

# M.S. in Environmental Science and Policy

## Area of Emphasis

One of the primary goals of the Environmental Science and Policy (ES&P) graduate program is to prepare technically competent and creative individuals for positions in the public or private sectors. Individuals with such career objectives will focus on environmental science course work in the emphases of Ecosystems Studies or Environmental Technology and Analysis. Another objective of the ES&P graduate program is to prepare highly skilled and imaginative individuals for management and policy-making positions in government, nonprofit organizations and the private sector. Individuals with such career objectives will focus on environmental policy course work in the emphasis of Environmental Policy and Administration. Students will be prepared to deal with a variety of environmental problems and to pursue further graduate work in similar or related areas. A fourth option is to develop a “personal program of study” more fitting to the career interest of the student. In addition to the general core requirements described above, students will select a program of study from one of the areas of emphasis described below.

## Areas of Emphasis and Requirements

Area of emphases and credit loads are described in detail below (credits are unduplicated by the program core). Note that some undergraduate courses are cross-listed as graduate courses and require only graduate status to enroll. It is strongly recommended that a student speak with the professor assigned to the course prior to enrolling to ensure that the student is adequately prepared to succeed in the course. Personal programs of study must conform to Environmental Science and Policy program guidelines and be approved in advance by the student’s graduate committee, the Environmental Science and Policy program chair, and the Associate Vice Chancellor for Graduate Studies. These programs must include the entire 18-credit program core requirements, at least one quantitative course ENV S&P 755 and include a minimum of 34 total credits. It is possible, even necessary depending on area requirements, that students will include one or two four-credit statistics courses in their academic program. In those cases, only seven credits would be needed in one semester which could be satisfied by ENV S&P 715 or ENV S&P 795, or an independent study or internship. If a regular course is selected, the academic program would include a total of 36 credits.

Students must complete requirements in one of the following areas of emphasis:

- Ecosystems Studies
- Environmental Policy and Administration
- Environmental Technology and Analysis
- Personal Program of Study

## Ecosystems Studies

Students who select the Ecosystems Studies emphasis may study general features of ecosystems such as nutrient regeneration, productivity, or trophic relationships. They may also focus on specific questions related to endangered species, predation and competition. Natural, managed, and disturbed ecosystems are examined in classroom and field activities. Studies on aquatic systems take advantage of the University’s location on Green Bay, participation in the University of Wisconsin Sea Grant Program, and the on-campus Cofrin Center for Biodiversity. The University’s proximity to large areas of northern forests and the Door County Peninsula provides convenient locations for the study of diverse ecosystems. The Ecosystems Studies area of emphasis prepares students to:

- design and conduct scientific investigations;
- collect, evaluate, and interpret data;
- make responsible decisions to implement appropriate technologies and strategies to solve environmental problems; and
- effectively communicate the results of environmental studies to other scientists, decision makers and the general public.

Graduates typically work as scientists, environmental specialists, or project managers with industry, commercial laboratories, engineering firms, or government agencies, where their work involves analysis, research, consulting, compliance, or enforcement. Students who pursue the Ecosystems Studies area of emphasis are expected to have completed biology courses beyond introductory courses, typically the equivalent to a minor or major in biology (taken elsewhere or prior to entrance). These courses should include an ecology course.

## Ecosystems Studies

### Emphasis Prerequisites

Students who pursue the Ecosystems Studies area of emphasis are expected to have completed biology courses beyond introductory courses, typically the equivalent to a minor or major in biology (taken elsewhere or prior to entrance). These courses should include an ecology course.

