments to your admission.

Our aid is entirely need-based, and grant eligibility is determined in the same manner for all admitted students.

Foreign students have the same access to financial aid funding as U.S. citizens.

We meet your demonstrated financial need for all four years, based on information that we receive from your family each year. In awarding aid, we take into consideration your individual circumstances, the effectiveness of our aid program, the demand for aid from all students and university resources.

Accountable parties, offices or departments for the Diversity and Affordability plan(s):

The Office of the Assistant to the President for Institutional Diversity and Equity

Harvard College Griffin Financial Aid Office

A brief description of the plan(s) to advance sustainability in Health, Wellbeing and Work:

The vitality of our University depends on the health of our people. We will strive to enhance the health, productivity, and quality of life of our students, faculty, and staff through the design and maintenance of the built environment and the development and implementation of cutting-edge programs that contribute to well-being.

The measurable objectives, strategies and timeframes included in the Health, Wellbeing and Work plan(s):

Reduce the Harvard community's exposure to toxic chemicals with a special focus on the natural and built environment, indoor air quality, furnishings, and cleaning products.

Identify and track high-risk chemicals in targeted building materials used on campus, informed by the latest research and LEED v.4 standards, through the Harvard Green Building Standards.

Identify and target at least two significant chemicals of concern for which viable alternatives exist, and develop a plan for eliminating exposure to those chemicals on campus.

Increase participation in, and access to, wellness programs through the Healthy Harvard Initiative by 2020.

Continue to develop and implement tobacco-free campus policies.

Accountable parties, offices or departments for the Health, Wellbeing and Work plan(s):

Harvard Office for Sustainability
Harvard Center for Wellness
Harvard Campus Services
Harvard Office for Work / Life

A brief description of the plan(s) to advance sustainability in Investment:

As a long-term investor, HMC is naturally focused on environmental, social, and governance (ESG) factors that may affect the performance of our investments—now and in the future. Aligned with our mission to provide strong long-term investment results to Harvard University, we consider material ESG criteria, among many factors, to inform our investment analysis and decision-making processes.

The measurable objectives, strategies and timeframes included in the Investment plan(s):

HMC, with the support of Harvard University, is the first university endowment in the United States to become a signatory to the United Nations-supported Principles for Responsible Investment (PRI). The PRI is a network of international investors who are committed to integrating ESG issues into their investment practices and ownership policies. As a signatory, we commit to implementing the six Principles put forth by the organization in our management of the University's endowment and related financial assets.

We are also a signatory to the CDP's climate change program. The CDP, formerly known as the Carbon Disclosure Project, is an international non-profit organization that works with governments, public companies, and over 700 investors to drive environmental disclosure and performance of publicly listed companies.

Accountable parties, offices or departments for the Investment plan(s):

Harvard Management Company

A brief description of the plan(s) to advance sustainability in other areas:

The Harvard Sustainability Plan sets goals, standards and commitments in five core topic areas including some areas not covered above including governance, communications, conservation and education.

The measurable objectives, strategies and timeframes included in the other plan(s):

Facilitate strong governance structures to ensure integration of sustainability into business practices at all levels of the University.

Develop an alumni engagement strategy by 2016 to strengthen involvement of alumni in sustainability efforts at Harvard. Communicate the “One Harvard” sustainability story to educate, engage, and motivate the Harvard community.

Continue to prioritize conservation, research, and education at Harvard-owned green spaces including the Harvard Forest and the Arnold Arboretum.

Accountable parties, offices or departments for the other plan(s):

Harvard Office for Sustainability

The institution’s definition of sustainability:

The University’s network of campuses is a living, breathing ecosystem set within an urban environment that includes 12 Schools, dozens of administrative and operational groups, a broad range of building types and land uses, and a diverse group of tens of thousands of faculty, students, and staff. From an institutional standpoint, we aim to transform the University into a sustainable community that contributes positive social, economic, and environmental benefits. We are dedicated to institutionalizing best practices in sustainable operations and translating research and teaching into practice by using our campus to pilot innovative solutions that can be widely replicated. We also have a deeper mandate that goes to the heart of Harvard's research and teaching mission: to educate and empower our students while on campus to become leaders who will use their knowledge to create sustainable impact in service to the world.

Additionally, the Harvard Sustainability Principles state:

Harvard University is committed to developing and maintaining an environment that enhances human health and fosters a transition toward sustainability. Sustainability should be advanced through research, analysis, and experience gained over time. To that end, Harvard University is committed to continuous improvement in:

Demonstrating institutional practices that promote sustainability, including measures to increase efficiency and use of renewable resources, and to decrease production of waste and hazardous materials, both in Harvard's own operations and in those of its suppliers.
Promoting health, productivity, and safety of the University community through design and maintenance of the built environment.
Enhancing the health of campus ecosystems and increasing the diversity of native species.
Developing planning tools to enable comparative analysis of sustainability implications and to support long-term economic, environmental, and socially responsible decision-making
Encouraging environmental inquiry and institutional learning throughout the University community.
Establishing indicators for sustainability that will enable monitoring reporting and continuous improvement.

Does the institution's strategic plan or equivalent guiding document include sustainability at a high level?:

A brief description of how the institution's strategic plan or equivalent guiding document addresses sustainability:

not applicable

The website URL where information about the institution's sustainability planning is available:

http://www.green.harvard.edu/plan

Governance

Criteria

Part 1

Institution’s students participate in governance in one or more of the following ways:

A. All enrolled students, regardless of type or status, have an avenue to participate in one or more governance bodies (through direct participation or the election of representatives)

B. There is at least one student representative on the institution’s governing body. To count, student representatives must be elected by their peers or appointed by a representative student body or organization.

