Environmental Science and Environmental Studies

FACULTY

Brian Bradley
Biological Sciences

Erle Ellis
Geography and Environmental Systems

William LaCourse
Chemistry, biochemistry

Laura Lewis
Geography and Environmental Systems

Wallace MacMillan
Physics

Virginia McConnell
Economics

Andrew Miller
Geography and environmental systems

Nagaraj Neerchal
Mathematics, statistics

Robert Neff
Geography and environmental systems

Edward Orser
American studies

Eugene Parker
Geography and environmental systems

Karin Readel
Geography and environmental systems

Chris Swan
Geography and environmental systems

Other faculty from the Department of Geography and Environmental Systems are listed on page 104. For updated and current information, visit our department Web site at www.umbc.edu/ges.

Two bachelor degree programs, a B.S. in Environmental Science and a B.A. in Environmental Studies, are offered, administered by the Department of Geography and Environmental Systems with an interdisciplinary group of faculty (listed above) who review the curriculum requirements. In conjunction with the Secondary Education Program of UMBC's Department of Education, there is also a degree track available for a B.S. in Environmental Science that satisfies both the curriculum requirements of the National Council for Accreditation of Teacher Education (NCATE) and the secondary-education certification in earth and space science in the state of Maryland. These degrees were offered in 2003. While the fundamental degree requirements have been approved, some details on electives and approved courses in the areas of concentration are still under discussion. The final versions will be available on the Department of Geography and Environmental Systems Web site, **www.umbc.edu/ges,** and from students' advisors. Interested students are encouraged to speak with a member of the faculty for advising and information. They may send a message to Phyllis Stevens, GES departmental secretary, **psteve4@umbc.edu**, which will be forwarded to the appropriate faculty. Many of the core and elective courses that can be used to meet requirements for the B.S. in Environmental Science or for the B.A. in Environmental Studies are offered within the Department of Geography and Environmental Systems, but many are taught by faculty from other departments across the university.

Career and Academic Paths

The B.S. in Environmental Science provides students with a strong grounding in both basic science and mathematics and in aspects of earth and environmental science that will enable them to address environmental problems from an interdisciplinary perspective. Graduates of the program will be eligible either for immediate employment or graduate study in earth science, environmental science or environmental engineering.

Employment opportunities include public agencies, private-sector companies and non-profit organizations, or K-12 science education with a focus on earth and environment. The jobs available may involve field, laboratory and computer work using skills and knowledge in biogeography and landscape ecology, hydrology, geomorphology, soils, watershed processes, atmospheric science, environmental chemistry, biogeochemical cycling, water quality, estuarine processes, GIS, remote sensing and computer modeling.

The educational objectives of the B.A. in Environmental Studies share many aspects of the objectives defined for the B.S. in Environmental Science, particularly at the introductory level. The B.A. program has a stronger emphasis on environmental policy and on the political, economic and cultural aspects of environmental problems, as well as on conservation strategies, risk analysis, environmental ethics and aesthetics. Opportunities for employment and graduate education focus more heavily on policy and management issues, including planning, natural resource management, urban issues, transportation, environmental health, environmental justice, environmental economics and sustainable development.

Academic Advising

Students who decide to major in environmental science or environmental studies will meet regularly with a faculty advisor to determine what combination of courses, selected from within geography and environmental systems and from other disciplines, are best suited to meeting their goals. Those who plan to attend graduate school are strongly encouraged to gain proficiency in statistical techniques. Students also should consult with faculty advisors to ensure their academic background includes other appropriate prerequisites if they are interested in pursuing graduate degrees. Although the degree programs are administered by the Department of Geography and Environmental Systems, it is possible that a student may wish to have his or her advisor in one of the affiliated disciplines more closely related to the student's own interests.

Major Programs

Both the B.A. and B.S. degrees include common foundation courses, a set of introductory-level requirements and a series of upper-level areas of concentration. The B.S. degree requires more credits (67) than the B.A. degree (57). However the need for science background mandates that the B.A. in Environmental Studies requires a larger number of credits than most other B.A. programs. Bachelor of Science (B.S.) in Environmental Science.

The B.S. in Environmental Science is for students who are interested in a natural-science approach to environmental issues. Subject

matter includes atmospheric science, hydrology and water quality, soils, landforms, ecosystem processes and biodiversity, and human impacts on natural systems.

