Environmental Studies

Graduate Faculty

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Note: Graduate faculty from the following programs also participate in the teaching and research associated with this program: Biology, Chemistry, Computer Science, Economics, Geography, Geology, Mathematics, Physics, Political Science, Sociology.

Master of Science - Environmental Studies

The Master of Science program accommodates individual student needs and backgrounds and provides students with several curricular and research opportunities. The interdisciplinary curriculum focuses on the natural and social sciences as they relate to environmental problem solving. Each student should contact a faculty member in the Center for Sustainability Studies to identify potential projects. Once accepted into the program students will complete course work requirements and either a thesis (for the thesis option) or internship (for the non-thesis option).

Center for Sustainability Studies

The Center for Sustainability Studies (CSS) provides a focus for (1) applied environmental work by faculty and students and (2) the interdisciplinary Environmental Studies program. Applied environmental research in the Center focuses on global and regional environmental problems. CSS has the instrumentation and faculty specialization to work on a variety of natural science and sustainability-oriented projects. Graduate students in CSS have both thesis and non-thesis options in pursuing a masters degree. The thesis pathway is geared towards students who want to demonstrate empirical skills through development and completion of a master's thesis. Students who have completed the thesis track have gone on to Ph.D. programs or employment in industry, government, or academia. The non-thesis track is geared towards students wanting to pursue a professional path and they work on projects in conjunction between the student, faculty, and community partners. To identify which pathway is right for you, we recommend that prospective students contact a faculty member who works in an area of interest to you.

Programs

- Environmental Studies, M.S. *master*

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Environmental Studies, MS

Required Credits: 30 (Thesis) or 32 (Non-Thesis)
Required GPA: 3.0

Pathway 1: Thesis Option

I. Required Core
Complete the following courses:

- ENVR 5800 Sustainability Analytics & Modeling (3 credits)
- ENVR 6250 Advanced Environmental Studies (3 credits)
- ENVR 6400 Research and Project Design (3 credits)

- ENVR 6700 Graduate Sustainability Seminar (1-3 credits)
  Complete for 3 credits
- ENVR 6790 Environmental Project Management (3 credits)

II. Required Elective Courses
Select, with the consent of thesis advisor, at least 9 credits of graduate level coursework in Environmental Studies, Geology, or related field. Course options include:

- ECON 5040 Environmental Economics (3 credits)
  or ENVR 5040 Environmental Economics (3 credits)
- ENVR 5050 Geochemistry (3 credits)
- ENVR 5110 Environmental Chemistry (3 credits)
- ENVR 5200 Wastewater Treatment (3 credits)
- ENVR 5210 Environmental Law and Policy (3 credits)
- ENVR 5220 Sampling and Analysis (4 credits)
- ENVR 5230 Air Pollution Technology (4 credits)
- ENVR 5240 Waste Management (4 credits)
- ENVR 5260 Risk, Resilience and Sustainable Community Development (3 credits)
- ENVR 5300 Environmental Management and Safety (3 credits)
- ENVR 5400 Environmental Microbiology (3 credits)
- ENVR 5500 Environmental Toxicology (4 credits)
- ENVR 5600 Environmental Justice and Sustainability (3 credits)
- ENVR 5610 Sustainability: Theory and Practice (4 credits)
- ENVR 5710 Indigenous Environmental Knowledge: Global Perspective (3 credits)
- ENVR 5720 Food Sovereignty, Health & Indigenous Environments (3 credits)
- ENVR 5730 Sustainable Communities: Local Indigenous Perspective (3 credits)
- ENVR 5740 Environment, Wellness & the Sacred Connection to Place (3 credits)
- ENVR 5750 Sustainable Communities: Global Indigenous Perspective (3 credits)
- ENVR 5840 Wetlands Ecology (3 credits)
  or BIOL 5840 Wetlands Ecology (3 credits)
- ENVR 6920 Directed Group Study: Seminar (2 credits)
- GEOG 5125 Weather and Climate (3 credits)
- GEOG 5130 Biogeography (3 credits)
- GEOG 5140 Landscape Ecology (3 credits)
- GEOG 5231 Introduction to Geographic Information Systems (3 credits)
- GEOG 5232 Intermediate Geographic Information Systems (3 credits)
- GEOG 5255 Introduction to Remote Sensing (3 credits)
- GEOG 5265 Spatial Analysis (3 credits)
- GEOG 5275 Advanced Geographic Information Systems (3 credits)
- GEOG 5532 Political Ecology (3 credits)
- GEOG 5570 Public Lands Planning (3 credits)
- GEOG 5630 Conservation Biology (3 credits)
  or BIOL 5630 Conservation Biology (3 credits)
- GEOL 5120 Soils (4 credits)
  or BIOL 5120 Soils (4 credits)
- GEOL 5211 Environmental Hydrology (3 credits)
- GEOL 5212 Hydrogeology (3 credits)
- GEOL 5300 Global Environmental Change (3 credits)
- GEOL 5400 Glacial and Pleistocene Geology (3 credits)
- GEOL 5500 Topics in Paleontology (3 credits)
- GEOL 5600 Stratigraphy and Sedimentation (3 credits)
- GEOL 5700 Environmental Geophysics (3 credits)