And/or

C. Students have a formal role in decision-making in regard to one or more of the following:

- Establishing organizational mission, vision, and/or goals
- Establishing new policies, programs, or initiatives
- Strategic and long-term planning
- Existing or prospective physical resources
- Budgeting, staffing and financial planning
- Communications processes and transparency practices
- Prioritization of programs and projects

Part 2

Institution’s staff participate in governance in one or more of the following ways:

A. All staff members, regardless of type or status, have an avenue to participate in one or more governance bodies (through direct participation or the election of representatives)

B. There is at least one non-supervisory staff representative on the institution’s governing body. To count, staff representatives must be elected by their peers or appointed by a representative staff body or organization.

And/or

C. Non-supervisory staff have a formal role in decision-making in regard to one or more of the areas outlined in Part 1.

Part 3

Institution’s faculty participate in governance in one or more of the following ways:

A. All faculty members, regardless of type or status, have an avenue to participate in one or more governance bodies (through direct participation or the election of representatives)

B. There is at least one teaching or research faculty representative on the institution’s governing body. To count, faculty representatives must be elected by their peers or appointed by a representative faculty body or organization.

And/or

C. Faculty have a formal role in decision-making in regard to one or more of the areas outlined in Part 1.

Participatory or shared governance bodies, structures and/or mechanisms may be managed by the institution (e.g. committees, councils, senates), by stakeholder groups (e.g. student, faculty and staff committees/organizations), or jointly (e.g. union/management structures).

Structures or mechanisms adopted by entities of which the institution is part (e.g. government or university system) may count for this credit as long as they apply and are adhered to by the institution.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Diversity & Affordability

This subcategory seeks to recognize institutions that are working to advance diversity and affordability on campus. In order to build a sustainable society, diverse groups will need to be able to come together and work collaboratively to address sustainability challenges. Members of racial and ethnic minority groups and immigrant, indigenous and low-income communities tend to suffer disproportionate exposure to environmental problems. This environmental injustice happens as a result of unequal and segregated or isolated communities. To achieve environmental and social justice, society must work to address discrimination and promote equality. The historical legacy and persistence of discrimination based on racial, gender, religious, and other differences makes a proactive approach to promoting a culture of inclusiveness an important component of creating an equitable society. Higher education opens doors to opportunities that can help create a more equitable world, and those doors must be open through affordable programs accessible to all regardless of race, gender, religion, socio-economic status and other differences. In addition, a diverse student body, faculty, and staff provide rich resources for learning and collaboration.

Credit
Diversity and Equity Coordination
Assessing Diversity and Equity
Support for Underrepresented Groups
Support for Future Faculty Diversity
Affordability and Access

Diversity and Equity Coordination

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Part 1

Institution has a diversity and equity committee, office and/or officer tasked by the administration or governing body to advise on and implement policies, programs, and trainings related to diversity and equity on campus. The committee, office and/or officer focuses on student and/or employee diversity and equity.

Part 2

Institution makes cultural competence trainings and activities available to all members of one or more of the following groups:

- Students
- Staff
- Faculty
- Administrators

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Assessing Diversity and Equity

Criteria

Institution assesses diversity and equity on campus and uses the results to guide policy, programs, and initiatives. The assessment(s) address one or more of the following areas:

1. **Campus climate**, e.g. through a survey or series of surveys to gather information about the attitudes, perceptions and experiences of campus stakeholders and underrepresented groups
2. **Student diversity and educational equity**, e.g. through analysis of institutional data on diversity and equity by program and level, comparisons between graduation and retention rates for diverse groups, and comparisons of student diversity to the diversity of the communities being served by the institution
3. **Employee diversity and employment equity**, e.g. through analysis of institutional data on diversity and equity by job level and classification, and comparisons between broad workforce diversity, faculty diversity, management diversity and the diversity of the communities being served by the institution
4. **Governance and public engagement**, e.g. by assessing access to and participation in governance on the part of underrepresented groups and women, the centrality of diversity and equity in planning and mission statements, and diversity and equity in public engagement efforts

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This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Support for Underrepresented Groups

Criteria

Part 1

Institution has mentoring, counseling, peer support, academic support, or other programs in place to support underrepresented groups on campus.

This credit excludes programs to help build a diverse faculty throughout higher education, which are covered in *PA 7: Support for Future Faculty Diversity*.

Part 2

Institution has a discrimination response policy, program and/or team (or the equivalent) to respond to and support those who have experienced or witnessed a bias incident, act of discrimination or hate crime.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Support for Future Faculty Diversity

Criteria

Institution administers and/or participates in a program or programs to help build a diverse faculty throughout higher education.

Such programs could take any of the following forms:

- Teaching fellowships or other programs to support terminal degree students from underrepresented groups in gaining teaching experience. (The terminal degree students may be enrolled at another institution.)
- Mentoring, financial, and/or other support programs to prepare and encourage undergraduate or other non-terminal degree students from underrepresented groups to pursue further education and careers as faculty members.
- Mentoring, financial, and/or other support programs for doctoral and post-doctoral students from underrepresented groups.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Affordability and Access

Criteria

Part 1

Institution has policies and programs in place to make it accessible and affordable to low-income students and/or to support non-traditional students. Such policies and programs may include, but are not limited to, the following:

- Policies and programs to minimize the cost of attendance for low-income students
- Programs to equip the institution’s faculty and staff to better serve students from low-income backgrounds
- Programs to prepare students from low-income backgrounds for higher education (e.g. U.S. federal TRIO programs)
- Scholarships provided specifically for low-income students
- Programs to guide parents of low-income students through the higher education experience
- Targeted outreach to recruit students from low-income backgrounds
- Scholarships provided specifically for part-time students
- An on-site child care facility, a partnership with a local facility, and/or subsidies or financial support to help meet the child care needs of students

Part 2

Institution is accessible and affordable to low-income students as demonstrated by one or more of the following indicators:

A. The percentage of entering students that are low-income

B. The graduation/success rate for low-income students

C. The percentage of student financial need met, on average

D. The percentage of students graduating with no interest-bearing student loan debt

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This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Health, Wellbeing & Work

This subcategory seeks to recognize institutions that have incorporated sustainability into their human resources programs and policies. An institution's people define its character and capacity to perform; and so, an institution's achievements can only be as strong as its community. An institution can bolster the strength of its community by making fair and responsible investments in its human capital. Such investments include offering benefits, wages, and other assistance that serve to respectfully and ethically compensate workers and acting to protect and positively affect the health, safety and wellbeing of the campus community. Investment in human resources is integral to the achievement of a healthy and sustainable balance between human capital, natural capital, and financial capital.