67 credit hours including:

- Nine credits of core courses
- Six credits in social science and humanities, from an approved list of courses
- Thirty-one credits in basic math and natural science
- Three credits in upper-level writing
- Eighteen credits selected from one or more upper-level areas of concentration, including:
  - Earth system science
  - Watershed processes
  - Ecosystems, habitat and biodiversity
  - Environmental chemistry and toxicology
  - Environmental statistics and risk assessment
  - Spatial analysis and modeling

Bachelor of Science (B.S.) in Environmental Science for Secondary School Education Certification in Earth and Space Science

There is a version of the B.S. designed specifically for students interested in a career teaching earth or environmental science at the secondary school level. The elective course selections are more restricted for these students to meet secondary education certification requirements. Any student interested in the earth and space science teaching certification option for the B.S. in Environmental Science is strongly encouraged to meet with a faculty advisor as early as possible to make sure that both certification and B.S. degree requirements are fulfilled.

Bachelor of Arts (B.A.) in Environmental Studies

The B.A. in Environmental Studies is for students who are interested in environmental policy, public decision-making about natural resources and conservation, environmental ethics and environmental aesthetics.

57 credit hours including:

- Nine credits of core courses
- Six credits in social science and humanities
- Eighteen credits in basic math and natural science
- Three credits in upper-level writing
- Nine credits in upper-level environmental studies distribution courses (from an approved list of courses)
- Twelve credits selected from one or more upper-level areas of concentration, approved by student's advisor, including:
  - Regulatory policy
  - Business and the environment
  - Natural resource management and conservation
  - Environmental mapping and spatial analysis
  - Risk analysis and policy
  - Environmental thought and history

Please see the Department of Geography and Environmental Systems Web site at **www.umbc.edu/ges** for a more detailed description of the program requirements.

Evening Option

Evening courses are offered occasionally, but generally, no more than three evening courses are offered in a single semester. Required core courses are almost always offered during daytime hours only.

Special Opportunities

Numerous internship opportunities are available for students who wish to pursue a practical work experience with local, state or federal government agencies, private corporations or non-profit organizations. Some, but not all, of these are paid internships.

Advanced students also have the opportunity to work with faculty on a range of research projects funded by agencies such as the National Science Foundation, Environmental Protection Agency, NASA and the U.S. Forest Service. Students also may develop their own independent study projects in collaboration with a faculty advisor. Several of our students have won competitive awards to pursue their own independent research projects through the Provost's Undergraduate Research Initiative.

Some of the opportunities for research and internships at UMBC that are particularly noteworthy are associated with the Baltimore Ecosystem Study (www.ecostudies.org/bes), the Center for Urban Environmental Research and Education (CUERE) and the Joint Center for Earth Systems Technology (JCET) (www.umbc. edu/jcet). Students interested in these opportunities should consult with a faculty advisor. Other research opportunities for working with faculty will be publicized on the department Web site.

The Baltimore Ecosystem Study

The Baltimore Ecosystem Study is one of only two NSF-funded Urban Long-Term Ecological Research sites in the United States. This is a long-term project with participation by scientists from many institutions and agencies, with the common goal of studying the internal structure and functioning of the Baltimore metropolitan area as an ecosystem involving interactions between humans and the natural and built environments. The field headquarters of this project are located on campus, and students are often hired as interns and field assistants.

Center for Urban Environmental Research and Education (CUERE)

The mission of CUERE is to advance understanding of the environmental, social and economic consequences of transformation of the urban and suburban landscape. It performs its mission through cooperative research projects, conferences and symposia, and support of university teaching programs. Students interested in science, policy or historical development of the urban environment may be able to work as interns on research projects through CUERE.

Joint Center for Earth Systems Technology (JCET)

JCET operates under a cooperative agreement between UMBC and the NASA Goddard Space Flight Center. JCET meets the common interest of UMBC and GSFC to develop new technology for environmental remote sensing. JCET's research focuses on four themes: atmospheric radiation, observations, clouds and precipitation, and interdisciplinary studies. Several JCET researchers teach climatology and weather classes in the Department of Geography and Environmental Systems and are interested in sponsoring students as interns.