Environmental Science

(Bachelor of Science)

The Environmental Science major prepares students to analyze, understand, and solve environmental problems. While many universities are just beginning to recognize the need for environmental science programs, UW-Green Bay has over 50 years of teaching and research experience in the field. This Environmental Science program was one of the first in the nation and the interdisciplinary focus allows students to have a diverse education.

The Environmental Science major is interdisciplinary, emphasizing an integrated approach to knowledge in the field. Because the study of environmental problems requires a sound understanding of scientific principles, the Environmental Science major is grounded in the natural sciences and mathematics. The curriculum also includes a social science component, enabling students to gain an understanding of environmental economic and policy issues. Field experiences, internships, practicums, independent research and travel courses are also emphasized throughout the program.

This major helps students: 1) understand fundamental physical and biological processes of the natural environment; 2) recognize relationships between humans and ecosystems at local, regional, and global scales; 3) apply knowledge from multiple disciplines to environmental challenges and opportunities; 4) build practical skills for scientific problem-solving, including familiarity with laboratory and field instrumentation, ability to use current computer technologies, and experience in statistical modeling techniques; 5) demonstrate competency in collecting, managing, evaluating, interpreting, and communicating information through hands-on research; and 6) critically evaluate strategies for sustainable management and restoration of environmental systems.

Students who plan to pursue this major will apply science and mathematics in their course work. Courses in biology, chemistry, geoscience, mathematics, and physics provide the needed background. They receive hands-on and practical learning experiences in both the laboratory and the field. A significant number of graduates of this major gain entry-level positions in the environmental science field. About one-third of these positions are in the public sector and two-thirds are in the private sector, including positions with industry, business, and engineering consulting firms. Numerous graduates have also successfully completed master's and doctoral degrees.

Faculty members are actively addressing current environmental problems and their solutions through research at the regional, national and international levels. This research keeps them up to date on current trends and topics in the field, while providing opportunities for undergraduates to become involved in their research projects and gain valuable knowledge and experience. Faculty members are highly involved in the students' education, both inside and outside of the classroom and laboratories.

Environmental Science students have access to modern computer facilities which are continually upgraded. Computing software resources emphasizing geographic information systems (GIS), mathematical modeling and statistical analysis tools also are available. In addition to general-access computer laboratories, students can also use a computer laboratory dedicated to the sciences. Students wishing to gain hands-on field experiences have access to the Cofrin Center for Biodiversity, which includes the 290-acre Cofrin Memorial Arboretum on campus and several natural areas in the region including Point au Sable, Tofts Point and Kingfisher Farms. The Gary A. Fewless Herbarium, and the Richter Museum of Natural History on campus include extensive collections of plant and animal specimens. Funding opportunities are also available through the Biodiversity Center for independent student research projects.

A variety of equipment is available for environmental measurements and monitoring. Laboratory instrumentation enhances student opportunities to perform chemical analyses which are important in environmental monitoring. Such instrumentation includes mass spectrometers, infrared and UV-visible spectrophotometers, nuclear magnetic resonance spectrometers, gas chromatographs, ion chromatographs, and high-performance liquid chromatographs. In addition to opportunities to monitor air and surface-water quality, students also have the opportunity to monitor ground water; three wells have been drilled on campus specifically for that purpose.

As industries recognize their responsibility to help create and maintain a sustainable environment, often achieving efficiencies in the process, they create positions dealing with waste management, pollution reduction, and other environmental responsibilities. Many UW-Green Bay Environmental Science graduates find employment in these industries or go on to advanced study in environmental science or other scientific disciplines. The following list represents some careers that have been pursued by Environmental Science graduates: agricultural scientist, botanist, ecologist, forest ranger, oceanographer, agricultural technician, engineering technician, forester, air and water quality manager, environmental analyst, park ranger, air pollution analyst, environmental consultant, environmental educator, geologist, project manager, environmental engineer, geophysicist, biologist, hazardous waste manager, hydrologist, environmental lawyer, chemical technician, soil conservation technician, chemist, management consultant, teacher, meteorologist, urban and regional planner, civil engineer, environmental planner, microbiologist/wastewater plant operator, natural resource specialist, wildlife manager, conservationist, zoologist.

