

Program Policy Statement

MS ENVIRONMENTAL ECONOMICS

*School of Marine Science & Policy
College of Earth, Ocean, and Environment
University of Delaware
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I. Program History & Purpose

A. Statement of Purpose

The School of Marine Science & Policy offers an interdisciplinary MS degree in environmental economics.¹ The degree focuses on the intersection of economics and the environment with the intention of training students to inform decision-making in environmental policy in a practical and socially beneficial way.² The degree is designed to be applied broadly to environmental issues, but the program's home in the School of Marine Science & Policy (SMSP) in particular offers strengths in interdisciplinary and marine applications such as fisheries, offshore energy, coastal land use, sea level rise, and climate change.

The degree has a professional orientation with a project-based capstone-style course in the final semester. The capstone is a critical part of the student experience and includes a setup course taken in the preceding semester. The capstone is developed with input from faculty across SMSP, is designed to address a specific real-world policy problem, and is sponsored by an outside client. Students work in small groups on the assigned project using skills and knowledge acquired in the classroom. The outside sponsor can be at the local, national, or international level and might, for example, include agencies such as Delaware's Department of Natural Resource and Environmental Control, the U.S. Environmental Protection Agency, the World Bank, or the Food and Agriculture Organization of the United Nations. The sponsors change from year to year. The SMSP faculty work with sponsors to design each year's capstone projects. The capstone experience is modeled after similar courses at [Duke](#), [Yale](#), and [UC Santa Barbara](#). In special circumstances, a student may opt out of the capstone experience and instead write an analytical paper. This option may be of interest, for example, for students continuing to a PhD and seeking a more self-directed research experience. The degree is designed to be completed in two years under either option.

Students graduating with the MS degree are prepared to conduct economic and policy analysis at all levels of government and in the private sector (consulting, interest groups, think tanks, industry, etc.). They have a good grasp of basic economic concepts as they relate to managing

¹ A PhD in Environmental Economics is also offered and is the subject of a separate Program Policy Statement.

² A MS in Environmental Science & Management (ES&M) is also offered in the College of Earth, Ocean, and Environment. It has some overlap with the Environmental Economics degree and shares some of the same course work. ES&M is oriented toward students with natural science backgrounds and an interest in resource management.

the environment, quantitative analytical skills--including data handling, model estimation and interpretation--and communication of analysis results to decision-makers. Their understanding of economic principles is coupled with background (coursework) in the policy-making process and the natural environment. Examples of job placement are the U.S. Environmental Protection Agency, National Oceanic and Atmospheric Agency, Delaware's Department of Natural Resource and Environmental Control, Research Triangle Institute, and DuPont. [Env-Econ.Net](#) provides a nice discussion of careers in environmental economics.

B. Date of Permanent Status

Fall 2022

C. Degree Offered

MS Environmental Economics

D. Term when first students may enroll

Fall 2022

E. Student demand for the program

The market for the degree is strong. The [Bureau of Labor Statistics](#) (BLS) makes annual projections of job prospects in different fields. For economists, the projected growth rate is 14% from 2019 to 2029. For environmental scientists and specialists, the projected growth rate is 8%. For comparison, across all occupations the projected growth rate is 4% over the same period. [CareerOneStop](#) projects 1,600 job openings annually for environmental economists in the United States through 2029. LinkedIn presently (2021) advertises 691 job openings that mention economics and the environment, and Indeed.com mentions 666. By most measures, the field is growing and doing so at a faster-than-average pace for other professional fields.

The BLS writes about economics that “[j]ob prospects should be best for those with a master’s degree or Ph.D., strong analytical skills, and experience using statistical analysis software.” These are all skills at the core of the MS degree. The BLS also writes about economics that “... demand is expected to be strong as organizations increasingly turn to economists to apply analysis of “big data” to pricing, advertising, and other areas. The increasing complexity of the global economy and a more competitive business environment also are expected to support demand for economists.” About Environmental Scientists & Specialists, the BLS writes that “heightened public interest in the hazards facing the environment, as well as increasing demands placed on the environment by population growth, are projected to spur demand for environmental scientists and specialists. Many jobs will remain concentrated in state and local governments, and in industries that provide consulting services. Scientists and specialists will continue to be needed in these industries to analyze environmental problems and develop solutions that ensure communities’ health.” [SustainableEarth.com](#) draws similar conclusions and specifically mentions advertised job titles that fit our proposed program: Environmental

Economist, Natural Resource Economist, Principal Associate, Principal Research Economist, Resource Economist, Senior Economist, Ecological Economist, Energy Economist, Environmental Protection Economist, and Marine Resource Economist.