| Code   | Title  | Credits |
|--|--|---------|
| General Core Requirements                                  |  | 9       |
| ENV S&P 701  | Perspectives in Environmental Science and Policy |         |
| Choose one of the following repeatable courses( 2 credits) |  |         |

|  |  |
|--|--|
| ENV S&P 702<br>or ENV S&P 715<br>or ENV S&P 795                | Stable Isotopes in the Environment<br>Seminar in Environmental Science and Policy<br>Special Topics  |
| <b>Environmental Science</b>                                   |  |
| ENV S&P 740<br>or ENV S&P 767                                  | Ecology and Management of Ecosystems<br>Environmental Technology and Analysis  |
| <b>Public Policy</b>   |  |
| ECON 713<br>or ENV S&P 731<br>or ENV S&P 732<br>or ENV S&P 752 | Environmental Economics and Sustainability<br>Freshwater and Marine Policy & Law<br>Wildlife Law and Policy<br>Environmental Policy and Administration |
| <b>Required Quantitative Course</b>                            |  |
| ENV S&P 755  | Environmental Data Analysis  |
| <b>Choose one of the following required ecology courses:</b>   |  |
| BIOLOGY 669  | Conservation Biology   |
| ENV S&P 740  | Ecology and Management of Ecosystems   |
| ENV S&P 743  | Ecology and Analysis of Communities and Landscapes   |
| <b>Additional Courses - complete 9 credits</b>                 |  |
| Choose any combination from the courses listed here or above.  |  |
| <b>Biology:</b>  |  |
| BIOLOGY 510  | Plant Biodiversity   |
| BIOLOGY 511  | Plant Physiology   |
| BIOLOGY 512  | Mycology   |
| BIOLOGY 520  | Field Botany   |
| BIOLOGY 522  | Environmental Microbiology   |
| BIOLOGY 542  | Ornithology  |
| BIOLOGY 543  | Mammalogy  |
| BIOLOGY 555  | Entomology   |
| BIOLOGY 557  | Marine Biology   |
| BIOLOGY 565  | Aquatic Invertebrates  |
| BIOLOGY 601  | Fish and Wildlife Population Dynamics  |
| BIOLOGY 602  | Advanced Microbiology  |
| BIOLOGY 649  | Wetland Ecology  |
| <b>Environmental Science:</b>                                  |  |
| ENV SCI 520  | The Soil Environment   |
| ENV SCI 530  | Hydrology  |
| ENV SCI 601  | Stream Ecology   |
| ENV SCI 603  | Limnology  |
| GEOSCI 670   | Glacial Geology & Landscapes   |
| <b>Environmental Policy and Planning:</b>                      |  |
| ECON 713   | Environmental Economics and Sustainability   |
| ENV S&P 752  | Environmental Policy and Administration  |
| EPP 579  | Natural Resource Policy, Law, and Administration   |
| POL SCI 578  | Environmental Law  |
| POL SCI 580  | Global Environmental Politics and Policy   |
| PUB ADM 522  | Environmental Planning   |
| <b>Math and Statistics:</b>                                    |  |
| MATH 529   | Applied Regression Analysis  |
| MATH 630   | Design of Experiments  |
| <b>Seminar and Special Topics:</b>                             |  |
| ENV S&P 715  | Seminar in Environmental Science and Policy  |
| ENV S&P 795  | Special Topics   |

|  |   |              |
|--|---|--------------|
| ENV S&P 702  | Stable Isotopes in the Environment  |              |
| <b>Completion Track - Select one of the following (Thesis, Internship, or Course Based):</b> |   | <b>6-12</b>  |
| <b>Thesis: (6 credits)</b>   |   |              |
| ENV S&P 799  | Thesis  |              |
| <b>Internship: (9 credits)</b>   |   |              |
| ENV S&P 763<br>& ENV S&P 797   | Capstone in Environmental Science and Policy<br>and Internship  |              |
| <b>Course Based: (12 credits)</b>  |   |              |
| ENV S&P 763  | Capstone in Environmental Science and Policy  |              |
| ENV S&P 715<br>or ENV S&P 795  | Seminar in Environmental Science and Policy<br>Special Topics   |              |
| ENV S&P 740<br>or ENV S&P 743<br>or ENV S&P 767  | Ecology and Management of Ecosystems<br>Ecology and Analysis of Communities and Landscapes<br>Environmental Technology and Analysis |              |
| 3-5 additional elective credits  |   |              |
| <b>Total Credits</b>   |   | <b>31-37</b> |

## Environmental Policy and Administration

Students who select the Environmental Policy and Administration emphasis may study the characteristics and operation of government institutions; organizational policy, design and evaluation; and substantive policies in regulation, environmental protection, science and technology, and energy and natural resources. Courses emphasize environmental problem analysis and planning, policy analysis and formulation, environmental law and implementation, program evaluation, statistical analysis and the application of social science research methods to environmental issues. Studies benefit from interaction with the Center for Public Affairs and the Cofrin Center for Biodiversity.

