

ENVIRONMENTAL SCIENCE PROGRAM

PROGRAM OFFICE

3005 New Science Facility

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Environmental Science at NMU

The environmental science program is an interdisciplinary approach offered jointly by the departments of Biology, Economics, Chemistry, Geography, Mathematics and Computer Science, Physics, and Political Science and Public Administration.

The program provides students an opportunity to gain an understanding of how the physical, biological and social sciences interact with each other in this field of study. The program is designed to prepare students for a variety of professions dealing with both natural and human-made environments as well as graduate study. Because of the interdisciplinary nature of the environmental field, it is important for students to be proficient in a range of technical skills such as ecological assessment, chemical analysis and geographic information systems. Students should also be familiar with a broad array of environmental policies and regulations, and possess effective communication skills.

Environmental scientists are often required to interact with professionals from a diverse number of disciplines or specialties. Therefore, every environmental science major will take a 36 credit-hour core of courses that provides a basic understanding of several environmentally related disciplines. Each student also must complete 25 to 30 credit hours in one of three areas of program emphasis: (1) biological science, (2) physical science, or (3) environmental policy. The track selected by the student will appear on his or her transcript.

Student Organization

- Student Environmental Science Organization

Facilities

- Environmental Chemistry Laboratory
- Environmental Resource Room
- Lake Superior Research Boat
- Longyear Forest
- Native Plants Study Area

Students also can use a large range of laboratory facilities and field equipment associated with the seven departments involved in the program. See each department's facility list for details.

Environmental Science Program Policies

Environmental science majors must select an area of emphasis (biological sciences, physical sciences or environmental policy) upon entering the program. Students also must select a faculty adviser. The adviser must be either the program director or a faculty member from one of the associated departments (Biology Department faculty for the biological sciences track, Chemistry Department faculty for the physical sciences track, and Geography Department faculty or Political Science and Public Administration Department faculty for the environmental policy track).

As a requirement for graduation, environmental science majors must maintain the minimum grades and cumulative grade point average as set forth by each of the participating departments. For example, a student in the biology track must maintain the same academic standards as biology majors. Likewise, students in the physical track must maintain academic standards as set forth by the Chemistry Department, and those in the environmental policy track must maintain the academic standards as determined by the department of their adviser in either the Geography or Political Science and Public Administration Departments.

BACHELOR DEGREE PROGRAM

Liberal Studies: Complete information on the liberal studies requirements and additional graduation requirements, including the health promotion requirement, is in the "Liberal Studies Program and Graduation Requirements" section of this bulletin (38-44).

Courses within each major that can be used to satisfy liberal studies requirements are listed with the Roman numeral (in brackets) that coincides with the liberal studies division the course falls under.

Environmental Science Major

This major provides students with an interdisciplinary approach on how to apply research methods, assessment techniques and management strategies to resolve environmental problems. It provides students an opportunity to gain an understanding of how the physical, biological and social sciences interact with each other in this field of study.

Total Credits Required for Degree **128**

Liberal Studies **30-40**
Health Promotion **2**

Required Courses in Major (Core + Emphasis)

Students must complete the core and one of the three areas of emphasis. ENV 101 should be taken during the first year of entering the program.

Core **36**

ENV 101 Introduction to Environmental Science [III] 4
BI 210 Principles of Ecology 4
CH 111 General Chemistry I [III] 5
CH 112 General Chemistry II [III] 5
GC 100 Physical Geography [III] 4
GC 225 Introduction to Maps 2
GC 320 Environmental Policy and Regulation 4
GC 335 Geographic Information Systems 4
MA 171 Probability and Statistics [V] or 4
 BI 412 Biometrics (4 cr.) or
 GC 235 Quantitative Methods (4 cr.)

Biological Sciences Emphasis **28**

BI 240 Conservation Biology 4
BI 310 Ecology Theory and Methods 4
BI 402 Microbial Ecology 4
BI 411 Limnology 4
BI 441 Fisheries Management 4
BI 442 Wildlife Management 4
GC 401 Biogeography 4

Physical Sciences Emphasis **27-30**

CH 220 Introductory Organic Chemistry (5 cr.) or 5-8
 CH 321 Organic Chemistry I (4 cr.) and
 CH 322 Organic Chemistry II (4 cr.)
CH 241 Chemical Equilibrium 3
CH 242 Quantitative Analysis 2
CH 340 Environmental Chemistry 5
GC 202 Soils 4
GC 370 Geomorphology 4
GC 465 Hydrology 4

Environmental Policy Emphasis **28**

GC 330 Planning Theory and Practice 2
GC 340 Land Use Controls 2
GC 470 Environmental Ethics 4
GC 475 Environmental Impact Assessment 4
PS 309 State and Local Government 4
PS 401 Seminar in Public Policy Analysis 4
PS 407 Principles of Public Administration 4
SP 432 Environmental Communication 4

Environmental Science Electives **12-15**

Choose from the following or any course from one of the above emphases, other than the student's chosen emphasis. No more than eight credits can be taken under a single prefix.

BC 415 Intercultural Communication (4 cr.)
BI 303 General Microbiology (5 cr.)
BI 305 Ecology of the Northern Forest (3 cr.) [III]
BI 410 Ecology of the Great Lakes (4 cr.)
BI 421 Invertebrate Zoology (4 cr.)
BI 424 General Entomology (4 cr.)
BI 433 Boreal Flora (3 cr.)
BI 460 Ichthyology (4 cr.)
BI 461 Herpetology (3 cr.)
BI 462 Ornithology (3 cr.)
BI 463 Mammalogy (3 cr.)
BI 498 Directed Studies in Biology (1-4 cr.)
BI 499 Internship (1-6 cr.)
CH 435 Gas and Liquid Chromatography (2 cr.)
CH 490 Senior Research and Seminar I (2-4 cr.)
CH 491 Senior Research and Seminar II (2-4 cr.)
EC 345 Environmental and Natural Resource Economics (4 cr.)
GC 385 Weather and Climate (4 cr.)
GC 425 Remote Sensing (4 cr.)
GC 428 Spatial Analysis (4 cr.)
GC 491 Internship (2-6 cr.)
GC 498 Directed Studies in Geography (1-4 cr.)
PH 201 College Physics I (5 cr.) [III]
PH 202 College Physics II (5 cr.) [III]
PH 220 Introductory Physics I (5 cr.) [III]
PR 231 Introduction to Public Relations (4 cr.)
 PR 250 co-requisite is waived
PS 105 American Government (4 cr.) [IV]
PS 215 Introduction to Law (4 cr.)
PS 332 Administrative Law (4 cr.)
PS 491 Internship in Public Policy or Law (2-6 cr.)
PS 498 Directed Studies in Political Science (1-4 cr.)
SP 401 Persuasion (4 cr.)

Other Required Courses **8**

BI 111 Introductory Biology: Principles [III] 4
BI 112 Introductory Biology: Diversity [III] 4