An analysis done by Professional and Continuing Studies at UD in January 2022 (uploaded with this proposal) using the Burning Glass Technologies Labor Insight tool showed that, over the last ten years, the number of yearly job postings in the Mid-Atlantic region for environmental economics has grown from 42,287 to 57,303 in the last 10 years – an increase of about 36%. These numbers include job announcements at all levels, but this is a large market with steady growth.

Around the country, several programs offer degrees like the one proposed here. They vary in terms of home college, focus, structure, and curriculum. In all cases there is close association (usually affiliation) with economics and agricultural economics departments in the school. The Masters in Environmental Science & Management in the [Bren School at the University of California](#), for example, offers a specialization in Economics & Politics of the Environment and has affiliation with their Economics Department. The [Forestry School at Yale University](#) offers a Masters of Environmental Management with courses in economics but no concentration or degree in environmental economics. The MS Environmental Economics & Natural Resources at [University of Rhode Island](#) is closest to ours in the degree offerings. Like our degree, their environmental economics degree is not embedded as a specialization within another degree. Also, like us, URI has strengths in marine resources, and the coursework is similar.

Our program is distinct in several ways. First, we are in the Mid-Atlantic with environmental issues of special concern to this area and in proximity to Washington D.C. where many government agencies, NGOs, and consulting firms who hire environmental economists are located. Second, being in a School of Marine Science & Policy we have a special interest in marine resource issues. Third, our capstone experience gives our program a practical orientation and has a more professional orientation than a traditional economics degree or agricultural economics degree. Fourth, our program has a blend of economics, policy, and natural science that is uncommon and is beneficial to analysts working in interdisciplinary teams on environmental policy issues.

Our long-term target is 10-20 MS students (5 to 10 students in each incoming class). This is based on the sizes of programs like URI and Bren and scaled back somewhat for the size of our faculty. The program's predecessor, the Master in Marine Policy, typically admitted 4 to 8 students when it was operating at full capacity. This is another useful benchmark.

F. College and School

The degree will reside in the School of Marine Science & Policy in the College of Earth Ocean and the Environment. All relevant core faculty are on the Newark campus.

II. Admission

A. Admission Requirements

Admission is competitive. It is based on grades, letters of recommendation, and an application essay. A GPA of 2.5 or higher on a 4.0 scale is expected. International students must have a TOEFL score of 90 or higher. The International English Language Testing System (IELTS) may be taken in lieu of the TOEFL exam. The University of Delaware requires an overall band score of 6.5 or higher on the IELTS, with no individual speaking score being less than 6. Alternatively, international student applicants can show proof of having graduated from an undergraduate or graduate program in a country where English is the primary language. TOEFL or IELTS scores must be within the last two years. The SMSP Graduate Committee evaluates each applicant for admission. The Committee reserves the right to interview applicants, but it is not required for admission.

B. Prior Degree Requirements

A four-year U.S. Bachelor's degree (or its equivalent) in any academic field from an accredited college or university is required.

C. Application Deadlines

January 30 for priority fall admission (with April 15 as a final deadline)
July 1 for fall admission in special circumstances

D. Special Competencies

Applicants may come from any undergraduate/graduate major. Majors in economics, natural science, mathematics, applied mathematics, statistics, or engineering are good backgrounds but not required. At least one course in each of calculus, statistics, and microeconomics is expected. Additional coursework in linear algebra is helpful. Students may attend an optional math boot camp in the Economics Department the summer (August) before arriving.

E. Admission Categories

No categories other than regular admission

F. Other Documents

Applicants must submit the following:

- All official undergraduate and (if applicable) graduate transcripts
- A resume or curriculum vitae that documents prior work experience, publications, honors and awards received, and a summary of educational credentials.
- A personal statement laying out professional goals and reasons for applying

- Three letters of recommendation
- International student applications must include TOEFL (or IELTS) scores and certified English translation of all materials when applicable

G. University Statement

Admission to the graduate programs is competitive. Those who meet stated requirements are not guaranteed admission, nor are those who fail to meet all of those requirements (except the foreign language minimum) necessarily precluded from admission if they offer other appropriate strengths.

III. Academic

A. Degree Requirements

1. Course Requirements

<i>Area</i>	<i>Requirements</i>	<i>Credit Hours</i>
<i>Economic Theory</i>	ECON 811 Microeconomic Theory I	3
<i>Environmental & Resource Economics Core</i>	MAST 675/ECON 675 Natural Resource Economics MAST 676/ECON 676 Environmental Economics MAST 688 Climate Change Economics	9
<i>Quantitative Methods</i>	SPPA 704 Advanced Quantitative Methods	3
<i>Natural Systems</i>	MAST 610 Coupling Human to Natural Systems Substitution of another science course is allowed with approval of the advisor.	3
<i>Policy Analysis</i>	Choose one of the following: UAPP 701 Public Policy UAPP 707 Public Policy Analysis	3
<i>Capstone Experience or Analytical Paper</i>	Choose one of the following options: <u>Capstone Experience</u> MAST 663 Decision Tools for Policy Analysis MAST 664 Environmental Issue Capstone <u>Analytical Paper</u> MAST 865 Analytical Paper Other relevant course at the graduate level as approved by the advisor. See examples below.	6
<i>Electives</i>	Other relevant courses at the graduate level as approved by the advisor. Here are some <u>example</u> courses: APEC 805 Behavioral Economics APEC 820 Experimental Economics MAST 672 Benefit-Cost Analysis	6

