

The issues are complex.
The solutions start with you.



To provide professionals the scientific knowledge and practical tools to address current and emerging sustainability issues, the Earth Institute offers the:

Executive Education Certificate Program in Conservation and Environmental Sustainability.

> Who should enroll?

The Certificate is ideal for: candidates with a professional and/or civic interest in environmental sustainability; those interested in the science behind environmental issues and cutting-edge sustainability practices; and, managers interested in translating this knowledge into sound decision making and action. The Certificate attracts professionals across sectors, including finance, media, engineering, insurance, law, public policy/relations, art and design, architecture, health care, social development, construction and marketing. This program is an opportunity to learn firsthand about current developments in sustainability, increase your general knowledge about a specific topic or work toward your own professional development goals.

Accommodating the working professional:

- Classes are held from 6 p.m. to 8 p.m. at Columbia University in New York City (with access to all University facilities).
- Courses meet once a week for five weeks.
- Weekend field courses are offered but not required.
- **Rolling admission deadlines.**
- No previous coursework or scientific knowledge is required
- The Certificate, which grants an official transcript from Columbia University, can be done in as little as nine months or as long as three years. Twelve courses must be completed to graduate.

Founded in 1994, The Certificate Program brings together global scientific and environmental leaders: the American Museum of Natural History, Columbia University, the New York Botanical Garden, the Wildlife Conservation Society and Wildlife Trust. Faculty and researchers from these institutions (with projects in over 60 countries) provide the scientific knowledge taught in the Certificate Program, while practitioners from the public and private sectors provide hands-on approaches to global sustainability issues.

The Certificate Program has been engaged in executive training since 1997. Alumni have made significant contributions to their organizations' sustainability projects, greened their careers, advocated in their communities and pursued advanced degrees. Successful completion of the Certificate's science courses is recognized as preparation for two Columbia University graduate programs: the M.P.A. in Environmental Science and Policy and the M.S. in Sustainability Management.

The Certificate Program is headquartered at the Earth Institute, Columbia University.

For further details, please contact **Desmond Beirne** at 212-854-0149 or djb2104@columbia.edu.

eices.columbia.edu

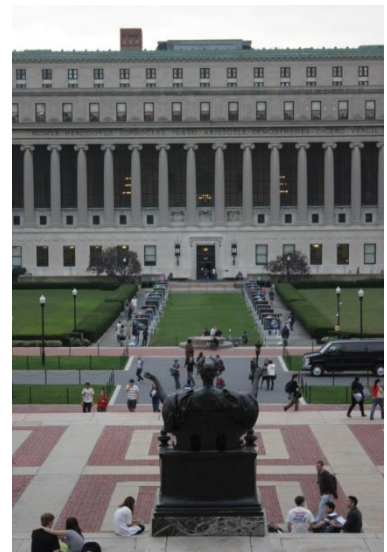
Earth Institute Center for Environmental Sustainability (EICES)

The Earth Institute Center for Environmental Sustainability brings together a world-renowned university, conservation organizations and an international NGO: **Columbia University, the American Museum of Natural History, the Wildlife Conservation Society, the New York Botanical Garden and the Wildlife Trust.**

EICES has been actively involved in protecting ecosystems since its inception in 1994. EICES is a forum for global environmental leaders to emphasize the essential role of the natural world in sustainable development. Through a diverse array of strategic partners in science, education and outreach, the center builds unique programs that promote human well-being through the preservation, restoration and management of biodiversity and the services our ecosystems provide.

Through science-based and holistic solutions, our program participants learn to apply “green” principles in the private and public sectors. Since the program’s inception, Certificate Program alumni have greened their careers, advocated in their communities and pursued advanced degrees. Successful completion of certificate science courses is recognized as preparation for two Columbia University graduate programs: the M.P.A. in Environmental Science and Policy and the M.S. in Sustainability Management.

Please join EICES in advancing the work on environmental sustainability. Candidates from all professions and interests are encouraged to enroll.



About The Earth Institute's Executive Education Certificate Program in Conservation and Environmental Sustainability

The Certificate Program provides professionals with the knowledge and tools to be effective environmental leaders and decision makers in the 21st century. It is an evening program in which environmental issues are discussed, debated and examined, where participants develop an in-depth understanding of conservation science and practice through case studies and a focus on Environmental Policy, Management and Finance.

The Certificate program gives public and private sector managers the knowledge and tools to make sound decisions about business activities and policy practices that impact the environment. The Certificate offers foundational courses in the science of environmental sustainability as well as electives designed to inform specific sectors such as finance, health and water management.

We offer a platform of *integrated and holistic thinking* on the interconnectedness of nature's systems, including energy, water and biodiversity, focusing on real problems and solutions. We also assert that environmental sustainability can be better achieved as thinking shifts to this integrated approach, allowing us to ask the right questions and arrive at powerful, implementable and measurable solutions.

The Certificate Program accommodates the working professional:

- Classes from 6 P.M. to 8 P.M. on the Columbia University campus in Manhattan
- Courses meet once a week for five weeks
- Weekend field courses are offered but not required
- Uses a rolling admissions process
- The Certificate, which grants an official transcript from Columbia University, can be done in as little as nine months or as long as three years. Twelve courses must be completed to graduate.