Credit
Employee Compensation
Assessing Employee Satisfaction
Wellness Program
Workplace Health and Safety

Employee Compensation

Criteria

Part 1

Institution’s employees and/or the employees of its on-site contractors are covered by sustainable compensation standards, guidelines, or policies and/or collective bargaining agreements.

A sustainable compensation (or “living wage”) standard, guideline or policy is one that addresses wages and benefits in terms of the ability of employees to meet basic needs. For example, a sustainable compensation policy may index hourly wages to a poverty guideline or to local cost-of-living indicators. A labor market survey, salary survey or similar assessment may be used in conjunction with a basic needs/cost-of-living approach, but is not sufficient on its own to count as a sustainable compensation policy.

Part 2

Institution’s employees and/or the employees of its on-site contractors receive sustainable compensation.

To earn points for Part 2 of this credit, an institution must assess employee compensation against one or more of the following:

1. A sustainable compensation standard developed or adopted by a committee with multi-stakeholder representation (i.e. its membership includes faculty, staff, and students and may include Human Resources administrators or other parties). The standard need not be formally adopted by the institution.
2. A sustainable compensation standard that is in use in the institution’s locality. The standard may be formal (e.g. a “living wage” ordinance covering public employees) or informal (e.g. a standard adopted by a local, regional or national campaign).
3. An appropriate poverty guideline, threshold or low-income cut-off for a family of four.

For institutions that elect to assess compensation against a poverty guideline, threshold or low-income cut-off, sustainable compensation is defined as wages equivalent to 120 percent of the poverty guideline for a family of four. An institution may offset up to 20 percent of the wage criteria with employer-paid benefits that address basic needs (e.g. healthcare and retirement contributions).

Both parts of this credit are based on the total number of employees working on campus as part of regular and ongoing campus operations, which includes:

- Staff and faculty, i.e. all regular full-time, regular part-time and temporary (or non-regular) employees, including adjunct faculty and graduate student employees (e.g. teaching and research assistants). Institutions may choose to include or omit undergraduate student workers.
- Employees of contractors that work on-site as part of regular and ongoing campus operations. Such contractors may include, but are not limited to, providers of dining/catering, cleaning/janitorial, maintenance, groundskeeping, transportation, and retail services.

Construction and demolition crews and other temporary contracted employees may be excluded.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Assessing Employee Satisfaction

Criteria

Institution conducts a survey or other evaluation that allows for anonymous feedback to measure employee satisfaction and engagement. The survey or equivalent may be conducted institution-wide or may be done by individual departments or divisions. The evaluation addresses (but is not limited to) the following areas:

- Job satisfaction
- Learning and advancement opportunities
- Work culture and work/life balance

The institution has a mechanism in place to address issues raised by the evaluation.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Wellness Program

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has a wellness and/or employee assistance program that makes available counseling, referral, and wellbeing services to all members of any of the following groups:

- Students
- Staff
- Faculty

Submission Note:

http://evp.harvard.edu/news/new-mindfulness-programs

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Workplace Health and Safety

Criteria

Part 1

Institution has reduced its total number of reportable workplace injuries and occupational disease cases per full-time equivalent (FTE) employee compared to a baseline.

Part 2

Institution has fewer than 5 reportable workplace injuries and occupational disease cases annually per 100 full-time equivalent (FTE) employees.

This credit includes employees of contractors working on-site for whom the institution is liable for workplace safety, for example workers for whom the institution is mandated to report injuries and disease cases by a health and safety authority such as the U.S. Occupational Health and Safety Administration (OSHA) or the Canadian Center for Occupational Health and Safety (CCOHS). Injuries and disease cases include OSHA/CCOHS-reportable fatal and non-fatal injuries (or the equivalent) arising out of or in the course of work and cases of diseases arising from a work-related injury or the work situation or activity (e.g. exposure to harmful chemicals, stress, ergonomic issues). See *Sampling and Data Standards*, below, for further guidance on reporting injuries and disease cases.

This credit was marked as **Not Pursuing** so Reporting Fields will not be displayed.

Investment

This subcategory seeks to recognize institutions that make investment decisions that promote sustainability. Most institutions invest some of their assets in order to generate income. Together, colleges and universities invest hundreds of billions of dollars. Schools with transparent and democratic investment processes promote accountability and engagement by the campus and community. Furthermore, institutions can support sustainability by investing in companies and funds that, in addition to providing a strong rate of return, are committed to social and environmental responsibility. Investing in these industries also supports the development of sustainable products and services. Finally, campuses can engage with the businesses in which they are invested in order to promote sustainable practices.

Throughout this subcategory, the term "sustainable investment" is inclusive of socially responsible, environmentally responsible, ethical, impact, and mission-related investment.

From the institution:

As a long-term investor, HMC is naturally focused on environmental, social, and governance (ESG) factors that may affect the performance of our investments—now and in the future. Aligned with our mission to provide strong long-term investment results to Harvard University, we consider material ESG criteria, among many factors, to inform our investment analysis and decision-making processes.

HMC, with the support of Harvard University, is the first university endowment in the United States to become a signatory to the United Nations-supported Principles for Responsible Investment (PRI).

We are also a signatory to the CDP's climate change program. The CDP, formerly known as the Carbon Disclosure Project, is an international non-profit organization that works with governments, public companies, and over 700 investors to drive environmental disclosure and performance of publicly listed companies.