	MAST 639 Renewable Energy & Climate ECON 845 Development Economics SPPA 721 Data Science Tools for Evidence-Based Policy	
	TOTAL CREDIT HOURS	33

2. Other Requirements

Residency

Students are expected to be in residence for the fall and spring semesters for two years.

Qualifying Exams

There is no qualifying exam.

Seminars

Students are expected to be active in brownbag lunches and seminars on-campus and off-campus in a way that is beneficial to their graduate education. SMSP has a student travel budget that students may use for presentation of papers/posters off-campus. Students apply to the School Director for these funds. Students report their activity in professional development on their annual progress report.

English Proficiency

English proficiency is required. All written and oral communication is in English.

Other

There is no portfolio, language, teaching, or internship requirement.

3. Procedure for petitions for variance in degree requirements

All petitions for variances in the degree requirements are handled by the SMSP Graduate Committee. Requests must be made in writing to the Chair of the Graduate Committee. The request should explain why the variance is sought and include written support from at least one SMSP faculty member. The committee reviews the request and issues a written determination for the student’s record.

4. Grade minimums

Minimums follow university policy.

5. Courses which may not be used towards the degree

Electives must be approved by the student’s advisor.

6. Identify expectations of facility of expression in English (oral and written) as part of the degree requirement.

English proficiency is required. All written and oral communication is in English.

B. Committees for exams, thesis, or dissertations

1. Procedure for advisor and advisement

MS students are assigned an advisor during their first semester. The advisor will be a core SMSP or SMSP-affiliated faculty. The faculty advisor meets at least once per semester with the student to help in course selection, outside professional engagement, capstone experience, and other matters deemed necessary to advance the student's career. MS students taking the Analytical Paper option typically have more interaction with their advisor as that faculty member is also responsible for directing and grading the paper. The Analytical Paper requirement is satisfied when the advisor issues a grade for MAST 865 Analytical Paper.

2. Committee requirement

3. Deadlines for establishing and preparation for comprehensive examinations

4. Policies for dates of examinations, grading of committee examinations and retake options

There is no committee. There is no comprehensive exam.

5. Guidelines for approving research proposals involving human subjects.

Students engaged in research involving human subjects are expected to complete the appropriate [Institutional Review Board](#) (IRB) training and follow IRB guidelines as they pertain to their research. Details for creating consent forms and submitting studies for review by the IRB can be obtained from the Office of Research. The research cannot proceed until IRB approval has been obtained. IRB forms also require the approval of the student's advisor.

6. Procedures for analytical paper approval in the department

A student may write an analytical paper in lieu of the capstone experience. If so, the student must secure the approval of an SMSP or SMSP-affiliated faculty member, who will offer guidance, direction, and grading of the paper. The analytical paper is an article-length paper targeting publication in an environmental economics or policy journal. The paper is evaluated by the chosen faculty member. The paper is approved when the assigned faculty member submits a grade for MAST 865 Analytical Paper. The faculty member has the option of requiring a presentation of the analytical paper in a seminar or conference setting. Actual publication is not required.

7. Departmental and student obligations for finding committee members

8. Departmental and student obligations and procedures for change in committee members

There is no MS committee.

C. Timetable and definition of satisfactory progress toward degree

1. Academic load, normal progress, and evaluation of performance

A full-time academic load is 9 credits hours per semester the first three semesters and 6 credit hours the fourth semester. All required coursework is completed in two years. All study is full-time.

Normal progress (capstone option) follows the schedule:

<p><u>Fall – Year 1 (9 credit hours)</u> ECON 811 Microeconomic Theory I MAST 675 Nat Res Economics MAST 610 Coupling Natural & Human Systems</p>	<p><u>Fall – Year 2 (9 credit hours)</u> UAPP 707 Policy Analysis MAST 663 Decision Tools for Policy Analysis MAST 688 Climate Change Economics</p>
<p><u>Spring – Year 1 (9 credit hours)</u> MAST 676 Env Economics SPPA 704 Advanced Quantitative Methods Elective</p>	<p><u>Spring – Year 2 (6 credit hours)</u> MAST 664 Environmental Issue Capstone Elective</p>

Normal progress (analytical paper option) follows the schedule:

<p><u>Fall – Year 1 (9 credit hours)</u> ECON 811 Microeconomic Theory I MAST 675 Nat Res Economics MAST 610 Coupling Natural & Human Systems</p>	<p><u>Fall – Year 2 (9 credit hours)</u> UAPP 707 Policy Analysis MAST 688 Climate Change Economics Elective</p>
<p><u>Spring – Year 1 (9 credit hours)</u> MAST 676 Env Economics SPPA 704 Advanced Quantitative Methods Elective</p>	<p><u>Spring – Year 2 (6 credit hours)</u> MAST 865 Analytical Paper Elective</p>

The student completes a progress report at the end of each academic year and submits it to Graduate Committee and the advisor. The Chair of the Graduate Committee and the advisor evaluate the progress of the student and communicate to the student if the progress is less than satisfactory. The advisor also communicates to the student the actions that must be taken to make progress satisfactory.

2. Grade requirements

Students must maintain a 3.0 GPA. There are no specific departmental or course grade requirements.

3. & 4. Analytical paper progress timetable and defense guidelines

The capstone course is taken and completed in spring semester of the student's second year. If the student takes the analytical paper (AP) option, the faculty advisor for the AP is identified no later than the end of spring semester in the first year and may be different than the assigned advisor. If a new advisor is selected, that advisor assumes all advising responsibilities. The paper is due in the spring semester of the second year. There is no defense of the analytical paper but the advisor may require a public presentation for fulfillment of the AP.

5. Forms required.

- Annual Progress report submitted to the Graduate Committee ([Link](#))
- Application for Advanced Degree ([Link](#))

6. Consequence for failure to make satisfactory progress

A student who is not making satisfactory progress will be issued a written warning. The warning will identify steps to make satisfactory progress and indicate the consequences of unsatisfactory progress. After a second semester of unsatisfactory progress, the student is issued a second warning, again with steps required to make satisfactory progress. After three semesters of unsatisfactory progress, the student will be recommended for dismissal. All graduate students are subject to the University of Delaware Graduate Probation and Dismissal Policy, as stated in the University Catalog. Protocol for grievance procedure if student has been recommended for termination for failure to make satisfactory progress.

7. Protocol for grievance procedure

A student that has been recommended for dismissal for failure to make satisfactory progress may file a grievance based on Graduate College policies.

IV. Program Educational Goals

The objective of the degree is to train policy analysts with a practical orientation and an ability to provided economic-based information that is rigorous and useful in the environmental policy-making process. This requires:

- A foundation in microeconomic theory and econometrics
- An understanding of public policy, the policy process, and policy analysis
- An understanding of the environment issues in the context of policy analysis
- Ability to structure problems, understand context and explore alternative solutions

- Professional oral and written communication skills
- Critical thinking skills
- Organizational skills – developing working plans, group management, and task management

These learning objectives are manifest in the requirements for the MS. They are measured directly in the courses through assignments and oral presentations, project reports and final examinations. Success in the capstone course is measured by the external sponsor, selected core SMSP faculty, and students in written evaluations. Since the capstone course is a real-world policy experience, this assessment is critical. Each year the relevant policy faculty meet at the end of the spring semester to evaluate what worked and what did not in the capstone experience and to prepare next year's capstone. Through that learning process, the capstone experience is continually updated and improved to meet the goals of the degree. We also plan to communicate with other programs using the capstone approach to learn from them.

V. Financial Aid

A. Financial Awards

1. Types of awards, policy for granting awards, summer appointments, and number of years of support.

Most MS students do not receive funding. Some highly qualified applicants may receive a fellowship or research assistantship.

2. Responsibilities of students on contract

Students receiving full funding are expected to work 20 hours per week on faculty projects.

3. Evaluation of students on contract

The School Director and faculty member providing funding (typically the student's advisor) review a student after each semester in terms of progress toward degree and performance on the project. Students are given feedback if progress and/or performance is not satisfactory. After two semesters of unsatisfactory progress or performance, the contract may be terminated.

VI. Departmental Operations

A. General student responsibilities

It is the student's responsibility to satisfy all University requirements described in the Academic Regulations for Graduate Students section in the Graduate Catalog, as well as any additional requirements established by the faculty in the academic program in which the student is enrolled.

All students enrolled at the University of Delaware are subject to student life policies set by the University and documented in the University publication, [Student Guide to University Policies](#).

B. Student government and organizations

Students may participate in graduate student governments for the School and the University. Students may join the [Association of Environmental and Resource Economist Association](#) (AERE), which is the major professional group environmental economists, and the American Economic Association (AEA), which is a central organization for job searches.

C. Travel for professional meetings and presentations

AERE has reduced fees for students and sponsors several graduate student workshops (North Carolina, Colorado, California, Illinois). These, as well as other professional meetings, are strongly encouraged. The SMSP often provides travel funds for students.