Program Applications

Relevance: With an increasing “green economy,” sustainability issues are progressively more important in both the public and private sectors. Certificate courses offer new insights on the scientific and physical dimension of sustainability, providing a vocabulary and general background in conservation science, skills for critical analysis and tools for sustainable thinking and action. This allows professionals to have important positive “green” impacts and make sound decisions in areas such as land use management, project finance, supply chains and environmental metrics, to name a few.

Flexibility: Courses are shorter in length than regular university classes. They typically run in five-week sessions with courses taking place one evening a week. To receive a certificate with an official transcript from Columbia University there is a 12-course curriculum, but anyone is welcome to register for individual classes that interest them.

University Access: The Certificate provides access to Columbia University talks, workshops and networking opportunities as well as library and facility use on campus. There is also the benefit of interacting with the 350+ graduates of the program at alumni meetings as well as with sustainability leaders at the many Earth Institute events throughout the year (i.e., <http://www.stateoftheplanet.org/content/video>).

Link to Other Programs: Successful completion of Certificate’s Core Science Fundamental courses will be recognized as preparation by the following graduate programs at Columbia University:

- M.P.A. in Environmental Science and Policy
- M.S. in Sustainability Management

Who should enroll? The Certificate is ideal for candidates with a professional and/or civic interest in environmental sustainability; those interested in the science behind environmental issues and cutting-edge sustainability practices; and, managers interested in translating this knowledge into sound decision making and action. The Certificate Program attracts professionals across sectors, including finance, media, engineering, insurance, law, public policy/relations, art and design, architecture, health care, social development, construction and marketing. This program is an opportunity to learn firsthand about current developments in sustainability, increase your general knowledge about a specific topic or work toward your own professional development goals.

Program Structure

The Certificate is awarded to participants who satisfactorily complete 12 courses (120 hours of instruction) in the program. Courses are five-weeks long, typically meet one evening per week for two hours and may include weekend workshops. Some courses may include an extra field trip off-campus; when opting for intensive field courses, you spend several days at a field site.

Participants are admitted into the Certificate Program on a competitive basis. Once enrolled, you can complete the coursework in as few as 9 months or up to 3 years. You must enroll in at least two modules per semester in order to maintain standing.

Courses are divided into four categories:

Science Fundamentals of Environmental Sustainability	5 courses required
Case Studies in Environmental Sustainability	3 courses required
International Field Experiences (optional)	
Practical Tools	1 course required
Environmental Policy, Management and Finance	3 courses required

Total number of courses required to earn the Certificate

12

An Independent Study can be proposed by Certificate Candidates (see Course Categories).



Course Categories

Science Fundamental courses give participants a foundation in the vocabulary and basic concepts that define the field of environmental sustainability, with a focus on ecology, basic economics and policy and human ecology. These courses are pre-requisite for many of the advanced electives.

Case Study courses allow participants to explore environmental conservation science in depth and examine specific taxa or scientific areas (i.e., Coral Reefs, or Conservation Genetics), habitats (i.e., Forest Ecology) or environmental concerns (i.e., Disease Ecology). International Field experiences are available, mainly in the Caribbean.

Practical Tools ensure that participants receive practical, hands-on training in applied conservation skills. Offerings include field courses, independent courses, Geographic Information Systems, topography and map reading.

Environmental Policy, Management and Finance (EPMF). Policy courses look at the interaction of human society and the environment, as well as the policy tools available to help promote conservation goals. Topics include — but are not limited to — law, international development, wildlife trade, local conservation and specialized courses in the management of environmental conservation. Business and finance courses focus on corporate practices and financial tools to better manage natural resources and help protect the environment. EPMF courses provide an effective combination of resources and instruments available to the public and private sectors as they move toward environmental sustainability.

Independent Study. A course can be proposed and, depending on the research topic of the study, it can replace one course in any category, except Science Fundamentals. The proposed course needs to be approved by and completed with a faculty advisor.



Course List

Sorted by Columbia University Course Numbers

Science Fundamentals (All 5 Required)

Diversity and Conservation	ENVB 0300
Environmental Economics	ENVB 0353
Evolution: Darwin to DNA	ENVB 0450
Introduction to Ecology	ENVB 0301
Introduction to Environmental Policy	ENVB 0351

Case Study Courses (2 Required)

Climate and Biodiversity	ENVB 0324
Climate Change: History, Causes, Economics and Decisions	ENVB 0341
Disease Ecology	ENVB 0306
Ecology and Sustainable Water Management	ENVB 0403
Forest Management and Conservation: Black Rock Forest	ENVB 0338
Green IT: Paradox and Practice	ENVB 0388
Hydraulic Fracturing: Energy, Environment and Policy	ENVB 0376
Sustainable Buildings: Design and Construction...	ENVB 0500
The Gulf Oil Spill: Implications for Leadership	ENVB 0378
The Sustainable City	ENVB N0483

