Environmental Sciences

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.

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.

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 465 (3 credits) and 1 credit for ENVR 498 Internship OR ENVR 480 Research.

Academic Map/Degree Plan at www.mnsu.edu/programs/#All

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):
MLTH 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)

Vertebrate Ecology
BIOL 316 Animal Diversity (3)
BIOL 405 Fisheries Biology (3)
BIOL 408 Vertebrate Ecology (4)

Comparative Animal Physiology
BIOL 431 Comparative Animal Physiology (3)

Animal Behavior
BIOL 436 Animal Behavior (4)

Ecology
BIOL 316 Animal Diversity (3)
BIOL 403 Conservation Biology (3)

Plant Science
BIOL 217 Plant Science (4)
BIOL 412 Soil Ecology (4)

Microbiology
BIOL 270 Microbiology (4)
BIOL 420 Diagnostic Parasitology (3)

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**

**Political Science**
- POL 451 Administrative Law (3)
- POL 452 Jurisprudence (3)
- POL 453 Constitutional Law (3)
- POL 461 Environmental Policy (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