ENVIRONMENTAL SCIENCES MS

College of Science, Engineering & Technology
Biological Sciences
242 Trafton Science Center S • 507-389-2786

Graduate Coordinator: Beth Proctor, Ph.D.

The Graduate Program in Environmental Sciences offers the student the opportunity for study in the areas of environmental quality, restoration and natural resources. These areas encompass a broad range of practical problems which cross the boundaries of applied natural sciences, mathematics, economics, management and law.

This program provides flexibility and a multidisciplinary basis. This is accomplished by drawing on the expertise from many departments at Minnesota State University, Mankato. The focus of research and/or teaching available in the Environmental Sciences Program includes: Environmental Monitoring, Environmental Toxicology, Environmental Microbiology, and Environmental Assessment.

The Master's Thesis Option is strongly encouraged, however, a non-thesis option is also available.

Admission. In addition to meeting the general admission requirements of College of Graduate Studies and Research, students must have completed the following courses with a minimum grade of C: One year of Chemistry, College Algebra, General Ecology, and Plant Science or Animal Diversity. Students lacking some of the admission requirements may be conditionally admitted to the program. Conditionally admitted students are given one academic year to complete coursework deficiencies.

Graduate Assistantships. Environmental Sciences is a Program in the Department of Biological Sciences. Graduate assistantships are available through the Department of Biological Sciences.

Occupational Outlook. There are diverse opportunities for employment in the area of environmental sciences. Numerous opportunities exist in environmental analysis and monitoring of environmental media (water, soil, air, indoor air, organisms, food, biological fluids, etc.). There are positions available in the regulation and monitoring of agricultural activities such as management of feed lots and septic systems; and in water planning on the county, regional, and state level. Moreover, there are positions in industrial (workplace environment), data management, chemical evaluation, quality control and quality assurance and geographic information systems (GIS).

There is also a need for persons with Environmental Science coupled with emphasis in Business, Economics, Political Science, and/or Urban and Regional Studies.

Potential employers include the Environmental Protection Agency (EPA); U.S. Geological Survey; the Department of Agriculture; the Food and Drug Administration (FDA); other federal, state and local government agencies, as well as private industry. Many of these employers study chemicals to determine if they are harmful, their mode of action, how they move in the environment, and whether they are carcinogenic or teratogenic (causing cancer or birth defects). The Environmental Sciences Program works with the EPA, as well as other federal and state agencies, to secure grants which support faculty and graduate student research. These contacts may lead to internships and/or permanent employment opportunities for graduates.

Professional positions are usually available for persons with hands-on experience in analytical instrumentation used in the detection of environmental contaminants, environmental modeling, data management including quality control and quality assurance, and geographic information systems. Employment is often secured through contacts with advisors, industry, internships and other links between the Environmental Sciences Program with state and federal agencies and institutions. Students also interview for jobs at meetings held by such professional organizations as the American Chemical Society. The Career Development and Counseling Center at Minnesota State University, Mankato is another source of job information and offers workshops that help students prepare credentials and interview skills.

Advising, Thesis Track (30 Credits). At the end of the first academic year the student should select a permanent advisor, an area of emphasis and a research thesis topic. The student with his/her advisor should select members from the graduate faculty to serve on the advisory committee. The advisory committee usually consists of 3-5 graduate faculty members. The advisory committee must include two members of the Department of Biological Sciences. The advisory committee is chaired by the student's advisor. The advisory committee reviews and approves the student's coursework, research, and thesis. A thesis will prepare students for the more technical fields or doctoral programs.

Advising, Alternate Plan Paper (34 Credits). At the end of the first academic year, the student should select a permanent advisor and an area of specialization. The student with his/her advisor should select members from the graduate faculty to serve on the advisory committee. The advisory committee usually consists of 3-5 graduate faculty members. The advisory committee must include two members of the graduate faculty from the Department of Biological Sciences. The advisory committee reviews and approves the student's course work and Alternate Plan Paper.

Environmental Science MS
Required Core (16 credits)

ENVR	540	Environmental Regulations (3)
ENVR	550	Environmental Pollution and Control (3)
ENVR	560	Analysis of Pollutants (4)
BIOL	510	Human Ecology (3)
ENVR	570	Environmental Assessment (3)

Required Environmental Science Electives (6 credits)
Choose two courses from the following:

URSI	604	Zoning & Legal Issues (3)
URSI	609	Applied Urban Analysis (3)
URSI	661	Long-Range & Strategic Planning (3)
URSI	662	Operational Planning (3)
GEOG	673	GIS For Planners (3)
GEOG	681	Evironmental Issues (3)
POL	669	Public Policy Analysis (3)
POL	670	Urban Law (3)

Required Electives
The remaining coursework will be drawn from other programs across University offerings.

Required Thesis or Alternate Plan Paper

ENVR	694	APP (1-2)
ENVR	699	Thesis (3-6)

Additional Requirements
A maximum of 9 credits can be taken of ENVR 600- level courses such as, independent study, internship, seminar, in-service, thesis and/or alternate plan paper. All courses must be approved (in advance) by the student's advisor and must be pertinent to the student's career goals. Independent study and internship credits from other programs cannot be used for electives in Environmental Sciences. Fifty percent of the coursework must be at the 600 level (excluding thesis and APP credits).

COURSE DESCRIPTIONS

ENVR 540 (3) Environmental Regulations
This lecture course introduces students to major federal environmental statutes, including the Clean Water Act; Clean Air Act; Safe Drinking Water Act; Resource, Conservation and Recovery Act; CERCLA (Superfund); Federal Insecticide, Fungicide and Rodenticide Act; Toxic Substances Control Act; Endangered Species Act; and Food, Drug and Cosmetic Act. In addition, several state of Minnesota environmental statutes will be discussed.
(F)

ENVR 550 (3) Environmental Pollution & Control
This is a lecture/lab course focusing on the sources and control of pollutants in air, soil, water, and groundwater. Hazardous waste treatment and the effects of pollutants on human health are also discussed.
(F)

ENVR 560 (4) Analysis of Pollutants
The is a lecture/lab class designed to give students "hands-on" experience with design and implementation of research projects coupled with the development of a research proposal. The class research project requires the collection and analysis of data. Quality control and Quality Assurance methods are emphasized.
(S)

ENVR 570 (3) Environmental Assessment

This lecture course introduces students to the National Environmental Policy Act and requirements for Environmental Impact Statements and Environmental Assessment Worksheets at the federal and state Level. Phase I Environmental Assessment of land and buildings, an International Perspective on Environmental Assessments, and Economic and Social Impact Assessment are also discussed.

ENVR 583 (1-2) Seminar
Each major will present a seminar on his/her research and also have the option to attend semester-long seminars on special topics.

ENVR 591 (1-2) In-Service

ENVR 619 (2-3) Selected Topics in Environmental Science

ENVR 677 (1-6) Individual Study
Individual Research Project.
(F,S)

ENVR 694 (1-2) Alternate Plan Paper
(F,S)

ENVR 698 (1-12) Internship
Experience in applied Environmental Sciences according to a prearranged training program.
(F,S)

ENVR 699 (1-6) Thesis
(F,S)