GRADUATE PROGRAM IN ENVIRONMENTAL SCIENCE (GPES)

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The Graduate Program in Environmental Science (GPES) supports interdisciplinary environmental research and teaching at SUNY ESF and offers unique graduate programs that serve the needs of our students. GPES is comprised of faculty from each of the seven departments at SUNY ESF who understand the importance of interdisciplinary collaborations to manage and solve critical environmental problems.

Requirements

The academic requirements of the graduate program in environmental science are designed to provide graduates with a sound preparation to meet the rapidly evolving challenges of the field as leading scholars and professionals. Programmatic requirements constitute a framework which includes a comprehensive core foundation emphasizing theory, issues and methods; extended knowledge within an area of study; and a synthesis experience.

In addition, students should have an academic background and/or work experience related to the selected area of study. Wherever possible, deficiencies should be made up prior to matriculation.

Master of Science (M.S.)

The Master's Degree is designed as a two-year experience. The minimum total credits for the degree is 30. Lists of courses that meet requirements identified in this section have been approved by each area of study.

These lists are not exclusive; courses not on these lists may be taken with the approval of the Major Professor and Steering Committee, as indicated on the Form 3B.

Required credit hours are identified in three categories:

1. **Core**: The broad interdepartmental focus of GPES is reflected in the core requirements - A minimum of 9 credit hours distributed in 3 areas: social science, natural or physical science, and methods/tools.
2. **Area of Study**: A minimum of 15 credit hours (excluding 898 and 899 courses) in AOS courses are required.
3. **Thesis**: A minimum of 6 credit hours of research resulting in a document that clearly demonstrates graduate level accomplishments of the student, followed by a defense examination. Students must have an approved Thesis Proposal.

Concurrent Degree

Concurrent degree students may “double count” 8 credit hours toward their M.S. degree.

Environmental Science Seminar

There is no seminar requirement for the Master of Science.

Advanced Standing

A maximum of 6 graduate credit hours with a grade of B or above that have not been applied to another degree may be transferred via petition. The petition must include an attached syllabus and a justification of how the courses are to be included on the student's Plan Sheet.

Petitions regarding Core requirements may be submitted following matriculation. Petitions regarding Area of Study requirements are to be submitted following the formalization of the student's steering committee (submission of Form 2A establishes the steering committee).

Master of Professional Studies (M.P.S.)

The Master of Professional Studies (MPS) degree is a 30 credit hour experience aimed at professional applications of environmental knowledge.

Core Requirements

Required course work: A total of 9 credit hours that includes one 3-hour social science course, one 3-hour natural or physical science course, and one 3-hour methods or tools course emphasizing applications of technical knowledge.

Area of Study Requirements

A minimum of 12-15 credit hours of course works in the chosen area of study, as determined by the major professor and study area faculty. Students in the Water and Wetland Resources program are required to take either (i) a minimum of 18** credit hours of area of study coursework and 3 hours of synthesis OR (ii) 15 credit hours of coursework in the area of study combined with 6 hours of synthesis. Students select a study area at the time of application for admission into the program.

A minimum of 12 credit hours of coursework is required in the chosen area of study, as determined by the major professor and study area faculty. Students select a study area at the time of application for admission to the program.

Synthesis Requirements

Students select either an Internship (minimum of 3 credit hours) or prepare a synthesis paper (3 credit hours). Some internships may extend to 6 credit hours, reducing electives to 0. All students must present a capstone seminar in their final semester and submit a written Capstone report documenting their research or internship experience. The length, depth, and format of the report is at the discretion of the student's supervisory committee. See Appendix B for internship guidance.

Advanced Standing

1. Course transfers. A maximum of six graduate credit hours with a grade of B or above that have not been applied to another degree may be transferred via Petition. The Petition must include an attached syllabus, and a justification of how the courses are to be included on the student's Plan Sheet. Petitions for course transfers are submitted following matriculation.
2. Credit for prior experience. Applicants with a minimum of three (3) years of post-baccalaureate full-time professional experience directly related to the intended area of study may apply for 6 credit hours of advanced standing in the program. Partial credit for

experience cannot be awarded. When awarded for prior work experience, the 6 credit hours are applied toward the Synthesis requirement.

3. All College Forms

Concurrent Degree

Concurrent degree students may "double-count" 8 credit hours toward their MPS degree.

Environmental Science Seminar

All students are required to take two (2) semesters of ENS 797 Environmental Science Seminar OR, in consultation with the Major Professor, appropriate seminars in other ESF departments or Syracuse University (the latter for credit only). ENS 797 is normally completed as an Audit, but at times may be taken for credit if offered.

Doctor of Philosophy (Ph.D.)

The Ph.D. program provides a unique opportunity to develop integrative research within a strong college community of environmental analysts and to draw upon the expertise of scholars at Syracuse University. Entering students are required to complete the equivalent of the GPES master's core either from prior graduate study or coursework taken within the first year of residency.

The Ph.D. in Environmental and Natural Resources Policy (ENRP) has separate and distinct requirements (discussed below). Also, applicants are expected to have completed a master's research thesis.

Graduate Areas of Study

Biophysical and Ecological Economics (M.S., M.P.S., Ph.D.)

Students in the Biophysical and Ecological Economics (BEE) study area develop an understanding of environmental problems and solutions through analyses of the relations between the human economy of goods and services and the biophysical economy of networks of energy and material resource flows.

Drawing on insights from social and physical sciences, BEE helps students to develop critical thinking, intellectual approaches, measurement tools and modeling skills for analyzing increasingly important topics in environment and natural resource science and policy. Specific course work in biophysical and ecological economics is supplemented by course work in ecology, resource management, environmental economics, policy analysis and others.