Students may study abroad or at other campuses in the United States through UW-Green Bay's participation in international exchange programs and National Student Exchange. Travel courses are another option for obtaining academic credits and completing requirements. For more information, contact the Office of International Education at (920) 465-2190 or see http://www.uwgb.edu/international/.

Major Area of Emphasis (http://catalog.uwgb.edu/undergraduate/programs/environmental-science/major/)

Students must complete requirements in one of the following areas of emphasis:

- General
- Environmental Science (Accelerated) - Integrated with graduate Environmental Science & Policy program

Minors (http://catalog.uwgb.edu/undergraduate/programs/environmental-science/minor/)

- Environmental Science Minor
- International Environmental Studies Minor

Curriculum Guide

The following curriculum guide is for a four-year Environmental Science degree program and is subject to change without notice. Students should consult an Environmental Science program advisor to ensure that they have the most accurate and up-to-date information available about a particular four-year degree option.

An example: Four year plan for **Environmental Science Major**
120 credits necessary to graduate.
Plan is a representation and categories of classes can be switched. Check with your advisor.

Course	Title	Credits
Freshman		
Fall		
BIOLOGY 201	Principles of Biology: Cellular and Molecular Processes	3
BIOLOGY 202	Principles of Biology Lab: Cellular and Molecular Processes	1
CHEM 211	Principles of Chemistry I	4
CHEM 213	Principles of Chemistry I Laboratory	1
MATH 104	Precalculus (or MATH 202 or MATH 203)	4
First Year Seminar		3
	Credits	**16**
Spring		
BIOLOGY 203	Principles of Biology: Organisms, Ecology, and Evolution	3
BIOLOGY 204	Principles of Biology Lab: Organisms, Ecology, and Evolution	1
CHEM 212	Principles of Chemistry II	4
CHEM 214	Principles of Chemistry II Laboratory	1
ENV SCI 102	Introduction to Environmental Sciences	3
WF 100 or WF 105	First Year Writing or Research and Rhetoric	3
	Credits	**15**
Sophomore		
Fall		
GEOSCI 202	Physical Geology	4
ENV SCI 302	Principles of Ecology	4
MATH 260	Introductory Statistics	4
POL SCI 101 or POL SCI 202	American Government and Politics or Introduction to Public Policy	3
	Credits	**15**

Spring		
ENV SCI 303	Environmental Sustainability (or ENV SCI 460 or PU EN AF 301 or PU EN AF 378)	3
ENV SCI 336	Environmental Statistics	3
ENV SCI 337	Environmental GIS	3
PU EN AF 250	Introduction to Geographic Information Systems (GIS)	2
General Education/Elective		3
General Education/Elective		3
	Credits	**17**
Junior		
Fall		
ENV SCI 305	Environmental Systems	4
ENV SCI 338	Environmental Modeling	2
ENV SCI 339	Scientific Writing	3
General Education/Elective		3
General Education/Elective		3
	Credits	**15**
Spring		
ENV SCI Upper Level Elective		3
General Education/Elective		3
General Education/Elective		3
General Education/Elective		3
General Education/Elective		3
	Credits	**15**
Senior		
Fall		
ENV SCI 467 or ENV SCI 491 or ENV SCI 492	Capstone in Environmental Science or Senior Thesis/ Research in Environmental Science or Practicum in Environmental Science	4
ENV SCI Upper Level Elective		3
General Education/Elective		3
General Education/Elective		3
General Education/Elective		3
	Credits	**16**
Spring		
ENV SCI Upper Level Elective		3
General Education/Elective		3
General Education/Elective		3
General Education/Elective		3
General Education/Elective		3
	Credits	**15**
	Total Credits	**124**

Engineering Dual Degree

Cooperative Program in Civil & Environmental Engineering with University of Wisconsin-Milwaukee

Advisers — John Katers, professor; Patricia A. Terry, professor and coordinator

Website: www.uwgb.edu/nas/ (http://www.uwgb.edu/nas/)

Dual Degree Program
UW-Green Bay and UW-Milwaukee also offer a Dual Degree Program in environmental science and civil and environmental engineering. Under this program a student completes three years of study in the Environmental Science major at UW-Green Bay, then transfers to UW-Milwaukee and continues

for two years in the civil/environmental engineering major. Upon completion of an outlined series of courses, the student receives both a B.S. degree from UW-Green Bay in Environmental Science and a B.S. degree from UW-Milwaukee in Civil/Environmental Engineering. Students wishing to enroll in this program should see an engineering adviser prior to registration in their freshman year.