The Environmental Policy and Administration area of emphasis prepares students to:

- identify and analyze policy-relevant problems of major importance;
- collect, assess, and interpret policy-relevant data;
- design, evaluate, and implement strategies and programs for addressing such problems; and
- effectively communicate the results of policy analyses and evaluations to diverse audiences, including environmental scientists, policy makers, and the general public.

Graduates typically enter governmental agencies at the national, state or local level, or nonprofit organizations, where their work involves policy analysis, planning, or administration. Some prefer positions in legislative bodies, environmental organizations, or industry where administrative or analytical work is combined with politics, public relations, education or advocacy.

## Emphasis Prerequisites

Students who pursue Environmental Policy and Administration come from a variety of undergraduate backgrounds such as economics, engineering, environmental planning, environmental policy, political science, public administration, sociology, or more traditional science disciplines. The appropriate undergraduate course preparation is dictated by the prerequisites for the courses to be included in a program of study and the thesis topic area. It would normally be expected that students would have the equivalent of one year of undergraduate course work in political science, public administration, or economics.

| Code  | Title   | Credits  |
|---|---|----------|
| <b>General Core Requirements</b>                                  |   | <b>9</b> |
| ENV S&P 701   | Perspectives in Environmental Science and Policy  |          |
| <b>Choose one of the following repeatable courses (2 credits)</b> |   |          |
| ENV S&P 702<br>or ENV S&P 715<br>or ENV S&P 795                   | Stable Isotopes in the Environment<br>Seminar in Environmental Science and Policy<br>Special Topics |          |
| <b>Environmental Science</b>                                      |   |          |
| ENV S&P 740<br>or ENV S&P 767                                     | Ecology and Management of Ecosystems<br>Environmental Technology and Analysis                       |          |
| <b>Public Policy</b>  |   |          |
| ECON 713<br>or ENV S&P 731  | Environmental Economics and Sustainability<br>Freshwater and Marine Policy & Law                    |          |