III. Thesis Option
Complete the following course for 6 credits:

- ENVR 6990 Thesis (1-6 credits)

Pathway 2: Non-Thesis Option: course work only

I. Required Core
Complete the following courses:

- ENVR 5800 Sustainability Analytics & Modeling (3 credits)
- ENVR 6250 Advanced Environmental Studies (3 credits)
- ENVR 6400 Research and Project Design (3 credits)
- ENVR 6700 Graduate Sustainability Seminar (1-3 credits)
  Complete for 3 credits
- ENVR 6790 Environmental Project Management (3 credits)

II. Required Elective Courses
Select, with the consent of thesis advisor, at least 12 credits of graduate level coursework in Environmental Studies, Geology, or related field. Course options include:

- ECON 5040 Environmental Economics (3 credits)
  or ENVR 5040 Environmental Economics (3 credits)
- ENVR 5050 Geochemistry (3 credits)
- ENVR 5110 Environmental Chemistry (3 credits)
- ENVR 5200 Wastewater Treatment (3 credits)
- ENVR 5210 Environmental Law and Policy (3 credits)
- ENVR 5220 Sampling and Analysis (4 credits)
- ENVR 5230 Air Pollution Technology (4 credits)
- ENVR 5240 Waste Management (4 credits)
- ENVR 5260 Risk, Resilience and Sustainable Community Development (3 credits)
- ENVR 5300 Environmental Management and Safety (3 credits)
- ENVR 5400 Environmental Microbiology (3 credits)
- ENVR 5500 Environmental Toxicology (4 credits)
- ENVR 5600 Environmental Justice and Sustainability (3 credits)
- ENVR 5610 Sustainability: Theory and Practice (4 credits)
- ENVR 5710 Indigenous Environmental Knowledge: Global Perspective (3 credits)
- ENVR 5720 Food Sovereignty, Health & Indigenous Environments (3 credits)
- ENVR 5730 Sustainable Communities: Local Indigenous Perspective (3 credits)
- ENVR 5740 Environment, Wellness & the Sacred Connection to Place (3 credits)
- ENVR 5750 Sustainable Communities: Global Indigenous Perspective (3 credits)
- ENVR 5840 Wetlands Ecology (3 credits)
  or BIOL 5840 Wetlands Ecology (3 credits)
- ENVR 6920 Directed Group Study: Seminar (2 credits)
- GEOG 5125 Weather and Climate (3 credits)
- GEOG 5130 Biogeography (3 credits)
- GEOG 5140 Landscape Ecology (3 credits)
- GEOG 5231 Introduction to Geographic Information Systems (3 credits)
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- GEOG 5275 Advanced Geographic Information Systems (3 credits)
- GEOG 5532 Political Ecology (3 credits)
- GEOG 5570 Public Lands Planning (3 credits)
- GEOG 5630 Conservation Biology (3 credits)
  or BIOL 5630 Conservation Biology (3 credits)
- GEOL 5120 Soils (4 credits)
  or BIOL 5120 Soils (4 credits)
- GEOL 5211 Environmental Hydrology (3 credits)
- GEOL 5212 Hydrogeology (3 credits)
- GEOL 5300 Global Environmental Change (3 credits)
- GEOL 5400 Glacial and Pleistocene Geology (3 credits)

- GEOL 5500 Topics in Paleontology (3 credits)
- GEOL 5600 Stratigraphy and Sedimentation (3 credits)
- GEOL 5700 Environmental Geophysics (3 credits)

III. Non-Thesis Option
Complete the following:

- ENVR 6600 Capstone Report (2 credits)
- ENVR 6970 Internship (3 credits)

COMPETENCY REQUIREMENT

All graduate students in Environmental Studies are required to demonstrate competency in the computer applications of statistics. This requirement is to be satisfied by the completion of the following course with a grade of B or better: ENVR 5800, Environmental Data Analysis, 3 credits, or equivalent.