Participants in the NEW Engineering Program typically complete 60 to 72 credits at UW-Green Bay toward the degree. This includes the completion of 18 credits of general education requirements specific to this program:

— 3 credits minimum in the arts
— 6 credits minimum in the humanities
— 6 credits minimum in the social sciences
— 3 credits in cultural diversity

General education courses are required of all students. These courses complement and enhance major coursework for additional exposure to other areas of knowledge and bring an understanding of the relationship among and between subject areas. At least 9 of the 18 required credits must be from courses at the 200-level or above or from 100-level courses that require at least one prerequisite.

A grade of C or better in WF 105 will satisfy UW-Milwaukee's English composition requirement.

UW-Green Bay students are eligible to apply for advancement into the major at UW-Milwaukee at the point of transfer. The UW-Green Bay Academic Advising Office has forms. The filing deadlines are October 1 for spring semester, February 15 for summer session, and June 1 for fall semester.

For information on other engineering options, refer to the Preprofessional Programs of Study section of this catalog or contact one of the engineering advisers listed above.

Requirements for the Cooperative Program

All engineering and dual degree majors must take:

Code	Title	Credits
Required Courses		
CHEM 211	Principles of Chemistry I	4
CHEM 212	Principles of Chemistry II	4
CHEM 213	Principles of Chemistry I Laboratory	1
CHEM 214	Principles of Chemistry II Laboratory	1
ENGR 213	Mechanics I	3
ENGR 214	Mechanics II	3
MATH 202	Calculus and Analytic Geometry I	4
MATH 203	Calculus and Analytic Geometry II	4
MATH 209	Multivariate Calculus	4
PHYSICS 201	Principles of Physics I	5
PHYSICS 202	Principles of Physics II	5
WF 100	First Year Writing	3
Total Credits		**41**

See an adviser for additional requirements in aerospace, chemical, nuclear, and petroleum engineering.

Faculty

Gregory J Davis; Professor; Ph.D., Northwestern University*

Mathew E Dornbush; Professor; Ph.D., Iowa State University*

Michael L Draney; Professor; Ph.D., University of Georgia, chair*

Heidi S Fencl; Professor; Ph.D., The Ohio State University*

Kevin J Fermanich; Professor; Ph.D., University of Wisconsin - Madison*

Robert W Howe; Professor; Ph.D., University of Wisconsin - Madison

Woo Jeon; Professor; Ph.D., University of Wisconsin - Madison

John F Katers; Professor; Ph.D., Marquette University*

John A Luczaj; Professor; Ph.D., Johns Hopkins University*

Patricia A Terry; Professor; Ph.D., University of Colorado*

Amy T Wolf; Professor; Ph.D., University of California - Davis*

Michael E Zorn; Professor; Ph.D., University of Wisconsin - Madison*

Franklin M Chen; Associate Professor; Ph.D., Princeton University*

Patrick S Forsythe; Associate Professor; Ph.D., Michigan State University*

Lisa Grubisha; Associate Professor; Ph.D., University of California - Berkeley

Jeremy J Intemann; Associate Professor; Ph.D., Iowa State University

Mohammad Mahfuz; Associate Professor; Ph.D., University of Ottawa

Tetyana Malysheva; Associate Professor; Ph.D., University of Oklahoma

Michael J McIntire; Associate Professor; Ph.D., University of California - Riverside

Steven J Meyer; Associate Professor; Ph.D., University of Nebraska - Lincoln*

Megan J Olson-Hunt; Associate Professor; Ph.D., University of Pittsburgh

Brian Welsch; Associate Professor; Ph.D., Montana State University

Julie M Wondergem; Associate Professor; Ph.D., Marquette University

Mary E Guy; Senior Lecturer; M.S., University of Wisconsin - Oshkosh

James M Meyer; Senior Lecturer; Ph.D., University of North Carolina

Nydia D Villanueva; Senior Lecturer; Ph.D., University of Connecticut