



July 2009

**ENVIRONMENTAL ECONOMICS AND POLICY PROGRAM**  
(Master of Environmental Management)

The Environmental Economics and Policy program is designed to train decision-makers, those who offer them expert advice, and those who try to influence policy through the political process. The program emphasizes the basic methods needed for analyzing how households and businesses react to existing and proposed environmental and resource policies. The program is highly analytical and is oriented toward the analysis of contemporary national and international environmental problems.

Understanding the effects of markets and institutions on people and the environment requires mastery of three broad areas of knowledge: (1) the basic sciences pertaining to a natural resource or an environmental phenomenon; (2) the relevant disciplines in the social sciences; and (3) the quantitative and qualitative tools required for using knowledge from the physical, biological, and social sciences to arrive at informed decisions.

Social sciences emphasized in the program are political science, economics, and legal analysis. Relevant political science topics include the study of collective action, interest group behavior, evolution and operation of local, domestic and international environmental institutions, and the formulation and implementation of public policy. Economic topics include sustainable development, the economics of public goods and externalities, public finance, valuation of nonmarket goods and services, and the intertemporal allocation of natural resources. Legal analysis emphasizes the allocation of resources as reflected in property rights, environmental risks as reflected in torts, and regulation by statutory law. Quantitative and analytical tools, an essential component of this program, include regression analysis, program evaluation, risk analysis, geospatial analysis, conflict resolution and benefit-cost analysis. Students also learn professional skills in teamwork and leadership, professional ethics, and oral and written presentation.

The Environmental Economics and Policy Concentration seeks to provide:

1. A knowledge base with breadth in environmental economics, politics, and law including the economics of public goods and externalities, the study of interest group behavior, political institutions, and property rights, and depth in a chosen area of concentration (e.g., environmental policy analysis, environmental and resource economics, or business and the environment);
2. Quantitative and qualitative skills in applied statistics, survey research, analytical modeling, and case study methods;
3. Management skills to train decision-makers, those who offer them expert advice, and those who try to influence policy through the political process, which includes an understanding of the basic methods needed for analyzing how households and businesses react to existing and proposed environmental and resource policies.
4. Oral and written skills to communicate the effects of markets and institutions on people and the environment include writing policy memos, research reports, and delivering public presentations.

Environmental Economics and Policy is offered under the Master of Environmental Management degree. To assist in course selection and advising, the EEP faculty have developed three tracks that reflect particular concentrations. The three tracks are 1) environmental policy analysis, 2) environmental and resource economics, and 3) business and the environment. All of the tracks are built on a common core of three required courses in environmental politics, economics and law. The environmental policy analysis track is for those students who want to emphasize the development and implementation of environmental policy. Supporting courses for this track come from the Nicholas School, the Sanford School of Public Policy and the Political Science Department. The environmental and resource economics track allows students to deepen their skills in economic analysis of environmental management and policy. Supporting courses for this track come from the Nicholas School, the Economics Department, and the Sanford School of Public Policy. The business and environment track is for those who want to specialize in the role of the private sector in environmental sustainability. Supporting courses come from the Nicholas School, the Fuqua School of Business, and the Kenan-Flagler Business School at the University of North Carolina. Students may work with their advisors to devise programs which, while meeting all requirements of one of these tracks, allow specializations in areas including international environmental policy, coastal zone management, marine policy, water resources management, and others.

## PREREQUISITES

Prerequisites for admission to the school are (1) some previous training in the natural sciences or the social sciences related to the student's area of interest in natural resources; (2) at least one introductory course in calculus; and (3) a statistics course that includes descriptive statistics, probability distributions, hypothesis testing, confidence intervals, correlation, simple linear regression, and simple ANOVAs. The Environmental Economics and Policy program also requires microeconomics or introductory economics that is predominantly microeconomics as a prerequisite.

## CREDIT REQUIREMENTS

Students must complete at least 48 units of credit. These units are distributed among the major courses required for the program, elective courses, seminars, and a master's project. Note that although a course may be listed in more than one category, it can only be counted once toward a program requirement. Students should develop a proposed program of study (listing courses and master's project topic) in consultation with their advisor by the end of the first semester. The proposed program can be amended with the advisor's approval. Students should work closely with their advisor to ensure that all requirements are met and that elective courses are appropriate to the program.

