NICHOLAS SCHOOL OF THE ENVIRONMENT AND EARTH SCIENCES
DUKE UNIVERSITY

August 2007

COASTAL ENVIRONMENTAL MANAGEMENT PROGRAM

(Master of Environmental Management)

The Coastal Environmental Management program provides a scientifically rigorous understanding of global, national and local physical and biological coastal Environments and processes and the human behaviors and policies that affect, and are affected by, those Environments and processes. The specific aim of the program is to train scientifically informed professionals to fill coastal policy and management, research, or advocacy positions in federal and state agencies, industry, consulting firms, and nonprofit organizations. The program also provides a firm foundation for future Ph.D. studies.

The first year of the program is typically spent on the Durham campus fulfilling the required courses in areas such as natural resource economics, general Environmental policy, ecology, and methodological skills. The second year is typically spent in residence at the Marine Laboratory in Beaufort taking courses in both the natural and the social and policy sciences specific to the coastal and marine Environment, and focusing on the production of the master's project. The Marine Laboratory provides an ideal setting for the study of natural and social scientific phenomena in the coastal and marine Environment, and for interaction with coastal and marine constituencies and policy makers in the application of science to policy. Potential opportunities for participation in the policy-making process are emphasized throughout the program.

The Coastal Environmental Management program is offered under the Master of Environmental Management degree. Students may emphasize subjects such as marine conservation biology and policy, fisheries management, marine protected area management, coastal zone management, water quality management or coastal sedimentary processes as part of the degree program. Each program is tailored to the interests of the student through the selection of electives and master's project topic. Students may use electives and additional coursework to accommodate a second emphasis in one of the other program concentrations offered within the school.

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; (3) a statistics course that includes descriptive statistics, probability distributions, hypothesis testing, confidence intervals; correlation, simple linear regression, and simple ANOVAs; (4) a working knowledge of microcomputers for word processing and data analysis. The Coastal Environmental Management program also requires a microeconomics course or an introductory economics course with a substantial microeconomics component. Deficiencies must be made up during the first semester in residence; these courses do not count toward degree requirements. It is especially important for CEM students who plan to spend their second year in Beaufort to make up any missing prerequisites prior to enrolling in the NSOE. CEM students should be aware that many of the required courses have prerequisites; these are listed in the bulletin. We strongly encourage students to fulfill prerequisite requirements before matriculation.

CREDIT REQUIREMENTS

Students must complete 48 units of credit. These credits are distributed among the core courses required for the program, quantitative courses, elective courses, seminars, and a master's project. Students should develop a proposed program of study (listing courses and master's project topic) in consultation with their advisors by the end of the first semester. The proposed program can be amended with the advisor's approval. Students should work closely with their advisors to ensure that all requirements are met and elective courses are appropriate to the program. Special care should be taken in determining how to meet credit requirements between the two campuses (Durham and Beaufort). Selected courses may be teleconferenced between Durham and Beaufort.

CORE COURSES

All students in the program are required to take six core courses (at least 18 units of credit) distributed as follows:

(1) ENV 270. Resource and Environmental Economics (3 units, fall, Durham)

(2) ENV 276. Marine Policy (3 units, fall, Beaufort)

(3) One additional policy course* *such as:*

ENV 271. Economic Analysis of Resource and Env. Policies (3 units, fall, Durham)
ENV 273. Marine Fisheries Policy (3 units, spring, Beaufort)
ENV 274. Environmental Politics (3 units, spring, Durham)
ENV 285. Land Use Principles and Policy (3 units, fall, Durham)
ENV 298.55. Ocean and Coastal Law and Policy (3 Units, fall, Durham)
LAW 235. Environmental Law (3 units, fall, Duke Law School)
LAW 241. Environmental Law (3 units, fall, UNC)

**Or equivalent with advisor's approval*

(4) One ecology course* *such as:*

ENV 219L. Marine Ecology (4 units, fall, spring, summer II, Beaufort)#
ENV 298.36. Fisheries Ecology (3 units, spring, Beaufort)
ENV 298.62 Urban Tropical Ecology (3 units, spring, Beaufort)

**Or equivalent with advisor's approval*

(5) One ocean science course* from the following suggestions:

EOS 215. Introduction to Physical Coastal Processes (3 units, fall, Durham)
ENV 219L. Marine Ecology (4 units, fall, spring, summer I, summer II, Beaufort)#
ENV 290. Physical Oceanography (3 units, spring, Durham)
ENV 292L. Biological Oceanography (4 units, spring, Beaufort)
ENV 293. Analysis of Ocean Ecosystems (3 units, fall, Beaufort)