International Field Experiences (Optional)

Coral Reefs Ecology: Bermuda	ENVB 0321
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Practical Tools (1 Required)

Marine Pollution	ENVB 0510
Measuring and Communicating Environmental Benefits	ENVB 0372
Smarter Social Media for Environmental Sustainability	ENVB N0435
Topography and Water Management	ENVB N0369
Urban Resilience and Other Strategies for an Eco-Economy	ENVB 0371
Wetland Restoration and Conservation	ENVB 0382

Environmental Sustainability Policy, Management and Finance (3 Required)

Business Approaches to Sustain Biodiversity	ENVB N0326
Business Models: Strategies from Ecology and Evolution	ENVB 0331
Ecosystem Services and Corporate Planning	ENVB 0448
Ecosystem Services for Economic and Social Well-Being	ENVB 0339
Energy and Sustainability	ENVB 0482
Environmental Entrepreneurship	ENVB 0349
Environmental Markets: The Nexus of ...	ENVB 0373
Environmental Sustainability and Corporate Decision-Making	ENVB 0378
Human Connections to Aquatic Ecosystems	ENVB 0401
Mainstreaming Climate Change into Development	ENVB 0323
Market-Based Approaches to Conservation	ENVB 0357
Scenarios for a Sustainable World	ENVB 0486
Sustainability and Investing	ENVB 0484
Sustainability on a Smarter Planet	ENVB 0488
Sustainable Coastal Economies: The Science and Policy...	ENVB 0374
Water and Sustainability	ENVB 0445

An Independent Study Course

Project in Conservation: Independent Study	ENVB 0400
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An Independent Study course can be proposed and needs to be approved by and completed with a faculty advisor. Depending on the research topic of the study, it can replace one course in any category, with the exception of Science Fundamentals.

Course Descriptions

Science Fundamental Courses

Diversity and Conservation

Matt Palmer, PhD - Lecturer in Discipline, Department of Ecology, Evolution and Environmental Biology, Columbia University

This course investigates the foundations of biological diversity. It uses genetics, evolutionary biology, and ecology to investigate the definition, location and conservation of Earth's biological diversity. Beginning at the genetic level and working up to populations, species and ecosystems, lectures and field trips will explore the complex processes that generate biological novelty at all levels and the destructive forces that eliminate it. Participants gain the scientific background necessary to understand how humans and the earth benefit from biodiversity and the importance of its protection.

Environmental Economics

Urvashi Kaul - Assistant Director, Center for Economic Transformation at NYC Economic Development Corp.; Adjunct Assistant Professor, School of International and Public Affairs, Columbia University

This course provides an introduction to environmental economics, discussing the basic principles of microeconomics as they apply to environmental issues and analyzing several case studies that illustrate how economics can guide conservation practice and policy.

Evolution: Darwin to DNA

Martin Mendez - Assistant Director, Latin America and Caribbean Program, Wildlife Conservation Society

After his journey in 1820 throughout the Galapagos Islands on the H.M.S. Beagle, Charles Darwin formulated the theory of evolution by natural selection. In the mid-1800s Gregor Mendel conducted research on peas and flowers to discover the basic underlying principles of heredity, creating the beginnings of our modern science of genetics. Explore the history of evolutionary thought and science to gain a conceptual overview of evolution. Learn how and why species change over time, why some species survive while others go extinct, and what modern genetics may reveal about human evolution.

Introduction to Ecology

Jenna Lawrence - Department of Ecology, Evolution and Environmental Biology, Columbia University

Ecology is the study of the interaction between the living components of the earth with the environment, including the distribution and abundance of plants and animals and the impact of human activities on these distributions. Ecologists attempt to predict how changes in the environment affect ecological systems. This course first examines ecological hierarchy, from the species level through populations, communities, and ecosystems. Key ecological principles are then illustrated with applied examples ultimately providing participants the tools to evaluate environmental issues for themselves.

Introduction to Environmental Policy

Caleb McClennen, PhD - Director of Marine Conservation, Wildlife Conservation Society; Adjunct Assistant Professor, School of International and Public Affairs, Columbia University

The past two decades have seen an increasing amount of attention given to the importance of environmental policy and planning in promoting a sustainable future for the planet. This course examines contemporary domestic and international issues that require environmental policy and planning solutions. Explore policy responses to local and global environmental problems such as biodiversity loss, clean air and water, and climate change. Examine how governments of industrial and developing countries, non-governmental organizations, the scientific community, and the private sector shape environmental policy through a wide range of economic, social, and political factors. Topics include environmental law, economics, human population growth, and public health.

Case Study Courses

Climate and Biodiversity

Shahid Naeem - Director, Earth Institute Center for Environmental Sustainability; Professor of Ecology, Evolution and Environmental Biology, Columbia University

Life on Earth is often perceived as a passive player in world events, but nothing could be further from the truth. The Earth's climate, for example, has been strongly regulated by life for over 3.5 billion years, and its current change is as much a function of life on Earth as it is of greenhouse gas emissions. This course explores the biosphere from a unique perspective, one in which climate is understood as a function of plants, animals and microorganisms. It goes beyond the conservation problems of mass extinction (e.g., the loss of polar bears and penguins) and shifting biogeography (e.g., the northern migration of species on a warmer planet) and considers how biodiversity conservation is also critical to managing and adapting to climate change.