## CORE COURSES (9 units)

The purpose of the core courses is to ensure that all students who complete the EEP program have a thorough exposure to the fundamental concepts of environmental economics and policy. Thus, ENVIRON 270, ENVIRON 274, and LAW 235 are specifically structured to cover theory and applications that are important, applicable, and relevant both in the US and abroad. ENVIRON 270 introduces students to the application to resource and environmental problems of economic concepts of production and consumption behavior of individuals and firms, markets and market failure, public goods, and intertemporal allocation. ENVIRON 274 deals with the politics of the policy process, comparative political institutions, interest group formation and behavior, policy implementation and enforcement, and bureaucratic behavior. Applications are drawn mainly from U.S. national-level policy, but both principles and examples have relevance to both subnational policymaking and to policymaking in other countries. LAW 235 introduces students to legal theory and institutions that have evolved to deal with resource and environmental problems. The core is intended to provide a uniform base of knowledge for all EEP graduates. Students interested in transnational and global issues can build on this base with such electives as International Environmental Law and Global Environmental Politics. Students who wish to learn more about the economics and institutions of policymaking in other countries can find such material through Duke's many area studies programs or through choice of their master's project (MP). Dozens of past

MPs have dealt with environmental issues in both developed and developing countries. Competitive summer research travel grants are available for international work.

Students are required to take

ENVIRON 270	Resource and Environmental Economics (3 units, fall)
ENVIRON 274	Environmental Politics (3 units, spring)
LAW 235	Environmental Law (3 units, fall, Duke Law School)

#### MAJOR ELECTIVES (12 units)

Students select major electives according to their program track. This includes three courses from their track list, or acceptable substitutes. One additional social science, law or business course should also be selected.

***Environmental Policy Analysis Track:*** ENVIRON 285 Land Use Principles and Policies, ENVIRON 275 Protected Areas, Tourism and Development, ENVIRON 276 Marine Policy, ENVIRON 298.55 Ocean and Coastal Law and Policy, ENVIRON 350 Program Evaluation of Environmental Policies, ENVIRON 326 Global Environmental Politics, LAW 368 Natural Resources Law, LAW 520 Climate Change and the Law, LAW 555 International Environmental Law, LAW 503 Sources of Environmental Law

***Environmental and Resource Economics Track:*** ENVIRON 252 Sustainability and Renewable Resource Economics, ENVIRON 271 Economic Analysis of Environmental Policies, ENVIRON 272 Evaluation of Public Expenditures, ENVIRON 350 Program Evaluation of Environmental Policies, ENVIRON 298.80 Energy Economics & Policy, ENVIRON 298.04 Economics of Forest Resources, ENVIRON 298.88 Environment and Development Economics, ENVIRON 331 Sustainable Business Strategy, ECON 205 Microeconomic Theory, ECON 287 Public Finance, PUBPOL 286 Economic Growth and Development Policy

***Business and the Environment Track:*** MMS 120 Managerial Effectiveness, MMS 182 Strategic Financial Management, ENVIRON 331 Sustainable Business Strategy, ENVIRON 298.23 Energy Technology and its Impacts on the Environment, ENVIRON 298.80 Energy Economics & Policy, ENVIRON 272 Evaluation of Public Expenditures, MANAGEMENT 345 (Fuqua) Legal Environment of Business, MANAGEMENT 426 - Social Entrepreneurship, MANAGEMENT 491.03 - Corporate Social Impact Management, MBA 831C, Strategic Corporate Social Responsibility (UNC), MBA 833B, Product Stewardship and Sustainability (UNC), MBA 865, Investment Strategy for Sustainability (UNC), MBA 831F, Climate Change: Turning the Heat Up on Business (UNC), MBA 832A, Design for Sustainability (UNC), MBA 815, Sustainable Enterprise (UNC), MBA 833A, Systems Thinking for Sustainable Enterprise

#### TOOLS (8-9 units)

Students must complete at least three courses in quantitative or analytical methods. One course must be selected from Group A and two from Group B.

