

## ENVIRONMENTAL SCIENCES BS AND MINOR

### Environmental Sciences

College of Science, Engineering & Technology  
Department of Biological Sciences

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Website: <http://cset.mnsu.edu/biology/programs/ugrad/envrsciences.html>

Chair: Penny Knoblich

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Environmental Sciences is an applied science designed to study interactions among biological, chemical and physical components of the environment. Major areas of focus include water quality, climate change, biodiversity, and environmental assessment with an emphasis on experiential learning through research and/or internships. This program is orientated towards helping students develop skills for leadership positions in industry, consulting firms, government and environmental groups, as well as providing a foundation for individual community involvement as an informed citizen.

#### Academic Map/Degree Plan at [www.mnsu.edu/programs/#All](http://www.mnsu.edu/programs/#All)

#### POLICIES/INFORMATION

**Admission to Major** is granted by the department. Admission requirements are: 32 earned credit hours including BIOL 105 and BIOL 106 with a grade of "C" in both BIOL 105 and BIOL 106 plus a minimum cumulative GPA of 2.00.

**P/N Grading Policy.** All courses leading to a major or a minor in environmental sciences must be taken for letter grades.

Refer to the college regarding required advising for students on academic probation.

**Residency Requirement.** At least 20 credits of 300-400 level courses required for the Environmental Science major must be taken at Minnesota State Mankato. Fourteen of these 20 credits must include ENVR 440 (3 credits), ENVR 450 (3 credits), ENVR 460 (4 credits), ENVR 470 (3 credits) and 1 credit for ENVR 498 (internship) OR ENVR 480 (Research).

**GPA Policy.** A minimum grade of "C" is required in all courses applied to the Environmental Sciences BS degree.

In addition to the specific requirements of the major, all university requirements must be met for graduation. This includes 120 credits of coursework, 40 credits of upper division courses (including those in the major), purple and gold course requirements, and two writing intensive courses.

Several scholarships in the Department of Biological Sciences are available for entering first year students and currently enrolled Minnesota State Mankato students who meet the requirements. Application deadline is in early February of each year.

#### ENVIRONMENTAL SCIENCES BS

Degree completion = 120 credits

#### Required General Education

BIOL 105 General Biology I (4)

Select one of the following math classes (choose 4 credits)

MATH 112 College Algebra (4)

MATH 115 Precalculus Mathematics (4)

MATH 121 Calculus I (4)

Select one of the following chemistry classes (choose 3-5 credits)

CHEM 106 Chemistry of Life Process Part I (General) (3)

CHEM 201 General Chemistry I (5)

#### Major Common Core

BIOL 106 General Biology II (4)

BIOL 215 General Ecology (4)

BIOL 410 Global Change Biology (3)

ENVR 440 Environmental Regulations (3)  
ENVR 450 Environmental Pollution & Control (3)  
ENVR 460 Analysis of Pollutants (4)  
ENVR 470 Environmental Assessment (3)

#### Major Restricted Electives

Select one of the following classes (choose 1-6 credits)

ENVR 480 Senior Research (1-6)

ENVR 498 Internship (1-6)

Select One of the Following Classes (choose 3 credits)

HLTH 475 Biostatistics (3)

STAT 154 Elementary Statistics (4)

Select one of the following classes (choose 5 credits)

CHEM 111 Chemistry of Life Process Part II (Organic & Biochemistry) (5)

CHEM 202 General Chemistry II (5)

#### CHOOSE 1 CLUSTER

Select TWO courses from ONE of the following 6 Areas

##### Aquatic Ecology

BIOL 402 Stream Ecology (4)

BIOL 404 Wetlands (4)

BIOL 405 Fisheries Biology (3)

BIOL 432 Lake Ecology (4)

##### Vertebrate Ecology

BIOL 316 Animal Diversity (3)

BIOL 405 Fisheries Biology (3)

BIOL 408 Vertebrate Ecology (4)

BIOL 409 Advanced Field Ecology (4)

BIOL 412 Soil Ecology (4)

BIOL 431 Comparative Animal Physiology (3)

BIOL 436 Animal Behavior (4)

##### Ecology

BIOL 316 Animal Diversity (3)

BIOL 403 Conservation Biology (3)

BIOL 405 Fisheries Biology (3)

BIOL 412 Soil Ecology (4)

BIOL 421 Entomology (3)

BIOL 443 Plant Ecology (4)

##### Toxicology

BIOL 460 Introduction to Toxicology (3)

BIOL 461 Environmental Toxicology (4)

BIOL 464 Methods of Applied Toxicology (3)

BIOL 465 Applied Toxicology Project (3)

BIOL 467 Industrial Hygiene (3)

##### Plant Science

BIOL 217 Plant Science (4)

BIOL 412 Soil Ecology (4)

BIOL 441 Plant Physiology (4)

BIOL 442 Flora of Minnesota (4)

BIOL 443 Plant Ecology (4)

##### Microbiology

BIOL 270 Microbiology (4)

BIOL 420 Diagnostic Parasitology (3)

BIOL 475 Medical Microbiology (4)

BIOL 476 Microbial Physiology and Genetics (5)

BIOL 478 Food Microbiology and Sanitation (4)

#### CHOOSE 1 CLUSTER

Select TWO courses from ONE of the following 6 areas. These electives cannot be used in the minor and are in addition to the two courses selected from one of the 6 areas in Biology

##### Geography

GEOG 370 Cartographic Techniques (4)

GEOG 373 Introduction to Geographic Information Systems (4)

GEOG 410 Climatic Environments (3)

GEOG 420 Conservation of Natural Resources (3)

GEOG 471 Digital Field Mapping with GPS (4)

GEOG 473 Intermediate GIS (4)

GEOG 474 Introduction to Remote Sensing (4)