Climate Change: History, Causes, Economics, and Decisions

Bob Newton, PhD - Research Scientist, Lamont-Doherty Earth Observatory, The Earth Institute, Columbia University

This course provides an analysis to climate change in three parts. The first part is through a history of the temperature at the planet's surface, and the basics of how the temperature is set and can change. Both natural and human influences are covered. The second part of the course reviews the ways that warming is likely to impact human beings, including sea-level rise, water availability, and crop productivity. The course concludes by examining what the main economic impacts of climate change might be, and what mechanisms are available for individuals and corporations to think about climate policy. The instructor is a climate scientist with a background in corporate infrastructure design and management.

Disease Ecology

Peter Daszak, PhD - President, EcoHealth Alliance; Adjunct Senior Research Scientist, Earth Institute Center for Environmental Sustainability, Columbia University

Sixty percent of emerging infectious diseases that affect humans originate in animals and more than two-thirds of those originate in wildlife. Human processes that infringe upon previously uninhabited areas have the potential to profoundly affect our exposure to diseases. Yet health assessments rarely take into account the principles of disease ecology, the interaction of the behavior and ecology of hosts with the biology of pathogens. Gain an overview of the principles of disease ecology with an emphasis on the effect of disease on human, wildlife, domestic animal, and ecosystem health. Explore the rise of emergent diseases as a result of various environmental factors and examine the impact of disease on biodiversity and rates of extinction.

Ecology and Sustainable Water Management

David Reid - Department of Ecology, Evolution, and Environmental Biology, Columbia University

Human societies require a constant supply of clean water to survive and environmental guidelines are designed to protect critically important aquatic ecosystems. Examines the beneficial functions provided by different aquatic ecosystems. Explores the science behind environmental guidelines designed to protect and manage these ecosystems and water resources.

Forest Management and Conservation

Matt Palmer, PhD - Lecturer in Discipline, Department of Ecology, Evolution and Environmental Biology, Columbia University

Forests are a vitally important habitat for much of the world's terrestrial biodiversity. They are sources of goods, such as timber and food, and provide services, such as carbon storage and water filtration. However, forests worldwide are threatened by overexploitation, conversion, climate change, and invasive species. Learn key issues in forest ecology and management through the local environment of Black Rock Forest. Participate in an all-day field trip to Black Rock Forest to study how pathogens and other invasive species affect forest structure and function. Local observations are scaled up to consider how these issues affect forest conservation on a global scale.

Green Information Technology: Paradox and Practice

Rajendra Bose - Manager, Research Computing Services, Columbia University

The growth in the use of computing and information technology (IT) in society demands more resources and energy, yet also allows us to understand and solve environmental problems. The course explores this paradox by discussing the environmental impacts of IT, and by reviewing examples of environmental research that require high-performance computing. The course also focuses on current IT practice in terms of designing and running data centers: Google, Amazon, and Microsoft are all representative of businesses that invest and depend heavily on large data centers, and the cost and energy efficiency of these centers has become a major concern. Other businesses and institutions, including universities and government research facilities, are also increasingly dependent on data centers, and the course describes current projects for green data centers and the metrics involved in those projects.

Hydraulic Fracturing: Energy, Environment and Policy

Nancy Degnan - Earth Institute Office of Academic Research Programs; Adjunct Associate Professor, School of International and Public Affairs, Columbia University

Natural gas is purported to be the transition fuel to cleaner energy production. New technologies, such as hydraulic fracturing, have recently made the Marcellus Shale formation a desirable area for gas development. Contextualize the practice of hydraulic fracturing to provide an overview of key issues around energy, water, and biodiversity. Examine the social and political conditions that make hydraulic fracturing a highly contentious issue by weighing tradeoffs through an analysis of business decisions, economics, science, and the regulatory environment surrounding this practice. Participate in a EICES case study, "Marcellus Shale Hydraulic Fracturing; Natural Gas Drilling Within New York State," and engage in role-playing exercises intended to consider environmental sustainability and highlight decisions in leadership and institutional settings.

Sustainable Buildings: Design & Construction in the 21st Century

Patrick Gallagher - LEED AP, Vice President of Estimating, BP Mechanical Corporation

The built environment has a vast impact on the natural environment, human health, and the economy. Green building strategies maximize both economic and environmental performance and green construction methods can be integrated into buildings at any stage of development, from design and construction to renovation and deconstruction. This course provides an understanding of the impacts buildings have on the environment and the unique challenges of building a sustainable building. Learn basics of sustainability and the essential strategies and work practices of sustainable design and construction.