Coupled Natural and Human Systems (M.S., M.P.S., Ph.D.)

The Coupled Natural and Human Systems (CNHS) area of study fosters interdisciplinary research and scholarship that explicitly integrates the social and biophysical dimensions of environmental issues using a systems approach.

Our research addresses the challenges of sustaining natural and social capital during the Anthropocene—the current era in which humans shape all major Earth system processes. Drawing on diverse backgrounds, CNHS students and faculty recognize humans as integral components of ecosystems and seek to understand their interactions and dynamics of change at multiple scales. Faculty mentors form collaborative and cross-disciplinary teams to advise

CNHS students based on their wide range of expertise and experiences. An emphasis is placed on research and graduate training experience with applications to emerging sustainability issues in real-world settings.

Ecosystem Restoration (M.S., M.P.S., Ph.D.)

The ecosystem restoration study area focuses on the technical, biogeochemical, ecological and cultural aspects of rehabilitating and restoring degraded ecosystems, habitats and landscapes.

The program is designed for graduate students who wish to take an interdisciplinary approach to ecosystem restoration, have access to multidisciplinary expertise, and develop advanced knowledge of ecological engineering, conservation biology, restoration ecology, forest and habitat restoration, landscape ecology and eco-cultural restoration to address complex environmental problems. Current research includes urban ecology and renewal, aquatic restoration, invasive species, agroforestry, brownfields, traditional ecological knowledge and the spatial monitoring, modeling and analysis of integrated ecological processes. Field sites and study areas are located throughout the world and involve a wide variety of ecosystems, cultures and landscapes. Specific course work in ecosystem restoration is supplemented by courses offerings in science, engineering, mathematics, natural resources, and environmental and social policy.

Environmental Communication and Participatory Processes (Ph.D. only)

This Ph.D. study area addresses the communicative dynamics of behaviors, attitudes, values, perceptions, and ideologies. It includes decision making, public policy, public participation, campaign development, organizational effectiveness, conflict prevention and resolution, and risk communication which all hinge on the ability of participants to communicate and use information effectively, strategically, and ethically.

GPES students within this option will be prepared to enter diverse arenas of academia, industry, non-government organizations, and government structures well equipped to facilitate and/or participate in interactions among individual citizens, non-government organizations, publics, agencies, bureaucracies, scientists, and others. They will have the skills and knowledge that will allow them to choose appropriate process structures and strategies to reach objectives.

Environmental and Community Land Planning (M.S., M.P.S., Ph.D.)

The program is designed for students with social science, natural science, engineering, or design backgrounds who are interested in an interdisciplinary and integrative program. Some students have majors in interdisciplinary programs in urban studies or environmental studies. Students develop an understanding and knowledge of development processes, natural systems and governmental planning and regulation. They develop a capacity to analyze environmental and community land planning problems and to form imaginative solutions. Skills obtained include preparation of land and environmental databases, plans, policies and implementation programs.

Environmental Monitoring and Modeling (M.S., M.P.S., Ph.D.)

This study area focuses on multidisciplinary approaches to measuring and modeling environmental systems and processes.

Students address pressing environmental problems in an integrative manner by taking advantage of a broad range of faculty expertise, a variety of course offerings related to the environment and access to advanced field equipment, study sites and computational hardware. Current research in this area includes sustainable development, air quality, water resources, biogeography, terrestrial

and aquatic ecosystems, climate and anthropogenic change, forest biometrics and energy systems. Specific course work in environmental monitoring and modeling is supplemented by courses offerings in the fields of science, engineering, mathematics, natural resources and environmental and social policy.

Environmental and Natural Resources Policy (Ph.D. only)

The Environmental and Natural Resources Policy (ENRP) doctoral program is an interdisciplinary Ph.D. program in that it combines social science (especially policy) with biophysical science.

The problems we study are grounded in the biophysical world, most specifically with the human impact on biophysical systems and vice versa. Investigating these problems requires scientific understanding of the interconnections between ecosystems and social systems; the skills developed in the ENRP program help our graduates to creatively and appropriately design managerial and policy solutions, as well as conduct research studies.

Human Dimensions of the Environment (M.S., M.P.S., Ph.D.)

Human Dimensions of the Environment deals with people's relationships and interactions with the biophysical world. This area incorporates knowledge from both the social and biophysical sciences to examine system interactions.

Research in this area works toward (1) understanding human perceptions, behaviors, attitudes and values with respect to natural resources and the environment; and (2) applying empirical findings to the development of social and biophysical science theory as it relates to human interactions with natural and constructed environments.

Water and Wetland Resource Studies (M.S., M.P.S., Ph.D.)

The water and wetland resources area of study focuses on technical, social, and institutional aspects of water resources management, water quality issue mitigation, and water system restoration.

Individual students may emphasize biophysical or social science subject areas but all study in both areas. The biophysical science aspects include the physical, chemical and biological interactions occurring in water systems. The social science aspects are concerned with planning, regulation, law and institutions, and management of water and wetland resources.

Recommended coursework includes:

- physical sciences: civil engineering, geology, geomorphology, hydrology, meteorology, environmental engineering, soils, water chemistry, hydrogeology, hydrogeochemistry and geographic information systems;
- biological sciences: ecology, entomology, fisheries biology, forestry, microbiology, water quality and limnology;
- social sciences: administration, economics, government, history, law, ethics, philosophy and policy.

* ***Special Course Codes*** *(Code indicates course meets certain program or accreditation requirements. Ignore if there is no relevance to this program of study.)* ***G*** *= General Education Course (GenEd),* ***E*** *= Engineering,* ***ES*** *= Engineering Sciences,* ***M*** *= Mathematic,* ***NS*** *= Natural Sciences,* ***PE*** *= Professional Education,* ***S*** *= Summer-only*