|  |   |             |
|--|---|-------------|
| or ENV S&P 732   | Wildlife Law and Policy   |             |
| or ENV S&P 752   | Environmental Policy and Administration   |             |
| <b>Required Courses - complete 6 credits:</b>                                    |   | <b>6</b>    |
| ECON 713   | Environmental Economics and Sustainability  |             |
| ENV S&P 752  | Environmental Policy and Administration   |             |
| <b>Administrative Organizations and Processes - complete 3 credits:</b>          |   | <b>3</b>    |
| EPP 578  | Environmental Law   |             |
| EPP 579  | Natural Resource Policy, Law, and Administration  |             |
| POL SCI 610  | Intergovernmental Relations   |             |
| PUB ADM 514  | Administrative Law  |             |
| <b>Public Policy - choose 3 credits:</b>   |   | <b>3</b>    |
| ECON 713   | Environmental Economics and Sustainability  |             |
| EPP 551  | Water Resources Policy and Management   |             |
| EPP 579  | Natural Resource Policy, Law, and Administration  |             |
| POL SCI 516  | Congress: Politics and Policy   |             |
| POL SCI 578  | Environmental Law   |             |
| POL SCI 580  | Global Environmental Politics and Policy  |             |
| PUB ADM 506  | Regulatory Policy and Administration  |             |
| PUB ADM 522  | Environmental Planning  |             |
| <b>Additional Courses</b>  |   | <b>4</b>    |
| Select any combination from the courses listed here or above.                    |   |             |
| <b>Research Methods:</b>   |   |             |
| ENV S&P 755  | Environmental Data Analysis   |             |
| MATH 630   | Design of Experiments   |             |
| <b>Environmental Science</b>   |   |             |
| ENV S&P 724  | Hazardous and Toxic Materials   |             |
| ENV S&P 740  | Ecology and Management of Ecosystems  |             |
| ENV S&P 743  | Ecology and Analysis of Communities and Landscapes  |             |
| ENV S&P 767  | Environmental Technology and Analysis   |             |
| ENV SCI 505  | Environmental Fate and Transport  |             |
| ENV SCI 518  | Pollution Control   |             |
| ENV SCI 523  | Pollution Prevention  |             |
| ENV SCI 660  | Resource Management Strategy  |             |
| ENV SCI 633  | Ground Water: Resources and Regulations   |             |
| <b>Environmental Planning and Geographic Information Systems:</b>                |   |             |
| EPP 650  | Advanced Geographic Information Systems   |             |
| <b>Seminar and Special Topics:</b>   |   |             |
| ENV S&P 715  | Seminar in Environmental Science and Policy   |             |
| ENV S&P 795  | Special Topics  |             |
| <b>Completion Track (Thesis, Internship, or 12 additional elective credits):</b> |   | <b>6-12</b> |
| <b>Thesis: (6 credits)</b>   |   |             |
| ENV S&P 799  | Thesis  |             |
| <b>Internship: (9 credits)</b>   |   |             |
| ENV S&P 763<br>& ENV S&P 797   | Capstone in Environmental Science and Policy<br>and Internship  |             |
| <b>Course Based: (12 credits)</b>  |   |             |
| ENV S&P 763  | Capstone in Environmental Science and Policy  |             |
| ENV S&P 715<br>or ENV S&P 795  | Seminar in Environmental Science and Policy<br>Special Topics   |             |
| ENV S&P 740<br>or ENV S&P 743<br>or ENV S&P 767                                  | Ecology and Management of Ecosystems<br>Ecology and Analysis of Communities and Landscapes<br>Environmental Technology and Analysis |             |

3-5 additional elective credits

**Total Credits****31-37****Environmental Technology and Analysis**

Students who select the Environmental Technology and Analysis emphasis may study concepts of: environmental modeling and remediation; municipal, industrial, and agricultural waste transformation, utilization and disposal; alternative energy systems and energy efficiency; or chemical, biological and geological aspects of ground or surface water systems. Students may be involved with evaluating alternative technologies and strategies for effective planning and policy implementation for the future. Principles and techniques of quantitative and qualitative analysis are applied to problems of supply, distribution, and utilization of natural resources and to the optimization of treatment and management costs in the context of public agencies, consulting firms and industries.

The Environmental Technology and Analysis area of emphasis prepares students to:

- design and conduct scientific investigations;
- collect, evaluate, and interpret data;
- make responsible decisions to implement appropriate technologies and strategies to solve environmental problems; and
- effectively communicate the results of environmental studies to other scientists, decision makers and the general public.

Graduates typically work as scientists, environmental specialists, or project managers with industry, commercial laboratories, engineering firms, or government agencies, where their work involves analysis, research, consulting, compliance, or enforcement.