The Gulf Oil Spill: Implications for Leadership and Decision Making

Nancy Degnan - Earth Institute Office of Academic Research Programs; Adjunct Associate Professor, School of International and Public Affairs, Columbia University

The Deepwater Horizon Oil Spill in the Gulf of Mexico is the worst environmental catastrophe in United States history. Since the well was "killed" on Day 87, attention has shifted from mitigating environmental damage toward examining leadership and decision-making processes. Implications for environmental sustainability include the interconnectedness of environmental, economic and social engagement manifest through stakeholders, institutional/regulatory effectiveness, and applications of technology. This course examines models of leadership, institutional missions and goals, tradeoffs and managerial practices. Then, it suggests an alternative approach to decision-making within the framework of environmental sustainability. Students will read and analyze a EICES case study, "Deepwater Horizon Oil Spill: A Case Study: BP's Blowout in the Gulf of Mexico," and engage in role-playing exercises intended to highlight decisions in leadership and institutional settings with considerations of sustainability. The course will be delivered on two Tuesdays and one Saturday.

The Sustainable City

Howard N. Apsan - Director of Environmental, Health, Safety & Risk Management, City University of New York; Adjunct Professor, School of International and Public Affairs, Columbia University

More than half of the world's population now lives in urban settings, making sustainable urban management such a critical concern. This course provides an introduction to the fundamentals of urban environmental management and sustainability, with a special focus on New York City. Topics will include air quality, water and wastewater, land use, transportation, energy, and waste management. Through readings and discussion you will gain an understanding of the many environmental challenges that today's cities face and will explore how those challenges are being addressed.

International Field Experiences

Coral Reefs Ecology: Bermuda

*Kaitlin Baird, Bermuda Institute
of Ocean Science (BIOS)*

Located at the Bermuda Institute of Ocean Sciences (BIOS), this five-day field course introduces participants to the world of corals. Through lecture, field and lab work, participants learn the biology and microbiology of corals, the ecology of coral communities, anthropogenic factors that impact coral reefs and coral reef restoration and sustainability. Daily snorkeling excursions enhance the learning experience.



Practical Tools

Marine Pollution

James M. Cervino, PhD – Visiting Scientist, Woods Hole Oceanographic Institute

Did you know that approximately 1.4 billion pounds of trash per year enters the ocean? Where does all that trash come from? Where does it go? Learn the sources, sinks, and biological effects of major classes of pollutants in the marine environment. Gain an in-depth understanding of causes, consequences and methods of assessment of marine pollution. Study basic ecological principles including biological and chemical oceanographic process in marine ecosystems and examine how they are relevant to water pollution. Explore policies, such as the Clean Water Act, to understand the influence of specific classes of contaminants on the marine environment. Gain an in-depth overview of the permit process associated with Hurricane Sandy Debris Damage to learn how environmental oversight is handled during ongoing Emergency Response Relief Efforts. Visit local New York City Urban locations currently under EPA and NYSDEC investigation to consider topics including chemical contamination from excess sewage pollutants, trace metals, synthetic organic “persistent” compounds, natural organic compounds, and construction waste from construction activities developers.

Measuring and Communicating Environmental Benefits

John F. Williams - HDR Engineering, Inc; Adjunct Professor, School of International and Public Affairs, Columbia University

Securing investments in sustainable strategies depends on the ability to measure and articulate the environmental, social and economic risks and benefits associated with specific initiatives. This course includes tools and processes to help public and private sector representatives in measuring and articulating the value of "green" in an objective and transparent manner. Associated with projects that involve built and natural environments, the course covers: standardization of a framework for environmental accounting; life cycle costs and analysis and Financial Return on Investment (FROI); and measurement of the triple bottom in monetary terms to reveal a Sustainable Return on Investment (SROI). Participants will create their own SROI business model based on cases presented in specific sectors.

Smarter Social Media for Environmental Sustainability

Sree Sreenivasan - Chief Digital Officer; Professor of Professional Practice, School of Journalism, Columbia University

How can technology and effective mass communication help achieve a sustainable future? Social media is going to play a critical role in the months and years ahead. This course takes social media to new levels by providing useful and practical lessons in how best to navigate this technology in strategic ways. Learn about the development of social media, where it is headed in the future, new ideas and trends and how to bring attention and traffic to enhance your work (and that of others) in protecting our planet. Discover best practices and what to avoid in this fast-changing Web 2.0 world. You will become conversant in using social media platforms professionally (including Facebook, Twitter, LinkedIn, YouTube) and will learn how these platforms can be used for environmental change and sustainability. Case studies illustrate how to put environmental issues in the mainstream and how to attract large and diverse audiences when social media is used effectively. You will create an environmental social media campaign.

Topography and Water Management

John Folchetti - CEO and Founder, Folchetti & Associates

Freshwater scarcity is a severe threat to human and ecological well-being in many areas, including the United States. As populations and urban areas grow, water management will become increasingly more complex. Land use projects need to analyze this issue in detail and topography is a critical tool necessary to make better-informed and more sustainable decisions. This course analyses the physical processes that govern the earth's hydrologic cycle, including impacts made by human beings. It reviews related policies and regulatory controls and provides basic GIS applications and map analysis skills. Instruction on water management is paired with techniques on how to identify these issues in topographical maps and aerial photography. You will work on a water project utilizing these applications.