Credit
Committee on Investor Responsibility
Sustainable Investment
Investment Disclosure

Committee on Investor Responsibility

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution has a formally established and active committee on investor responsibility (CIR) or similar body that makes recommendations to fund decision-makers on socially and environmentally responsible investment opportunities across asset classes, including proxy voting. The body has multi-stakeholder representation, which means its membership includes faculty, staff, and students and may include alumni, trustees, and/or other parties.

Institutions for which investments are handled by the university system and/or a separate foundation of the institution should report on the investment policies and activities of those entities.

A general committee that oversees the institution's investments does not count for this credit unless social and environmental responsibility is an explicit part of its mission and/or agenda.

This credit applies to institutions with endowments of US $1 million or larger. Institutions with endowments totaling less than US $1 million may choose to omit this credit.

"---" *indicates that no data was submitted for this field*

Does the institution have a formally established and active committee on investor responsibility (CIR) or similar body that has multi-stakeholder representation and otherwise meets the criteria for this credit?:

Yes

The charter or mission statement of the CIR or other body which reflects social and environmental concerns or a brief description of how the CIR is tasked to address social and environmental concerns:

The Advisory Committee on Shareholder Responsibility (ACSR) comprises twelve members: four members of the faculty, four students, and four alumni. Each year, through a series of meetings, the ACSR carefully considers a range of shareholder resolutions raising issues of corporate social responsibility, in regard to publicly traded companies in which Harvard owns shares. It formulates its recommendations in light of what is now a wide and deep body of precedent, in areas that range from human rights to environmental practices, from equal employment opportunity to corporate political contributions and beyond. The ACSR presents its recommendations, along with its reasoning, to the Corporation Committee on Shareholder Responsibility (CCSR). In light of the ACSR's analysis of issues and consideration of precedent, the CCSR exercises the Harvard Corporation's fiduciary duty to determine how Harvard votes on social responsibility proxies each year. The CCSR issues an extensive annual report that summarizes the ACSR's recommendations and rationale and sets forth the CCSR's decisions on how to vote. While advice on proxy voting has been the steady focus of the ACSR's annual efforts, over the years the CCSR has occasionally sought advice from the ACSR on questions of investment (or divestment) policy.

Members of the CIR, including affiliations and role (e.g. student, faculty, alumni):

List of members at:

http://www.harvard.edu/shareholder-responsibility-committees

Examples of CIR actions during the previous three years:

The CCSR publishes an annual report summarizing its actions at:

http://www.harvard.edu/shareholder-responsibility-committees

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Over the years, Harvard’s two Shareholder Committees have considered shareholder proposals addressing a wide range of topics, including environmental concerns, corporate involvement in the political process, human rights and equal employment. For example, in 2014, the CCSR followed the ACSR's recommendation to support proposals calling on companies to adopt goals for reducing greenhouse gas emissions, to provide detailed reports on corporate political giving, to review policies for addressing human rights, and to provide diversity data on workplace demographics.

The website URL where information about the CIR is available:

http://www.harvard.edu/shareholder-responsibility-committees

Sustainable Investment

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

There are two possible approaches to this credit; institutions may pursue one or both. Institutions for which investments are handled by the university system, a separate foundation of the institution and/or a management company contracted by the institution should report on the combined activities of those entities.

Option 1: Positive Sustainability Investment

Institution invests in one or more of the following:

- **Sustainable industries** (e.g. renewable energy or sustainable forestry). This may include any investment directly in an entire industry sector as well as holdings of companies whose entire business is sustainable (e.g. a manufacturer of wind turbines).
- **Businesses *selected for* exemplary sustainability performance** (e.g. using criteria specified in a sustainable investment policy)**.** This includes investments made, at least in in part, because of a company's social or environmental performance. Existing stock in a company that happens to have socially or environmentally responsible practices should not be included unless the investment decision was based, at least in part, on the company's sustainability performance.
- **Sustainability investment funds** (e.g. a renewable energy or impact investment fund). This may include any fund with a mission of investing in a sustainable sector or industry (or multiple sectors), as well as any fund that is focused on purchasing bonds with sustainable goals.
- **Community development financial institutions** (CDFI) or the equivalent (including funds that invest primarily in CDFIs or the equivalent).
- **Socially responsible mutual funds with positive screens** (or the equivalent). Investment in a socially responsible fund with only negative screens (i.e. one that excludes egregious offenders or certain industries, such as tobacco or weapons manufacturing) does not count for Option 1.
- **Green revolving loan funds** that are funded from the endowment

Option 2: Investor Engagement

Institution has policies and/or practices that meet one or more of the following criteria:

- Has a publicly available sustainable investment policy (e.g. to consider the social and/or environmental impacts of investment decisions in addition to financial considerations)
- Uses its sustainable investment policy to select and guide investment managers
- Has engaged in proxy voting to promote sustainability, either by its CIR or other committee or through the use of guidelines, during the previous three years
- Has filed or co-filed one or more shareholder resolutions that address sustainability or submitted one or more letters about social or environmental responsibility to a company in which it holds investments, during the previous three years

- Has a publicly available investment policy with negative screens, for example to prohibit investment in an industry (e.g. tobacco or weapons manufacturing) or participate in a divestment effort (e.g. targeting fossil fuel production or human rights violations)
- Engages in policy advocacy by participating in investor networks (e.g. Principles for Responsible Investment, Investor Network on Climate Risk, Interfaith Center on Corporate Responsibility) and/or engages in inter-organizational collaborations to share best practices

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"---" *indicates that no data was submitted for this field*

Total value of the investment pool:

36,400,000,000 *US/Canadian $*

Value of holdings in each of the following categories::

	Value of Holdings
Sustainable industries (e.g. renewable energy or sustainable forestry)	0 *US/Canadian $*
Businesses selected for exemplary sustainability performance (e.g. using criteria specified in a sustainable investment policy)	0 *US/Canadian $*
Sustainability investment funds (e.g. a renewable energy or impact investment fund)	0 *US/Canadian $*
Community development financial institutions (CDFIs) or the equivalent	0 *US/Canadian $*
Socially responsible mutual funds with positive screens (or the equivalent)	0 *US/Canadian $*
Green revolving loan funds that are funded from the endowment	---

A brief description of the companies, funds, and/or institutions referenced above:

Harvard Management Company does not disclose value of individual holdings.