WRITTEN EXAMINATION

All major programs require satisfactory completion of a final written examination which needs to be successfully completed prior to scheduling the oral examination. Please consult with your academic advisor for requirements specific to your area of study.

Environmental Studies Courses

ENVR 5040 Environmental Economics (3 credits)
Examines environmental problems as consequence of market's failure to accurately value environmental resources. Alternative private and public policies are examined in terms of their effectiveness in improving the efficiency and equity with which water, air, and other resources are allocated. (Also offered under ECON 5040.)

ENVR 5050 Geochemistry (3 credits)
Study of processes in the lithosphere, hydrosphere, and atmosphere; cycling of the elements; weathering; microbe-mineral interactions; nanoparticles; microscopic imaging. Prerequisite: Consent of instructor.

ENVR 5110 Environmental Chemistry (3 credits)
Intensive study of biogeochemical cycles of natural and man-made pollutants including transformations, transport, fate and persistence mechanisms. Environmental effects, long-term impacts, and methods of treatment/ prevention are discussed. Prerequisite: Consent of instructor.

ENVR 5200 Wastewater Treatment (3 credits)
Introduction to the operation of the principal methods and treatment processes of municipal and industrial wastewaters, and for the disposal of treated effluent and sludges, and other solid materials. Integration of fundamental principles of science with different aspects of sanitary technology. Prerequisite: Consent of instructor.

ENVR 5210 Environmental Law and Policy (3 credits)
Overview of environmental laws, regulations, and policies. Prerequisite: Consent of instructor.

ENVR 5220 Sampling and Analysis (4 credits)
Methods of sampling and analysis of air, water, soil and other environmental compartments will be described in lecture and experienced in laboratory session. The focus is on regulations and prescribed protocols for environmental field and lab work. Lecture and laboratory. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor.

ENVR 5230 Air Pollution Technology (4 credits)
In-depth overview of sources and types of air pollution, major environmental impacts, regulations, and technologies for control and cleanup. Prerequisite: ENVR 5210 and ENVR 5300 or consent of instructor.

ENVR 5240 Waste Management (4 credits)
An overview of the solid and hazardous waste situation at the local, state, national, and international levels. The focus on management will include a systems approach to prevention, control, and remediation of wastes. Prerequisite: ENVR 5300 or consent of instructor.

ENVR 5260 Risk, Resilience and Sustainable Community Development (3 credits)
We are experiencing dramatic, rapid, unexpected environmental changes due to human caused global climate change, stresses on natural resources as well as our ability to manage our waste generation. In this course, we will explore risk and resilience from a community development perspective. How can we work together in community to survive disruption and anticipate, adapt, and flourish in the face of change. Using Bemidji State University and the greater Bemidji area as a case study we will explore key quantitative as well as qualitative indicators of resilience such as energy, housing, transportation, water, materials & waste, health & wellness, and economic opportunity. Students will be asked to produce quantitative and qualitative assessments of the resilience in our BSU-Bemidji community and actively engage with citizens and working professionals to advance suggestions on how to strengthen our campus and community¿s resilience.

ENVR 5300 Environmental Management and Safety (3 credits)
Helps students pursuing environmental studies to develop environmental management skills required in both manufacturing and non-manufacturing businesses. Safe handling, transport, and storage of hazardous materials with respect to their physical and chemical nature, and application of regulatory requirements relevant to specific business and hazardous materials involved. Prerequisite: Consent of instructor.

ENVR 5400 Environmental Microbiology (3 credits)
Fundamental aspects of microbiology as related to land production, environmental pollution and water quality control processes. The role of major groups of microbes as pollutants, as purifying agents, and as agents of biochemical changes, and ecological functions and importance of each group in the environment. Prerequisite: Consent of instructor.