Urban Resilience & Other Strategies for an Eco-Economy

John F. Williams - Senior Vice President & National Director of Sustainable Development, HDR Engineering; Adjunct Assistant Professor, SIPA, Columbia University

Many public and private sector investment decision makers are focusing on an economy in which the connections between actions and social, environmental and economic outcomes become clearly relevant (“Eco-Economy”). These decision makers are concerned about extreme environmental and social events and the resiliency of their communities, business operations and customer buying power. However, practical realities such as budget considerations and shareholder demands are placing constraints on the option of pursuing “green” alternatives. This course examines the connections between environmental sustainability, resilience, and the need and ability to compete in a global marketplace. It begins by defining “urban resilience” and the “eco-economy,” exploring the competitive realities that exist in human driven systems. The course also analyses the need for “org-ware” developers and “future system integrators” – those professionals who connect the dots between data, intelligent design, resilience, and sustainable communities to achieve a distinct competitive advantage in the 21st century.

Wetland Restoration and Conservation

James M. Cervino, PhD – Visiting Scientist, Woods Hole Oceanographic Institute

The conservation and restoration of wetlands re-establishes and adds important ecological and biological functions to the marine landscape, including habitat creation, protection, erosion control, hydrological conservation and the enhancement of water quality. This course provides the basics of wetland chemistry, microbial ecology and marine biology, and studies the organisms that inhabit the wetlands of New York City. The significance of wetland organisms to the greater biology and ecology of the region and the overall health of the biosphere will be examined. This intense field course offers the opportunity to visit ongoing restoration efforts at College Point, Queens, NY, to collect, analyze and study samples in a lab setting.

Environmental Sustainability Policy, Management and Finance

Business Approaches to Sustain Biodiversity

Helen Crowley - Associate Director, Market-based Conservation Initiatives, Wildlife Conservation Society; Adjunct Research Scientist, Earth Institute Center for Environmental Sustainability, Columbia University

Conserving biodiversity requires multi-disciplinary and creative approaches. The development and success of small businesses as “conservation enterprises” depends on functioning ecosystem services and finding markets for the ‘natural’ products and services produced. The rapidly expanding field of ‘corporate sustainability’ has opened the door for biodiversity conservation to become integrated into global business - or has it? This course explores market-based approaches to conservation, such as the marketing value of certification and labeling. You will engage in interactive lectures and assignments focused on how to integrate biodiversity and ecosystem services into corporate sustainability strategies, matching conservation initiatives to markets and designing a certification program.

Business Models: Strategies from Ecology and Evolution

David Meyers - Senior Analyst and Consultant, Green Ant Advisors

Business strategy and the scientific disciplines of ecology and evolution share a similar vocabulary: competition, resources, game theory, and ecosystems. Companies and business theorists alike increasingly appreciate how natural systems provide powerful models for design, operations, and strategy. Further your understanding of what businesses can learn from the fields of ecology and evolution. Learn business strategy, design, and operations and explore the use of the concept of 'business ecosystems' and 'adaptive imperative' as part of an analysis of how ecological and evolutionary principles can help us address emerging sustainability challenges.

Ecosystem Services and Corporate Planning

Jeffrey Potent - Environmental Protection Specialist, United States Environmental Protection Agency; Adjunct Professor, School of International and Public Affairs, Columbia University

This course explores the emerging incorporation of environmental factors into core business decision-making and strategic planning. It examines the impacts and dependencies of corporations on our ecosystems. Utilizing a methodology of ecosystem services review, along with an examination of various case studies, students explore strategic considerations corporations face in order to move beyond regulatory compliance to sustainable business practices.

Ecosystem Services for Economic and Social Wellbeing

Carter Ingram, PhD - Lead, Ecosystem Services/Payments for Ecosystem Services, Wildlife Conservation; Adjunct Research Scientist, Department of Ecology, Evolution, and Environmental Biology, Columbia University

Humankind benefits from resources and processes provided by nature. Scientists, economists, and policy/decision-makers label these as ecosystem services. Explore how these services can be both conserved and managed sustainably for economic and social wellbeing, through an emerging mechanism called Payment for Ecosystem Services (PES). The focus is on developing countries, and the importance of ecosystem services at the local level.

Energy and Sustainability

Kathy Callahan - Adjunct Associate Professor, School of International and Public Affairs, Columbia University

This course examines the evolution of issues, attitudes, and policies surrounding energy production and use through time, and provide a critical examination of current trends in consumption, production, and potential future sources of energy. Technologies, philosophies and policy approaches, as well as the current accepted thinking on the topic will be evaluated to enable participants to ask new questions and derive innovative ideas and approaches to address this prominent global issue through readings, research, and discussion.

Environmental Entrepreneurship

William Davis - President and CEO, Ze-gen

Humanity, a single species, appropriates 40% of the Earth's productivity yet a billion people live in abject poverty on less than \$1 a day. Arguably, an effective way to protect and enhance Earth's precious resources is to find better ways to address human needs. The tools of entrepreneurship can be harnessed to provide powerful solutions to both human and ecological distress. This course explores how to stimulate demand for products and services that serve both people and the planet. Participants are encouraged to come prepared with entrepreneurial ideas of their own.