Does the institution have a publicly available sustainable investment policy?:

No

A copy of the sustainable investment policy:

The sustainable investment policy:

As a long-term investor, HMC is naturally focused on environmental, social, and governance (ESG) factors that may affect the performance of our investments—now and in the future. Aligned with our mission to provide strong long-term investment results to Harvard University, we consider material ESG criteria, among many factors, to inform our investment analysis and decision-making processes.

HMC, with the support of Harvard University, is the first university endowment in the United States to become a signatory to the United Nations-supported Principles for Responsible Investment (PRI). We are also a signatory to the CDP's climate change program. The CDP, formerly known as the Carbon Disclosure Project, is an international non-profit organization that works with governments, public companies, and over 700 investors to drive environmental disclosure and performance of publicly listed companies.

For more on Harvard's commitment to sustainable investing visit:

http://www.hmc.harvard.edu/investment-management/sustainable_investment.html

Does the institution use its sustainable investment policy to select and guide investment managers?:

A brief description of how the policy is applied, including recent examples:

Does the institution's sustainable investment policy include negative screens?:

A brief description of the negative screens and how they have been implemented:

Harvard University has standing exclusion policies pertaining to its direct investments in companies engaged in the manufacture of tobacco products as well as two companies, PetroChina and Sinopec, involved in oil production activities with the Government of Sudan. Harvard Management Company oversees the implementation of these exclusions. Harvard University's standing exclusion policies pertain to its direct investments in public companies.

Approximate percentage of the endowment that the negative screens apply to:

Has the institution engaged in proxy voting, either by its CIR or other committee or through the use of guidelines, to promote sustainability during the previous three years?:

Yes

A copy of the proxy voting guidelines or proxy record:

A brief description of how managers are adhering to proxy voting guidelines:

The Advisory Committee on Shareholder Responsibility (ACSR), a committee that includes students, faculty and alumni representatives, deliberates and makes recommendations for voting proxies to the Corporation Committee on Shareholder Responsibility (CCSR). The CCSR, a subcommittee of the Harvard Corporation, is responsible for determining how Harvard should vote on social responsibility proxies. Shareholder proposals regarding corporate governance matters are reviewed by Harvard Management Company and voted accordingly.

Has the institution filed or co-filed one or more shareholder resolutions that address sustainability or submitted one or more letters about social or environmental responsibility to a company in which it holds investments during the previous three years?:

Yes

Examples of how the institution has engaged with corporations in its portfolio about sustainability issues during the previous three years:

The CCSR directly communicates as appropriate with companies on matters related to proxy voting decisions. Detailed information about CCSR proxy voting is available on Harvard's website on its Shareholder Responsibility Committees (

http://www.harvard.edu/shareholder-responsibility-committees

). In 2015, Harvard Management Company, will join more than 700 institutional investors working with the CDP, formerly known as the Carbon Disclosure Project, to request more than 5,000 public companies to disclose climate risks.

Does the institution engage in policy advocacy by participating in investor networks and/or engaging in inter-organizational collaborations to share best practices?:

Yes

A brief description of the investor networks and/or collaborations:

Harvard Management Company (HMC), with the support of Harvard University, is the first university endowment in the United States to become a signatory to the United Nations-supported Principles for Responsible Investment (PRI). The PRI is a network of international investors who are committed to integrating ESG issues into their investment practices and ownership policies. As a signatory, HMC commits implementing the six Principles put forth by the organization in managing the University's endowment and related financial assets. HMC is also a signatory to the CDP's climate change program. The CDP, formerly known as the Carbon Disclosure Project, is an international non-profit organization that works with governments, public companies, and over 700 investors to drive environmental disclosure and performance of publicly listed companies.

The website URL where information about the institution's sustainable investment efforts is available:

http://www.hmc.harvard.edu/investment-management/sustainable_investment.html

Investment Disclosure

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

Institution makes a snapshot of its investment holdings available to the public, including the amount invested in each fund and/or company and proxy voting records. The snapshot of holdings is updated at least once per year.

Institutions for which investments are handled by the university system, a separate foundation of the institution and/or a management company contracted by the institution should report on the combined activities of those entities.

Submission Note:

Harvard Management Company's policy portfolio is the underlying framework for its investment activity. The policy portfolio is a theoretical portfolio allocated among asset classes in a mix that is judged to be most appropriate for Harvard University from both the perspective of potential return and risk over the long term.

http://www.hmc.harvard.edu/investment-management/policy_portfolio.html

"---" *indicates that no data was submitted for this field*

Does the institution make a snapshot of its investment holdings available to the public?:

No

The percentage of the total investment pool included in the snapshot of investment holdings:

0

A copy of the investment holdings snapshot:

The website URL where the holdings snapshot is publicly available:

http://www.hmc.harvard.edu/investment-management/policy_portfolio.html

Innovation

Innovation

These credits recognize institutions that are seeking innovative solutions to sustainability challenges and demonstrating sustainability leadership in ways that are not otherwise captured by STARS.