| Code  | Title  | Credits   |
|---|--|-----------|
| <b>General Core Requirements</b>                                  |  | <b>9</b>  |
| ENV S&P 701   | Perspectives in Environmental Science and Policy |           |
| <b>Choose one of the following repeatable courses (2 credits)</b> |  |           |
| ENV S&P 702   | Stable Isotopes in the Environment               |           |
| or ENV S&P 715  | Seminar in Environmental Science and Policy      |           |
| or ENV S&P 795  | Special Topics                                   |           |
| <b>Environmental Science</b>                                      |  |           |
| ENV S&P 740   | Ecology and Management of Ecosystems             |           |
| or ENV S&P 767  | Environmental Technology and Analysis            |           |
| <b>Public Policy</b>  |  |           |
| ECON 713  | Environmental Economics and Sustainability       |           |
| or ENV S&P 731  | Freshwater and Marine Policy & Law               |           |
| or ENV S&P 732  | Wildlife Law and Policy                          |           |
| or ENV S&P 752  | Environmental Policy and Administration          |           |
| <b>Required Quantitative Course:</b>                              |  | <b>4</b>  |
| ENV S&P 755   | Environmental Data Analysis                      |           |
| <b>Additional Courses - 12 credits</b>                            |  | <b>12</b> |
| Choose any combination of the following courses listed below:     |  |           |
| <b>Chemistry</b>  |  |           |
| CHEM 520  | Thermodynamics and Kinetics                      |           |
| CHEM 522  | Thermodynamics and Kinetics Laboratory           |           |
| CHEM 530  | Biochemistry                                     |           |
| CHEM 531  | Biochemistry Laboratory                          |           |
| CHEM 602  | Advanced Organic Chemistry                       |           |
| CHEM 603  | Advanced Organic Chemistry Laboratory            |           |
| CHEM 613  | Instrumental Analysis                            |           |
| <b>Environmental Science:</b>                                     |  |           |
| BIOLOGY 522   | Environmental Microbiology                       |           |
| ENV SCI 505   | Environmental Fate and Transport                 |           |
| ENV SCI 518   | Pollution Control                                |           |
| ENV SCI 520   | The Soil Environment                             |           |
| ENV SCI 523   | Pollution Prevention                             |           |
| ENV SCI 530   | Hydrology  |           |

|  |   |
|--|---|
| ENV SCI 535  | Water and Waste Water Treatment   |
| ENV SCI 615  | Solar and Alternate Energy Systems  |
| ENV SCI 660  | Resource Management Strategy  |
| ENV SCI 633  | Ground Water: Resources and Regulations   |
| ENV SCI 664  | Atmospheric Pollution and Abatement   |
| ENV S&P 724  | Hazardous and Toxic Materials   |
| ENV S&P 740  | Ecology and Management of Ecosystems  |
| ENV S&P 767  | Environmental Technology and Analysis   |
| GEOSCI 621   | Geoscience Field Trip   |
| GEOSCI 632   | Hydrogeology  |
| GEOSCI 670   | Glacial Geology & Landscapes  |
| <b>Environmental Policy and Planning:</b>  |   |
| ECON 713   | Environmental Economics and Sustainability  |
| ENV S&P 752  | Environmental Policy and Administration   |
| EPP 551  | Water Resources Policy and Management   |
| EPP 579  | Natural Resource Policy, Law, and Administration  |
| POL SCI 578  | Environmental Law   |
| POL SCI 580  | Global Environmental Politics and Policy  |
| <b>Math and Statistics</b>   |   |
| MATH 529   | Applied Regression Analysis   |
| MATH 630   | Design of Experiments   |
| <b>Seminar and Special Topics:</b>   |   |
| ENV S&P 715  | Seminar in Environmental Science and Policy   |
| ENV S&P 795  | Special Topics  |
| ENV S&P 702  | Stable Isotopes in the Environment  |
| <b>Completion Track (Thesis, Internship, or 12 additional elective credits):</b> |   |
|  |   |
| <b>Thesis: (6 credits)</b>   |   |
| ENV S&P 799  | Thesis  |
| <b>Internship: (9 credits)</b>   |   |
| ENV S&P 763<br>& ENV S&P 797   | Capstone in Environmental Science and Policy<br>and Internship  |
| <b>Course Based: (12 credits)</b>  |   |
| ENV S&P 763  | Capstone in Environmental Science and Policy  |
| ENV S&P 715<br>or ENV S&P 795  | Seminar in Environmental Science and Policy<br>Special Topics   |
| ENV S&P 740<br>or ENV S&P 743<br>or ENV S&P 767                                  | Ecology and Management of Ecosystems<br>Ecology and Analysis of Communities and Landscapes<br>Environmental Technology and Analysis |
| 3-5 additional elective credits  |   |
| <b>Total Credits</b>   |   |