Environmental Markets: The Nexus of Business, Regulation, and Sustainability

Richard Weihe - Managing Partner, Karbone

Companies around the world are developing innovative solutions in the area of energy efficiency, water infrastructure, and waste management technologies. The leading companies in these markets are fast becoming major drivers of global economic growth as industries, governments, and societies come to terms with these challenges. Learn the history of the development of environmental markets and how they are used to solve environmental issues. Examine the political, business, and regulatory contexts of these markets using real-world examples through case study analysis. Topics include air quality, climate change, pollution, water, and renewable energy mandates.

Environmental Sustainability and Corporate Decision-Making

Jeffrey Potent - Environmental Protection Specialist, United States Environmental Protection Agency; Adjunct Professor, School of International and Public Affairs, Columbia University

This course addresses how innovative corporations are beginning to address environmental issues from a business perspective: minimizing associated costs and risks and capturing business opportunities to improve competitive advantage. You examine how the business landscape is changing through increased expectations of stakeholders, the reduction of environmental impacts that equate to real world risks and costs, and the expansion of markets for products and services that offer environmental attributes as important to customers and quality, timeliness and price. The course focuses on ecosystem service valuation as an effective tool that corporations are using to assess company-specific environmental footprints, identify approaches to effectively reduce impacts, and to bring this information to the marketplace as a means of product differentiation to secure existing markets and facilitate access to new business opportunities.

Human Connections to Aquatic Ecosystems

David Reid - Department of Ecology, Evolution, and Environmental Biology, Columbia University

New York City is surrounded by water and its human inhabitants are dependent on a constant supply of clean water to survive. However, many city-dwellers feel disconnected from those aquatic ecosystems which influence the quality and quantity of water on which they depend. This course explores the importance of human connections to water and the influence of human activities on the condition of aquatic ecosystems. The goal of this course is to emphasize our dependence on, and role in maintaining, functioning aquatic ecosystems. This understanding is critical for addressing the ongoing challenge of ensuring access to clean water, which is only likely to become more pressing with human population growth and climate change.

Mainstreaming Climate Change into Development

Juan Pablo Bonilla - Unit Chief, Sustainable Energy & Climate Change, Inter-American Development Bank

This course will discuss how to mainstream climate change into economic and social development. The course's introduction will cover the main outcomes from the COP16 in Cancun (Conference of the Parties) in terms of challenges and opportunities, within the Latin America and the Caribbean (LAC) Region and discuss the financing structure proposed for climate change mitigation and adaptation. The course will also discuss the topics of Multilateral Development Banks in financing and scaling up investment in climate change, the role of the public and private sectors and bilateral cooperation, and institutional frameworks for incorporating climate change mitigation and adaptation into development policy. The course will conclude with a group exercise in stakeholder analysis about mainstreaming climate change into the public/private sector of a LAC country.

Market-Based Approach to Conservation

Richard Weihe - Managing Partner, Karbone

Companies around the world are developing innovative solutions in the area of energy efficiency, water infrastructure, and waste management technologies. The leading companies in these markets are fast becoming major drivers of global economic growth as industries, governments, and societies come to terms with these challenges. Learn the history of the development of environmental markets and how they are used to solve environmental issues. Examine the political, business, and regulatory contexts of these markets using real-world examples through case study analysis. Topics include air quality, climate change, pollution, water, and renewable energy mandates.

Scenarios for a Sustainable World

Cary Krosinsky - Executive Director, Network for Sustainable Financial Markets

Climate change, habitat loss, and population growth are dramatically reshaping life on Earth. Human activities are pushing the Earth toward environmental 'tipping points' that could cause sudden, irreversible changes to our planet. Learn the causes behind these issues and examine future scenarios that can help us best avoid potential global environmental tipping points. Featuring prominent speakers from corporations, investment houses, and NGOs this course addresses key questions such as:

- Can finance and investing be a part of the solution?
- How can companies be more involved to drive solutions and what are they already bringing to the table?
- What role do governments and other global bodies have to play?
- What happens if we do nothing or instead choose only incremental change as a way forward?
- What does dramatic change look like? Do we now need to consider dire choices? And what are they?

Topics include: stakeholder analysis, portfolio and asset allocation construction, differences between short and long term goals for organizations, and how current behaviors to drive solutions may be counterproductive.

Sustainability and Investing

Cary Krosinsky - Executive Director, Network for Sustainable Financial

Sustainable investing is a burgeoning investment philosophy that represents a positive methodology, one that is in sharp distinction from the previous generation of socially responsible practices, which tended to be primarily negative. Sustainable investment can also be a key driver that can help solve global inequity. This course will cover the asset classes, trends, performance analysis and metrics involved in sustainable investing. Participants will actively contribute in the creation of a model sustainable portfolio while reviewing how sustainability affects asset classes, regions and public policy. Guest speakers may include CSR/Sustainability officers from leading corporations, experts on fiduciary duty, shareholder advocacy and corporate governance, as well as fund managers and other practitioners.