GEOG 475 Applied Remote Sensing & GIS (4)

##### Urban and Regional Studies

URBS 402 Urban Analysis (3)

URBS 411 Urban Policy and Strategic Analysis (3)

URBS 417 Urban Law (3)

URBS 433 Urban Development (3)

URBS 455 Regional & County Development (3)

## ENVIRONMENTAL SCIENCES CONTINUED

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### Political Science

POL	451	Administrative Law (3)
POL	452	Jurisprudence (3)
POL	453	Constitutional Law (3)
POL	461	Environmental Politics (3)
POL	472	Urban Government (3)
POL	473	Legislative Process (3)
POL	474	Executive Process (3)
POL	475	Judicial Process (3)

### Recreation, Parks and Leisure Services

RPLS	378	Commercial Recreation and Tourism (3)
RPLS	379	Management of Parks and Recreation Facilities (3)
RPLS	475	Public Land Use Policies (3)
RPLS	481	Park Planning (3)
RPLS	483	Legal Processes in Recreation, Parks and Leisure Services (3)

### Business Law

BLAW	453	International Legal Environment of Business (3)
BLAW	474	Environmental Regulation and Land Use (3)
BLAW	476	Construction and Design Law (3)

### Biology

BIOL	316	Animal Diversity (3)
BIOL	320	Cell Biology (4)
BIOL	324	Neurobiology (3)
BIOL	402	Stream Ecology (4)
BIOL	403	Conservation Biology (3)
BIOL	404	Wetlands (4)
BIOL	405	Fisheries Biology (3)
BIOL	408	Vertebrate Ecology (4)
BIOL	409	Advanced Field Ecology (4)
BIOL	412	Soil Ecology (4)
BIOL	417	Biology of Aging and Chronic Diseases (3)
BIOL	420	Diagnostic Parasitology (3)
BIOL	421	Entomology (3)
BIOL	424	Developmental Biology (3)
BIOL	431	Comparative Animal Physiology (3)
BIOL	432	Lake Ecology (4)
BIOL	435	Histology (4)
BIOL	436	Animal Behavior (4)
BIOL	438	General Endocrinology (3)
BIOL	441	Plant Physiology (4)
BIOL	442	Flora of Minnesota (4)
BIOL	443	Plant Ecology (4)
BIOL	451	Agroecology (4)
BIOL	460	Introduction to Toxicology (3)
BIOL	461	Environmental Toxicology (4)
BIOL	464	Methods of Applied Toxicology (3)
BIOL	472	Microbial Ecology and Bioremediation (4)
BIOL	474	Immunology (4)
BIOL	476	Microbial Physiology and Genetics (5)
BIOL	478	Food Microbiology and Sanitation (4)
BIOL	479	Molecular Biology (4)

### **General Electives**

It is the student's responsibility to ensure that he/she has completed 40 credits at the 300-400 level. This is a University requirement for graduation.

### **Minor**

Select One Minor from the following: Anthropology, Automotive Engineering Technology, Business Law, Chemistry, Geography, Geology, Law Enforcement, Political Science, Recreation, Parks and Leisure Services, or Urban and Regional Studies

### **ENVIRONMENTAL STUDIES MINOR**

#### **Minor Core**

ENVR	440	Environmental Regulations (3)
ENVR	450	Pollution and Control (3)*
ENVR	460	Analysis of Pollutants (4)
ENVR	470	Environmental Assessment (3)

\*Requires 2 semesters of chemistry

#### **Minor Electives**

Select one of the following: CHEM 106 and CHEM 111 OR CHEM 201 and CHEM 202

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### **COURSE DESCRIPTIONS**

#### **ENVR 101 (4) Perspectives in Environmental Science**

This course is designed to introduce students to the complex field of environmental science. Reading assignments, lectures, discussions and other class assignments will introduce students to the structure and functions of ecosystems, the concept of sustainability, issues in environmental protection with an emphasis on global commons, the interrelationships between environment, culture, government and economics and what individuals or groups can do to influence environmental policy/rules. Fall, Spring  
GE-8, GE-10

#### **ENVR 440 (3) Environmental Regulations**

This is a lecture course introducing students to major federal environmental laws and regulations. Discussions include the cause(s) that prompted the enactment of various environmental legislation as well as intent and implementation of the legislation. Both Federal and State of MN environmental statutes will be discussed. Fall

#### **ENVR 450 (3) Environmental Pollution & Control**

This is a lecture course that introduces students to sources and controls for pollutants in air, water, and soils including hazardous waste. Chemical and biological mechanisms that are important in nature and used to control/treat various types of pollutants are emphasized. Strongly recommended that this course be taken immediately after completing 1 year of Chemistry.

Prerequisite: 1 year CHEM

Fall

#### **ENVR 460 (4) Analysis of Pollutants**

The purpose of this lecture/lab class is to introduce students to standard practices and procedures used in sampling and analysis of environmental matrices and to develop an environmental research project. Standard quality control/quality assurance procedures per EPA are emphasized.

Spring

#### **ENVR 470 (3) Environmental Assessment**

Introduces students to National Environmental Policy Act and requirements for Environmental Impact Statements and Environmental Assessment Worksheets. Phase I Environmental Assessment of land and buildings, an international perspective on environmental assessments, and economic and social impact assessment are discussed.

Prerequisite: ENVR 440

Spring

#### **ENVR 480 (1-6) Senior Research**

Participate in an independent research project with advisory support and with a focus on the student's career objectives.

Fall, Spring

#### **ENVR 498 (1-6) Internship**

Only three credits can be counted toward major. Experience in applied Environmental Sciences according to a prearranged training program.

Fall, Spring

#### **ENVR 499 (1-6) Individual Study**

Individual Research Project.

Fall, Spring