6-12

31-37

## Personal Program of Study

Personal programs of study must conform to Environmental Science and Policy program guidelines and be approved in advance by the student's graduate committee, the Environmental Science and Policy program chair, and the Associate Vice Chancellor for Graduate Studies and Research. These programs must include the entire 18-credit program core requirements, at least one quantitative course ENV S&P 755 ([http://catalog.uwgb.edu/search/?P=ENV S&P 755](http://catalog.uwgb.edu/search/?P=ENV%20S&P%20755)) and include a minimum of 34 total credits.

It is possible, even necessary depending on area requirements, that students will include one or two four-credit statistics courses in their academic program. In those cases, only seven credits would be needed in one semester which could be satisfied by ENV S&P 715 ([http://catalog.uwgb.edu/search/?P=ENV S&P 715](http://catalog.uwgb.edu/search/?P=ENV%20S&P%20715)) or ENV S&P 795 ([http://catalog.uwgb.edu/search/?P=ENV S&P 795](http://catalog.uwgb.edu/search/?P=ENV%20S&P%20795)), or an independent study or internship. If a regular course is selected, the academic program would include a total of 36 credits.

| Code  | Title  | Credits      |
|---|--|--------------|
| <b>General Core Requirements</b>  |  | <b>9</b>     |
| ENV S&P 701   | Perspectives in Environmental Science and Policy               |              |
| <b>Choose one of the following repeatable courses (2 credits)</b>   |  |              |
| ENV S&P 702   | Stable Isotopes in the Environment                             |              |
| or ENV S&P 715  | Seminar in Environmental Science and Policy                    |              |
| or ENV S&P 795  | Special Topics   |              |
| <b>Environmental Science</b>  |  |              |
| ENV S&P 740   | Ecology and Management of Ecosystems                           |              |
| or ENV S&P 767  | Environmental Technology and Analysis                          |              |
| <b>Public Policy</b>  |  |              |
| ECON 713  | Environmental Economics and Sustainability                     |              |
| or ENV S&P 731  | Freshwater and Marine Policy & Law                             |              |
| or ENV S&P 732  | Wildlife Law and Policy  |              |
| or ENV S&P 752  | Environmental Policy and Administration                        |              |
| <b>Required:</b>  |  | <b>3</b>     |
| ENV S&P 755   | Environmental Data Analysis                                    |              |
| <b>Pre-approved individual courses:</b> <sup>1</sup>  |  | <b>13</b>    |
| Personal programs of study must conform to Environmental Science and Policy program guidelines and be approved in advance by the student's graduate committee, the Environmental Science and Policy program chair, and the Associate Vice Chancellor for Graduate Studies and Research. |  |              |
| <b>Completion Track (Thesis, Internship, or 12 additional elective credits):</b>  |  | <b>6-12</b>  |
| <b>Thesis: (6 credits)</b>  |  |              |
| ENV S&P 799   | Thesis   |              |
| <b>Internship: (9 credits)</b>  |  |              |
| ENV S&P 763<br>& ENV S&P 797  | Capstone in Environmental Science and Policy<br>and Internship |              |
| <b>Course Based: (12 credits)</b>   |  |              |
| ENV S&P 763   | Capstone in Environmental Science and Policy                   |              |
| ENV S&P 715   | Seminar in Environmental Science and Policy                    |              |
| or ENV S&P 795  | Special Topics   |              |
| ENV S&P 740   | Ecology and Management of Ecosystems                           |              |
| or ENV S&P 743  | Ecology and Analysis of Communities and Landscapes             |              |
| or ENV S&P 767  | Environmental Technology and Analysis                          |              |
| 3-5 additional elective credits   |  |              |
| <b>Total Credits</b>  |  | <b>31-37</b> |

<sup>1</sup> If ENV S&P 755 is completed, only 12 additional credits of pre-approved coursework is required.