**Or equivalent with advisor's approval*
 # can serve as either ocean science or ecology but not both

(6) One science and policy synthesis course from the following:

ENV 209. Conservation Biology and Policy (3 units, summer II, Beaufort)
ENV 226. Marine Mammals (3 units, fall; 4 units, summer II, Beaufort)
ENV 227. Biology and Conservation of Sea Turtles (3 units, spring; 4 units, summer II, Beaufort)
ENV 298.64. Marine Conservation Biology (3 units, spring, Beaufort)
ENV 322. Coastal Watershed Science and Policy (3 units, fall, Beaufort)
ENV 360S. Political Ecology (3 units, fall, Beaufort)

* *Courses cannot count to fulfill more than one requirement.*

QUANTITATIVE AND ANALYTICAL METHODS COURSES

Three courses (at least 9 units) in quantitative and analytical methods of resource analysis are required. One of the courses ***(or equivalent with advisor's approval)*** must be from list A and one course must be from list B below. The third may be from either list. Be SURE to check the online Advising site and ACES for additional courses. Some of these courses are not offered every year, and ***this list is not all inclusive. Some courses are not offered every year.***

List A

ENV 210.001. Applied Data Analysis for Environmental Science (3 units, fall, Durham)
ENV 231. Ecological Theory and Data (3 units)
ENV 254. Qualitative Research Design (3 units, fall, Beaufort)
ENV 255/STA 242. Applied Regression Analysis (3 units, spring, Durham)
ENV 352. Spatial Analysis in Ecology* (3 units)
ENV 385. Environmental Decision Analysis (3 units, spring, Durham)
EOS 250. Applied Mathematics for Environmental and Earth Sciences (3 units, fall)
ECON 239. Econometrics (3 units, spring)
ECON 271. Economic Analysis of Resource & Environmental Policies (3 units) *cross-listed with ENVIRON 271; cannot fulfill both policy and quantitative requirements*
BMA 567. Modeling of Biological Systems (3 units, Fall, NCSU)
PPS 231. Quantitative Evaluation Methods (3 units, spring)
SOC 212. Social Statistics II (3 units, spring, Durham)
STA 216. Generalized Linear Models (3 units)
STA 221. Bayesian Inference and Decision (3 units)
STA 244. Introduction to Linear Models (3 units)
STA 245. Introduction to Multivariate Statistics (3 units)
STA 293. Special Topics in Statistics (3 units, fall)
ST 512. Experimental Biological Statistics (3 units, NCSU)
ST 518. Applied Time Series Analysis (3 units, NCSU)
ST 523. Experimental Design (3 units, NCSU)

(*Other courses in quantitative and statistical methods with approval of the advisor*)

List B

ENV 234L. Watershed Hydrology (4 units, fall, Durham)
ENV 259. Fundamentals of Geospatial Analysis (3 units, fall, Durham)
ENV 261. Geospatial Analysis for Conservation and Mgmt. (3 units, spring, Durham)
ENV 265. Geospatial Analysis for Coastal and Marine Mgmt. (3 units, spring, Durham)
ENV 280. Social Science Survey for Environmental Management (3 units, spring)
ENV 303. Principles of Ecological Modeling (3 units, spring, even-numbered years)
ENV 357. Satellite Remote Sensing (3 units, fall)
SOC 208. Survey Research Methods (3 units, spring, Durham)

(*Others as approved by program faculty*)

ELECTIVE COURSES

Students may take three or four courses (9 to 16 units of credit) as electives. Electives should be chosen to add depth to the area of specialization, to develop a second area of expertise, or to strengthen quantitative skills. Courses cannot be counted as both a required course and an elective. Suggested electives are listed below. Students may consult with their advisors concerning other acceptable courses.