Credit
Innovation 1
Innovation 2
Innovation 3
Innovation 4

Innovation 1

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

1. Innovation credits are reserved for new, extraordinary, unique, ground-breaking, or uncommon outcomes, policies, and practices that greatly exceed the highest criterion of an existing STARS credit or are not covered by an existing STARS credit.
2. In general, innovation credits should have roughly similar impacts or be on the same scale as other STARS credits.
3. Outcomes, policies, and practices that are innovative for the institution's region or institution type are eligible for innovation credits.
4. The innovative practice, policy, program, or outcome must have occurred within the three years prior to the anticipated date of submission.
5. The innovative practice or program has to be something that the institution has already done; planned activities do not count.
6. The innovative practice or program should originate from an area within the defined institutional boundary.
7. An institution can only claim a particular activity as an innovation credit once. When re-submitting for a STARS rating, an innovation credit that the institution submitted previously cannot be re-submitted. An institution that has made significant advancements to a project or program that was previously submitted as an innovation may resubmit based on those advancements if the project or program is still considered innovative.
8. Practices, policies, and programs that were once considered innovative but are now widely adopted (e.g. being the first institution to enact a policy 20 years ago that is now common) may not be claimed as innovation credits.
9. Multiple activities or practices whose sum is innovative can be considered for an innovation credit as long as those activities or practices are related. For example, three innovative waste reduction programs in research laboratories could be listed together under a single innovation credit for Greening Laboratories. Listing a series of unrelated accomplishments or events under a single innovation credit is not accepted.
10. While the practices that led to receiving an award may be appropriate for an innovation credit, winning awards and/or high sustainability rankings in other assessments is not, in and of itself, grounds for an innovation credit. When the innovation is part of a partnership, the summary provided must clearly describe the institution's role in the innovation.

To help ensure that the policy, practice, program, or outcome that the institution is claiming for an innovation credit is truly innovative, institutions must submit a letter of affirmation from an individual with relevant expertise in the associated content area. The letter should affirm how the innovation meets the criteria outlined above.

For example, if an institution claims an innovation credit for water use reduction, the institution might solicit a letter from a hydrologist or a water expert from another campus or organization to verify that the strategy is innovative. An innovation may be affirmed internally by campus personnel who are independent of the policy, practice, program, or outcome. Please note that it is not required that the individual be employed in the higher education sector to submit a letter of verification.

The letter should be specific to a single innovation credit. If an institution is claiming three innovation credits, it would solicit and submit three separate letters, with each letter speaking to the specific innovation credit it addresses.

Title or keywords related to the innovative policy, practice, program, or outcome:

Harvard Food Better Campaign

A brief description of the innovative policy, practice, program, or outcome :

In 2014 a coalition of Harvard partners, launched the Harvard Food Better Campaign, to focus the Harvard community on the food system and how to improve it – how to grow better, eat better, shop better, conserve better . . . how to Food Better. This year, the Harvard Innovation Lab is hosting a year-long Deans' Food System Challenge, in which students from across the university are invited to develop innovative solutions to make our food system more healthy and sustainable. In conjunction with the Challenge, the Harvard Food Law and Policy Clinic, Harvard University Dining Services, Food Literacy Project, and Harvard Office for Sustainability are opening a year-long, community-wide dialogue about how we can Food Better, which will include events, field trips and more.

A brief description of any positive measurable outcomes associated with the innovation (if not reported above):

The Food Better campaign has already resulted in dozens of events, attended by hundreds of community members. The Food Challenge is underway so no measurable outcomes are available now.

Each month, Food Better events will focus on a different theme (closely tied to Deans' Challenge topic areas):

SEPTEMBER 2014: PEOPLE AND LABOR IN THE FOOD SYSTEM

OCTOBER 2014: PRODUCING SUSTAINABLE, NUTRITIOUS FOOD

NOVEMBER 2014: INNOVATING IN FOOD DISTRIBUTION AND MARKETS

FEBRUARY 2015: IMPROVING OUR DIET

MARCH 2015: REDUCING FOOD WASTE

APRIL 2015: CLIMATE CHANGE AND THE FOOD SYSTEM

A letter of affirmation from an individual with relevant expertise:

Affirmation Letter.docx

Which of the following STARS subcategories does the innovation most closely relate to? (Select all that apply up to a maximum of 5):

	Yes or No
Curriculum	---
Research	Yes

Campus Engagement	---
Public Engagement	Yes
Air & Climate	---
Buildings	---
Dining Services	Yes
Energy	---
Grounds	---
Purchasing	---
Transportation	---
Waste	---
Water	---
Coordination, Planning & Governance	Yes
Diversity & Affordability	---
Health, Wellbeing & Work	Yes
Investment	---

Other topic(s) that the innovation relates to that are not listed above:

Food

The website URL where information about the innovation is available :

http://foodbetter.squarespace.com/about-food-better-campaign/

Innovation 2

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

1. Innovation credits are reserved for new, extraordinary, unique, ground-breaking, or uncommon outcomes, policies, and practices that greatly exceed the highest criterion of an existing STARS credit or are not covered by an existing STARS credit.
2. In general, innovation credits should have roughly similar impacts or be on the same scale as other STARS credits.
3. Outcomes, policies, and practices that are innovative for the institution's region or institution type are eligible for innovation credits.
4. The innovative practice, policy, program, or outcome must have occurred within the three years prior to the anticipated date of submission.
5. The innovative practice or program has to be something that the institution has already done; planned activities do not count.
6. The innovative practice or program should originate from an area within the defined institutional boundary.
7. An institution can only claim a particular activity as an innovation credit once. When re-submitting for a STARS rating, an innovation credit that the institution submitted previously cannot be re-submitted. An institution that has made significant advancements to a project or program that was previously submitted as an innovation may resubmit based on those advancements if the project or program is still considered innovative.
8. Practices, policies, and programs that were once considered innovative but are now widely adopted (e.g. being the first institution to enact a policy 20 years ago that is now common) may not be claimed as innovation credits.
9. Multiple activities or practices whose sum is innovative can be considered for an innovation credit as long as those activities or practices are related. For example, three innovative waste reduction programs in research laboratories could be listed together under a single innovation credit for Greening Laboratories. Listing a series of unrelated accomplishments or events under a single innovation credit is not accepted.
10. While the practices that led to receiving an award may be appropriate for an innovation credit, winning awards and/or high sustainability rankings in other assessments is not, in and of itself, grounds for an innovation credit. When the innovation is part of a partnership, the summary provided must clearly describe the institution's role in the innovation.