ENVR 5500 Environmental Toxicology (4 credits)
An overview of major environmental pollutants, their transport, fate, and toxicology. Pollutant effects studied from practical and theoretical focus on stress at various levels of biological organization. Prerequisite: Consent of instructor.

ENVR 5600 Environmental Justice and Sustainability (3 credits)
The ethical and moral dimensions of environmental choices. The legal, philosophical, political, and economic underpinnings of various theories of justice. A major focus is the inequitable distribution of environmental risks and the implications of policies that attempt to combat these risks. Prerequisite: Consent of instructor.

ENVR 5610 Sustainability: Theory and Practice (4 credits)
Becoming agents of positive change in our communities requires building many different skill sets. This course will build core competencies of community leadership and focus on sustainability issues in our community. We will integrates theories, principles and practices of sustainability throughout the course and explore how various entities such as the University, the City of Bemidji, local tribes, companies, non-profits and individuals approach sustainability actions and choices. We will explore issues such as energy, water, waste, food and transportation as well as diversity, equity and inclusion in decision making. Students will be asked to identify a specific problem facing our community and utilize Problem and Project Based Learning (PBL) techniques to directly engage with these local issues, connect with the stakeholders involved and work together to propose potential solutions. Prerequisite(s): ENVR 2000 or consent of instructor.

ENVR 5700 Natural Resource Management (3 credits)
This class offers an interdisciplinary introduction to the principles of natural resource management highlighting the biological and physical science aspects of natural resource management at local, national, and global scales. Topics covered may include resource management of soil, water, forests, rangelands, wetlands, waterways, and wildlife. This is an intermediate-level course designed to introduce key concepts and topical areas in natural resource management. A specific focus for the course will be the application of adaptive natural resource management to key Minnesota resources at multiple levels of government (local, county, state, federal, and tribal) over time. Prerequisite(s): consent of instructor.

ENVR 5710 Indigenous Environmental Knowledge: Global Perspective (3 credits)
Indigenous cultures refer to pre-colonial societies who today represent a minority, non-dominant group in the societies presently residing in territories these cultures once developed. Throughout their history, Indigenous people have developed their own body of environmental knowledge that they have passed on, generation to generation. This course will provide students with a global perspective of Indigenous environmental knowledge and how this knowledge has affected the relationship of the Indigenous peoples with the natural world and its resources. Students will also investigate present-day political, economic, social, and technological issues related to incorporating Indigenous environmental knowledge into sustainability efforts.

ENVR 5720 Food Sovereignty, Health & Indigenous Environments (3 credits)
This course is designed to help students understand the interconnections of food sovereignty, health and environmental sustainability. Students will explore why it is not only important for people to control the way their food is produced, distributed, and consumed but why the food should be appropriate to the cultural background of the people consuming it. Students will learn the critical connections between food and health with an exploration of those influences within the context of Indigenous worldviews and ways of knowing. This is an experiential learning course -- learning through interaction, projects, and reflection. This course may be suitable as an elective in Indigenous Studies and Environmental Studies, Health and Nursing degree programs.

ENVR 5730 Sustainable Communities: Local Indigenous Perspective (3 credits)
Human societies all across the globe have developed rich sets of experiences and explanations relating to the sustainable communities they live, work and play in. This course is designed to introduce students to the basic concepts of these sustainable communities. Students will learn how these communities function, their challenges, and the critical networks that exist with the environment. This class will explore the role of Indigenous knowledge and traditional ways of learning, as well as scientific knowledge in maintaining the sustainability of a community. This is an experiential learning course -- learning through interaction, projects, and reflection.

ENVR 5740 Environment, Wellness & the Sacred Connection to Place (3 credits)
In Indigenous communities, there is a deep and lasting connection to place. Today, there exists overwhelming evidence that connection to place offers important elements for overall individual wellness. However, many communities face challenges in their environments that are detrimental to their health and well-being. To support these communities, there is a need to reconnect them with ways to restore the sustainability of their environment and connection to place. In this course, students will learn the critical connections between the environment and health and will explore the influences of connection to place within the context of Indigenous worldviews and ways of knowing. This is an experiential learning course -- learning through interaction, projects, and reflection.