Durham Courses

ENV 212. Ecological Toxicology (3 units, fall)
ENV 216. Applied Population Ecology (3 units, spring, Durham)
ENV 217. Tropical Ecology (3 units, spring, Durham)
ENV 221. Soil Resources (3 units, fall)
ENV 234L. Watershed Hydrology (4 units, fall)
ENV 236. Water Quality Management (3 units, fall, Durham)
ENV 240. Chemical Fate of Organic Compounds (3 units, fall)
ENV 242. Environmental Aquatic Chemistry (3 units, spring)
ENV 274. Resource and Environmental Policy (3 units, spring)
ENV 275S. Protected Areas (3 units, fall, Durham)
ENV 277. Professional Ethics for Environmental Practice (1 unit, fall, Durham)
ENV 285. Land Use Principles and Policy (3 units, fall)
ENV 296. Environmental Conflict Resolution (2 units, fall, Durham)
ENV 309. Wetland Restoration Ecology (3 units, spring, Durham) *prerequisite: ENV 312*
ENV 312. Wetlands Ecology and Management (3 units, fall)
ENV 320. Ecosystem Management (3 units, spring, Durham)
EOS 272. Biogeochemistry (3 units, fall) *cross-listed with BIOLOGY 272*
EOS 200. Beach and Coastal Processes (3 units)
EOS 221. Hydrogeology (3 units)
EOS 300. Topics in Earth Processes (3 units, fall, Durham)
ZOO 216L. Limnology (4 units)
LAW 262. Ocean and Coastal Law (UNC Law School)
MLS 601. Coastal Issues (NCSU, spring, 3 units)

Beaufort Courses (courses change frequently in Beaufort – consult ACES, the web site and your advisor)

ENV 218L. Barrier Island Ecology (4 units, summer II)
ENV 219L. Marine Ecology (4 units, summer II, fall)
ENV 298.36 Fisheries Ecology (3 units, spring)
ENV 226L. Marine Mammals (4 units, summer II; 3 units, fall – no lab)
ENV 228L. Physiology of Marine Animals (4 units, fall, spring; 6 units, summer I)

ENV 229L. Biochemistry of Marine Animals (6 units, summer Session I)
ENV 243. Environmental Biochemistry (3 units, fall)
ENV 251. International Conservation and Development (3 units, spring)
ENV 253L. Sensory Physiology and Behavior of Marine Mammals (3 units, spring)
BIO 254. Vertebrate and Invertebrate Endocrinology (3 units, fall)
ENV 256S. Seminar in Ocean Sciences: Marine Tourism (2 units, spring)
BIO 254. Vertebrate and Invertebrate Endocrinology (3 units, summer)
ENV 295L. Marine Invertebrate Zoology (4 units, fall, spring, summer II; 6 units, summer I)
ENV 298.09. Professional Writing and Self-Editing (3 units, fall)
ENV 298.46. Green By Design (3 units, fall)
ENV 298.62. Urban Tropical Ecology (3 units, spring)
ENV 298.64. Marine Conservation Biology (3 units, spring)
ENV 299. Independent Studies and Projects (limit 4 units)
BIO 207AL. Tropical Marine Ecology (2 units, fall)
BIO 207BL. Marine Ecology of the Pacific (2 units, fall)
BIO 207FL. Human-Coast Interactions (2 units, fall)
Additional selected courses may be teleconferenced

SEMINARS

Second-year students are required to take the Coastal Environmental Management seminar (ENV 398.02) and present the results of their master's project in a school symposium in Durham and in Beaufort. First-year students are required to attend the presentations as well as the required skills modules. **Please note that students MUST register for the seminar credit EACH semester. The credit is for 1 unit total for all 4 semesters.**

RECOMMENDED SEQUENCE

Year 1, fall, Durham: ENV 270, quantitative course (from list A), elective(s)
Year 1, spring, Durham: Quantitative and analytical methods courses, policy course, elective(s)
Summer: Internship or research or take required courses at Beaufort
Year 2, fall, Beaufort: ENV 276, ENV 293, ENV 399, elective(s)
Year 2, spring, Beaufort: ENV 398.02, ENV 399, elective(s)

MASTER'S PROJECT

A master's project for 4 to 6 units of credit is required. The project should represent an in-depth analysis of a coastal Environmental problem and emphasize the use of problem-solving methodologies. The master's project should include a practicum, and development of management recommendations should constitute a part of the project where possible. The project may be an individual or a group effort.

Specific instructions for submission of the proposal and the final paper are available from the Office of Enrollment Services, A142 Levine Science Research Center.

A master's project topic and precis approved and signed by the student's advisor are due by early April of the first year of enrollment. Final proposals (approved and signed by the advisor) are due by early October of the second year of enrollment. Both the proposal and the final report must be well written; most require several revisions to meet acceptable standards.

PARTICIPATING FACULTY MEMBERS

Faculty members serving as advisors in the Coastal Environmental Management program are listed below. Please consult the Nicholas School of the Environment and Earth Sciences website or the Bulletin of the Nicholas School of the Environment and Earth Sciences for a description of their research interests.

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