To help ensure that the policy, practice, program, or outcome that the institution is claiming for an innovation credit is truly innovative, institutions must submit a letter of affirmation from an individual with relevant expertise in the associated content area. The letter should affirm how the innovation meets the criteria outlined above.

For example, if an institution claims an innovation credit for water use reduction, the institution might solicit a letter from a hydrologist or a water expert from another campus or organization to verify that the strategy is innovative. An innovation may be affirmed internally by campus personnel who are independent of the policy, practice, program, or outcome. Please note that it is not required that the individual be employed in the higher education sector to submit a letter of verification.

The letter should be specific to a single innovation credit. If an institution is claiming three innovation credits, it would solicit and submit three separate letters, with each letter speaking to the specific innovation credit it addresses.

Title or keywords related to the innovative policy, practice, program, or outcome:

Mindfulness at Work

A brief description of the innovative policy, practice, program, or outcome:

Mindfulness at Work is an initiative that grows out of Harvard's commitment to provide employees with new tools to manage stress and increase personal resilience. The programs and courses that comprise Mindfulness at Work are part of the University-wide initiative, Healthy Harvard, which is designed to support the well-being of staff and faculty across the many dimensions of their lives.

A brief description of any positive measurable outcomes associated with the innovation (if not reported above):

The program includes:

Six-week course. Mindfulness at Work is a free course, held on campus and during work hours, that teaches the fundamentals of mindfulness practice with an emphasis on meditation. These sessions are open to anyone in Central Administration and are located around Harvard Square. To date, over 200 staff have participated in the six-session course. A typical six-week session combines theory and practice as it introduces sitting meditation, the physiology of stress and neuroscience, mindful movement and listening, and the integration of mindfulness into daily life.

One-hour workshops are offered on a regular basis. These sessions are useful as introductions to mindfulness and its practice beyond meditation and into daily living; workshops are also good as refreshers for those who have been through the six-week course. Topics include Introduction to Mindfulness; Managing Daily Stresses: A Mindful Approach to Work; Mindfulness and Parenting; Mindfulness: Self Care; and more.

Guided Meditation Line, 4-CALM. This Harvard telephone line (617-384-2256) provides three- and four-minute guided meditations, pointers to other Harvard resources, and reflections on stress and resilience.

Tailored mindfulness programs for departments. Departments can request an overview and introduction to mindfulness for staff meetings, special events, or leadership briefings. Departments may also request specially designed four, six, or eight week mindfulness programs to be held on site for their staff.

A letter of affirmation from an individual with relevant expertise:

Affirmation Letter.docx

Which of the following STARS subcategories does the innovation most closely relate to? (Select all that apply up to a maximum of five):

	Yes or No
Curriculum	---
Research	---

Campus Engagement	Yes
Public Engagement	---
Air & Climate	---
Buildings	---
Dining Services	---
Energy	---
Grounds	---
Purchasing	---
Transportation	---
Waste	---
Water	---
Coordination, Planning & Governance	---
Diversity & Affordability	---
Health, Wellbeing & Work	Yes
Investment	---

Other topic(s) that the innovation relates to that are not listed above:

The website URL where information about the innovation is available:

http://evp.harvard.edu/book/what-mindfulness-work

Innovation 3

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

1. Innovation credits are reserved for new, extraordinary, unique, ground-breaking, or uncommon outcomes, policies, and practices that greatly exceed the highest criterion of an existing STARS credit or are not covered by an existing STARS credit.
2. In general, innovation credits should have roughly similar impacts or be on the same scale as other STARS credits.
3. Outcomes, policies, and practices that are innovative for the institution's region or institution type are eligible for innovation credits.
4. The innovative practice, policy, program, or outcome must have occurred within the three years prior to the anticipated date of submission.
5. The innovative practice or program has to be something that the institution has already done; planned activities do not count.
6. The innovative practice or program should originate from an area within the defined institutional boundary.
7. An institution can only claim a particular activity as an innovation credit once. When re-submitting for a STARS rating, an innovation credit that the institution submitted previously cannot be re-submitted. An institution that has made significant advancements to a project or program that was previously submitted as an innovation may resubmit based on those advancements if the project or program is still considered innovative.
8. Practices, policies, and programs that were once considered innovative but are now widely adopted (e.g. being the first institution to enact a policy 20 years ago that is now common) may not be claimed as innovation credits.
9. Multiple activities or practices whose sum is innovative can be considered for an innovation credit as long as those activities or practices are related. For example, three innovative waste reduction programs in research laboratories could be listed together under a single innovation credit for Greening Laboratories. Listing a series of unrelated accomplishments or events under a single innovation credit is not accepted.
10. While the practices that led to receiving an award may be appropriate for an innovation credit, winning awards and/or high sustainability rankings in other assessments is not, in and of itself, grounds for an innovation credit. When the innovation is part of a partnership, the summary provided must clearly describe the institution's role in the innovation.

To help ensure that the policy, practice, program, or outcome that the institution is claiming for an innovation credit is truly innovative, institutions must submit a letter of affirmation from an individual with relevant expertise in the associated content area. The letter should affirm how the innovation meets the criteria outlined above.

For example, if an institution claims an innovation credit for water use reduction, the institution might solicit a letter from a hydrologist or a water expert from another campus or organization to verify that the strategy is innovative. An innovation may be affirmed internally by campus personnel who are independent of the policy, practice, program, or outcome. Please note that it is not required that the individual be employed in the higher education sector to submit a letter of verification.

The letter should be specific to a single innovation credit. If an institution is claiming three innovation credits, it would solicit and submit three separate letters, with each letter speaking to the specific innovation credit it addresses.

Title or keywords related to the innovative policy, practice, program, or outcome:

Catch of the Day Program

A brief description of the innovative policy, practice, program, or outcome:

As part of an innovative seafood purchasing program developed in partnership with National Geographic fellow Barton Seaver, Harvard University Dining Services has started serving fish from local vendor Red's Best in dining halls for lunch on Fridays under a program it calls the "Catch of the Day."