- (A) ENVIRON 210.001 Applied Data Analysis for Environmental Sciences (3 units, fall)
- (B) ENVIRON 255 Applied Regression Analysis (3 units, spring)
- ENVIRON 252 Sustainability and Renewable Resource Economics (3 units, spring)
- ENVIRON 264 Applied Differential Equations in Environmental Sciences (3 units, fall)
- ENVIRON 271 Economic Analysis of Environmental Policies (3 units, fall)
- ENVIRON 272 Evaluation of Public Expenditures (3 units, fall)
- ENVIRON 296 Environmental Conflict Resolution (2 units, fall)

ENVIRON 350	Program Evaluation of Environmental Policies (3 units, spring)
ENVIRON 298.67	Participatory Techniques Env Decisions (2 units, spring)
ENVIRON 385	Environmental Decision Analysis (3 units, spring)
ENVIRON 280	Social Science Surveys for Environmental Management (3 units, spring)
ENVIRON 259.001	Fundamentals of Geospatial Analysis (3 units, fall)
ENVIRON 352	Spatial Analysis in Ecology (3 units, fall)
PUBPOL 313	Quantitative Evaluation Methods (3 units, spring)
SOCIOL 208	Survey Research Methods (3 units, spring)
SOCIOL 212	Social Statistics I: Linear Models, Path Analy. & Struct. Equations Sys.
SOCIOL 213	Social Statistics II: Discrete Multivariate Models

#### RESOURCE ELECTIVES (9 units)

Students in Environmental Economics and Policy must also have a solid grounding in the natural science aspects of managing natural resources. The resource electives consist of 9 units of courses used to develop skills in another program offered by the school or in another area of specialization related to the management of natural resources (e.g., water, energy, forest resources, tropical resources, coastal resources). Students should consult with their advisor as they select a coherent set of resource electives. They should be carefully selected to complement the student's previous undergraduate training in the natural sciences and to make up deficiencies if necessary.

For most students, it is a good idea to use some combination of core courses, quantitative courses and electives to acquire one or two "suites" of marketable skills. Among the skill suites that seem to be most marketable at present are: benefit-cost analysis, application of geospatial analysis to policy problems, corporate environmental management, and management of particular types of land resources, such as biodiversity reserves, coastal zones, and wetlands.

#### SEMINARS

Students are required to register for the Environmental Economics and Policy seminar course (ENVIRON 398.05, 1 unit) in all four terms for a total of 1 credit hour towards graduation, defend a project proposal at the start of their third semester and present the results of their master's project in a school symposium. First year students are required to attend the presentations as well as required skills modules in graphical design and public speaking.

#### MASTER'S PROJECT

A master's project for 4 to 6 units of credit is required. Students should identify project topics in the spring of the first year. Final proposals (approved and signed by the advisor) are due in early fall of the second year of enrollment. Both the proposal and final report must be well written; most require several major revisions to reach acceptable standards. Guidelines for completion of the proposal and final project can be found on the Nicholas School's web site.

#### PARTICIPATING FACULTY MEMBERS

Faculty members serving as advisors in the Environmental Economics and Policy program are listed below. Please consult the Nicholas School home page for a description of their research interests.

##### Core Faculty

Lori Snyder Bennear  
 Lisa Campbell  
 Deborah Gallagher  
 Randall Kramer  
 Lynn Maguire  
 Marie Lynn Miranda  
 Brian Murray  
 Richard Newell  
 Michael Orbach

##### Office number

A125 (on leave 2008-2009)  
 Duke Marine Lab  
 A118B  
 A120  
 A222  
 A134 (on leave 2009-2010)  
 A116  
 106 Old Chem (on leave 2009-2011)  
 Duke Marine Lab

Subhrendu Pattanayak  
James Salzman  
Martin Smith  
Jeffrey Vincent  
Erika Weinthal (Program Chair)

126 Rubenstein Hall  
3010 Law School  
A122(on leave 2009-2010)  
A118A  
A136

Affiliated Faculty

Thomas Holmes  
Carol Mansfield  
Margaret McKean  
Evan Mercer  
Alex Pfaff  
Sally Schauman  
Christopher Timmins  
David Wear  
Jonathan Wiener

U.S. Forest Service, RTP  
Research Triangle Institute, RTP  
502 Perkins Library  
U.S. Forest Service, RTP  
108 Rubenstein  
Professor Emerita, University of Washington  
213 Social Sciences  
U.S. Forest Service, RTP  
3016 Law School