Sustainability on a Smarter Planet

Rich Lechner - Vice President, Cloud & Services Marketing, IBM

The world is becoming increasingly instrumented, interconnected, and intelligent - in a word, 'smarter'. Organizations now have the ability to see the exact condition of practically everything in near real-time and can leverage this information to achieve financial, environmental, social, and operational benefits. This course will use case studies to provide a broad overview of how technology can be leveraged to optimize all aspects of an organization's infrastructure and operations for energy, carbon, water, and waste. We will discuss a number of challenges and opportunities ranging from behavioral change to public policy to financing.

Sustainable Coastal Economies:

The Science and Policy of Managing and Conserving our Ocean Resources

Caleb McClennen, PhD - Director of Marine Conservation, Wildlife Conservation Society; Adjunct Assistant Professor, School of International and Public Affairs, Columbia University

In New York State alone, activities that depend on healthy, accessible, and clean oceans such as tourism and recreation, fisheries, and marine transport generate more than \$14.3 billion a year for our state economy. Continuing coastal development, intensification of agriculture and inland activities such as waste, sewer and water management, all continue to directly impact the sustainability of our coastal resources. Students in this course will explore the science and policy behind the trade-offs in increased ocean and coastal economic development in several core marine sectors. Students will also investigate existing options for improving sustainability and discuss areas of necessary improvement in our ability to effectively manage this transformation. In addition, students will gather a more in depth understanding and connection to New York's coastal economy by participating in a single day field trip to the New York's waterfront. Finally the course will explore the past and present of New York's maritime economy and discuss at the site level, elements of New York's Comprehensive Waterfront Plan: Vision 2020.

Water and Sustainability

Michael Puma - Associate Research Scientist, Columbia University Center for Climate Systems Research, NASA Goddard Institute for Space Studies

The sustainability of water resources is a critical issue facing society over the coming decades. Water resources are affected by changes not only in climate but also in population, economic growth, technological change, and other socioeconomic factors. In addition, successful water management must account for the importance of water for both human society and natural ecosystems. The objective of this course then is to examine water management issues in light of the expected climatic and socioeconomic changes that will occur during the twenty-first century. Students will be asked to think critically in order to answer questions related to sustainable development. The knowledge that students obtain from this course will ultimately allow them to make informed decisions on the sustainability of water resources.

Faculty List

Alonso Aguirre

EICES, Adjunct Senior Research Scientist
Wildlife Trust

George D. Amato

EICES, Adjunct Associate Research Scientist
American Museum of Natural History

Felicity Arengo

EICES, Adjunct Research Scientist
American Museum of Natural History

Sarah Aucoin

Director
Urban Park Rangers

Kaitlin Baird

Bermuda Institute of Ocean Sciences

Mark Becker

Senior Staff Associate
Center for International Earth Science Information
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Rajendra Bose

Manager, Research Computing Services
Columbia University

Kathy Callahan

Associate Professor of Professional Practice
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Christina P. Colon

EICES, Adjunct Associate Research Scientist
New York Botanical Garden

James Danoff-Burg

Associate Research Scientist
Arts & Science Interdepartment, Columbia
University

Peter Daszak

EICES, Adjunct Senior Research Scientist
Wildlife Trust, President

William Davis

President and CEO
ZE.GEN

Stefan Doering

President and Founder
Best Coaches Inc.

Robin Dublin

Senior Consultant
Resourceful Results LLC

Susan Elbin

Department of Ecology, Evolution and
Environmental Biology (E3B), Columbia University
New York Audubon

John Folchetti

CEO and Founder
Folchetti & Associates

Lisa Garcia

Senior Advisor on Environmental Justice
Environmental Protection Agency

Urvashi Kaul

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School of International and Public Affairs (SIPA),
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EICES, Adjunct Associate Research Scientist
Dean, The School for Field Studies

Eric Slayton

Project Coordinator, NY Bird Monitoring Program
Wildlife Conservation Society

Ina Vandebroek

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Research Associate, Institute of Economic Botany
New York Botanical Garden

Andrew Voros

Adjunct Research Scientist
Earth and Environmental Engineering, Columbia
University

Richard Weihe

Managing Director
Karbone

John Williams

Adjunct Assistant Professor
School of International and Public Affairs (SIPA),
Columbia University

Program Fees

Please check our website for current tuition. Participants are charged a flat fee per course. EICES awards fellowships to participants who demonstrate need. If you would like to be considered for a fellowship, please fill out the fellowship application on our website.

Dates and Deadlines

EICES accepts applications on a rolling basis throughout the year, with several opportunities to enroll each semester. Note that financial support is awarded at the beginning of the semester. Applicants for fellowship are encouraged to apply early.

Application Checklist

Application

- A non-refundable \$95.00 **application fee**
Payable by check or money order to “Columbia University”
- An unofficial copy of your most recent **transcript**
- Current **resume** or **CV**
- A **brief description of why you have chosen** to participate in **the Certificate Program**
(no more than 500 words)
- Letter** of recommendation

For more information, please contact:

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