Starting in late January 2015, Red's Best began selling 760 pounds of fresh fish to HUDS weekly, depending on what local fishermen caught that week, at a pre-determined rather than market price, according to Crista Martin, HUDS director for marketing and communications.

Under the new program, HUDS will not know what variety of fish it will serve each coming Friday until that week, but offerings will include haddock, pollock, redfish, hake, cod, and flounder, according to Martin.

Each dining hall will receive a recipe based on the fish that it will serve each week and begin preparing the food on Thursdays, according to Ted Smith, a chef at Quincy House. HUDS served pollock on the two most recent Fridays, according to Smith. Smith said the program aims to ensure that the fish HUDS serves is fresh. In the past, fish like flounder were usually flash frozen, according to Smith. He said feedback so far has been positive.

The sustainable seafood program developed with Barton Seaver includes the following criteria and factors for purchasing:

Criteria for Sustainability:
(any combination of the below)
• Certified by a recognized resource
• Locally/domestically sourced
• An abundant species
• Where appropriate, off-cuts used to ensure no waste of fish
Key Factors in Sourcing Sustainable Seafood:
• Price – good for HUDS and for the fishermen
• A volume available for our scale of ordering
(700-1,200 lbs per service)
• Customer taste/choice
• Can be purchased in a manner we can prepare
(already fileted, etc.)

A brief description of any positive measurable outcomes associated with the innovation (if not reported above):

On Tuesday of each week, Red's Best will let us know what type of fish is plentiful – typically one of six varieties readily caught off our coast: Haddock, Pollock, Redfish, Hake, Cod or Flounder. We need more than 700 pounds of fish, and then it is featured at lunch on Fridays. The fishermen will get a consistent price for their catch, not subject to market variation.

A letter of affirmation from an individual with relevant expertise:

Which of the following STARS subcategories does the innovation most closely relate to? (Select all that apply up to a maximum of five):

	Yes or No
Curriculum	---
Research	---
Campus Engagement	---
Public Engagement	Yes
Air & Climate	---
Buildings	---
Dining Services	Yes
Energy	---
Grounds	---
Purchasing	---
Transportation	---
Waste	---
Water	---
Coordination, Planning & Governance	---
Diversity & Affordability	---
Health, Wellbeing & Work	---
Investment	---

Other topic(s) that the innovation relates to that are not listed above:

The website URL where information about the innovation is available:

http://www.thecrimson.com/article/2015/2/10/huds-fish-catch-weekly/

Innovation 4

Responsible Party

Colin Durrant
Manager of Sustainability Communications
Office for Sustainability

Criteria

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The letter should be specific to a single innovation credit. If an institution is claiming three innovation credits, it would solicit and submit three separate letters, with each letter speaking to the specific innovation credit it addresses.

Submission Note:

Learn about the Harvard Undergraduate Beekeepers at:

http://www.harvardundergraduatebeekeepers.com/

Learn about the Graduate School of Design Pollinators group:

http://gsdbees.tumblr.com/

"---" *indicates that no data was submitted for this field*

Title or keywords related to the innovative policy, practice, program, or outcome:

Harvard Forest Biomass Project

A brief description of the innovative policy, practice, program, or outcome:

The Harvard Forest's new, super-efficient, thermal biomass system, which provides heating to five nearby buildings, is expected to reduce greenhouse-gas emissions because it is fueled by wood that has been responsibly harvested by the woods crew. The system will allow researchers to explore how using plants can be an integral component of an actively managed forest that supports long-term conservation and local economies.

With this project, we are putting our assertions into practice and providing a practical application to our fundamental research exploring the role of forests as infrastructure," said Forest Director David Foster. "We can address looming questions about carbon dynamics, and the linkages between conservation, use of resources, and the way our land can figure in as a solution toward climate change."

"The Harvard Forest is truly leading by example, not only by demonstrating sustainable forest management, but also by using its renewable wood resources to provide heat and reduce the carbon footprint of its facility," said Stephanie Cooper, assistant secretary for land and forest conservation at the Massachusetts Executive Office of Energy and Environmental Affairs.

The trees used to fuel the boilers are harvested as part of a sustainable management plan. The woods crew focuses on taking low-quality material out of the forests for use as biomass, therefore improving the growth and quality of trees with a higher economic and ecological value.

A brief description of any positive measurable outcomes associated with the innovation (if not reported above):

Small-scale biomass systems for heat, like the Harvard Forest, have net-positive benefits because they are more efficient, have less impact on forests, and haul wood over less distance.

Wood is fed into the boilers at least three times a day to heat a large thermal storage tank that pushes up to 100 gallons of hot water per minute to heating loops in the various buildings.

The decades-long, interdisciplinary research projects in place in the Harvard Forest focus on tracking carbon emissions in the air, measuring how much of that carbon gets stored in trees and soil, and understanding how the carbon flow is affected by changes such as logging or hurricanes.

"Without thinking about it, we have greatly expanded our research team," said Foster. "Our woods crew now tracks their activities, collecting and analyzing data in order to benefit the larger research being conducted here."

Carbon emissions are a major contributor to global climate change, so an improved understanding of what role forests play in taking carbon out of the atmosphere would help policymakers and governments determine more effective strategies for conserving and managing land to improve the environment.

A letter of affirmation from an individual with relevant expertise:

Affirmation Letter.docx

Which of the following STARS subcategories does the innovation most closely relate to? (Select all that apply up to a maximum of five):

	Yes or No
Curriculum	---
Research	Yes
Campus Engagement	---
Public Engagement	---
Air & Climate	Yes
Buildings	---
Dining Services	---
Energy	Yes
Grounds	Yes
Purchasing	---
Transportation	---
Waste	---
Water	---
Coordination, Planning & Governance	---

Diversity & Affordability	---
Health, Wellbeing & Work	---
Investment	---

Other topic(s) that the innovation relates to that are not listed above:

The website URL where information about the innovation is available:

http://news.harvard.edu/gazette/story/2014/01/warmth-from-the-woods/