ENVR 5750 Sustainable Communities: Global Indigenous Perspective (3 credits)
Throughout their history, Indigenous people have developed their own body of knowledge on global sustainability that they have passed on, generation to generation. This course will provide students with a large picture perspective of global Indigenous sustainability knowledge and viewpoints and how this perspective continues to affect the relationship of the Indigenous peoples with the natural world and its resources. Students will also investigate present-day global political, economic, social, and technological issues related to incorporating Indigenous views into sustainability efforts across the continents.

ENVR 5800 Sustainability Analytics & Modeling (3 credits)
The aim of this course is to expose students to both introductory and advanced analytical methods for environmental applications. The class will provide a primer on introductory inferential statistics (sampling, probability, central tendencies, spread, t- tests and ANOVA) and work towards more advanced analytical applications which are geared towards research questions in Economics, Environmental Studies, Geology, and Geography. These techniques include multiple regression, logistic regression, multi-dimensional scaling, regression trees, cluster analysis, survival analysis and basic time series analysis. This class will focus on learning both the theoretical background and application of these methods and discuss the ethical and contextual issues that surround the use of statistical analysis in environmental research.

ENVR 5840 Wetlands Ecology (3 credits)
Survey course develops a basic understanding of the terminology, classification, ecology, values, and conservation of wetlands. Covers wetland systems from around the world, with emphasis on wetlands in North America.

ENVR 6250 Advanced Environmental Studies (3 credits)
The social causes, ecological impacts, and human health effects of environmental degradation. Students provide in-depth analyses of environmental problems through laboratory research and field studies, library research, oral presentation, and written communication.

ENVR 6400 Research and Project Design (3 credits)
Advanced learning in research and project design as it applies to qualitative and quantitative research, sampling and data collection methods, experimental vs. non-experimental procedures, and various statistical methods for data analysis.

ENVR 6500 Advanced Graduate Project I (2 credits)
Students learn a combination of literature, laboratory, or field techniques and carry out research under the supervision of a faculty advisor. Students will work together to critique and improve course projects during the semester.

ENVR 6600 Capstone Report (2 credits)
In this final course, students work closely with the professor of record and up to 2 additional professionals to design and implement a capstone project. Capstone projects involve scholarly and/or research-based pursuit of knowledge and content development. Though projects may vary based on individual interests, each will reflect a significant level of scholarship and creativity and build upon existing knowledge to create new learning experiences and an enhances level of expertise.

ENVR 6700 Graduate Sustainability Seminar (1-3 credits)
This course exposes graduate students to a range of topics within environmental studies from a sustainability perspective. In a seminar format, students will discuss environmental problems in a deeper context and present progress reports on their thesis research and projects. Faculty and guests will make presentations for students to discuss. Students may enroll for up to 6 credits.

ENVR 6790 Environmental Project Management (3 credits)
Students will learn the fundamentals of the management of environmental projects, including stakeholder engagement, planning and achieving realistic project milestones, and modifications needed to ensure project success. A practical investigation of grantsmanship with emphases on funding sources, creative writing, effective conduct of project and reporting results. Gives students first-hand practice in all phases of grantsmanship. Review and critique both qualitative and quantitative model proposals.

ENVR 6910 Directed Independent Study (1-9 credits)
Directed Independent Study

ENVR 6920 Directed Group Study: Seminar (2 credits)
When taken as Graduate Seminar the following description applies: Interdisciplinary study and detailed discussion of major areas of environmental controversy with emphasis on individual investigation of the available literature and effective oral presentation. Prerequisite: Consent of instructor.

ENVR 6970 Internship (3 credits)
Graded Satisfactory/Unsatisfactory only. Student internships may be either full-time or part-time in a public or private agency appropriate to the degree objective. Internships consist of closely supervised periods of service that are arranged in advance of the course registration. Students should consult their advisor concerning prerequisites.

ENVR 6990 Thesis (1-6 credits)
A thesis written by the student that reports extensive original research carried out by the student and demonstrates appropriate methodology and scholarship.

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
1930, 2930, 3930, 4930 EXPERIMENTAL COURSE
1940, 2940, 3940, 4940 IN-SERVICE COURSE
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
1970, 2970, 3970, 4970 INTERNSHIP
1980, 2980, 3980, 4980 RESEARCH
1990, 2990, 3990, 4990 THESIS