ENVIRONMENTAL & SPATIAL SCIENCES, B.S.

Millersville University's Bachelor of Science program in Environmental and Spatial Sciences prepares students as environmental scientists with advanced training in geospatial technologies, including: geographic information science (GIS), global positioning system (GPS) technology, remote sensing, data management, and cartography. Graduates of the program are well-positioned for careers in environmental analysis and mitigation of environmental problems. Through coursework in the program, students assess environmental and human-environment systems, identify and evaluate environmental problems, and design innovative and sustainable solutions.

The program is housed in the Department of Geography. 60 credits required in addition to required related courses applied to the general education program.

Major in Environmental & Spatial Sciences

Code	Title	Hours
REQUIRED CORE GEOGRAPHY		
GEOG 130	Intro to Environmental Science	3
GEOG 120	Human Geography	3
Physical Geography or Geomorphology - Choose 1 of the following:		3
GEOG 230	Physical Geography	
ESCI 225	Geomorphology	
GEOG 289	Field and Research Methods in Geography	3
GEOG 408	Sustainable Development	3
REQUIRED SPATIAL SCIENCE		
GEOG 281	Maps and GIS	3
GEOG 292	Quantitative and Spatial Analysis	3
GEOG 295	GIS I: Vector Data Analysis	3
GEOG 296	GIS II: Raster Data Analysis	3
SPATIAL SCIENCE ELECTIVES		
undefined - Choose 2 of the following:		6
GEOG 395	GIS for Web Development	
GEOG 384	Cartography	
GEOG 396	GIS Modeling	
GEOG 397	GIS Data Management	
ENVIRONMENTAL STUDIES ELECTIVES		
undefined - Choose 3 of the following:		9
GEOG 304	Water Resources Management	
GEOG 305	Energy Sustainability	
GEOG 306	Environmental Impact Assessmnt	
GEOG 307	US Environmental Policy	
GEOG 333	Biogeography	
GEOG 336	Climate And Society	
GEOG 407	Glbl Envrnmtl Policy/Negotiatn	
REQUIRED CAPSTONE		
undefined - Choose 1 of the following:		3-12
GEOG 300	Co-Op Ed Experience in Geog	
GEOG 488	Senior Thesis	
GEOG 489	Honors Thesis	
Total Hours		**45-54**

Req Related for Environmental & Spatial Sciences

Code	Title	Hours
REQUIRED RELATED ENVIRONMENTAL SCIENCE		
BIOL 100	General Biology	3
CHEM 111	Introductory Chemistry 1	4
CHEM 112	Introductory Chemistry 2	4
Physical Geology or Intro to Oceanography - Choose 1 of the following:		4
ESCI 221	Physical Geology	
ESCI 261	Introduction to Oceanography	
MATH 161	Calculus 1	4
Physics I with Algebra or with Calculus - Choose 1 of the following:		4-5
PHYS 131	Physics 1 with Algebra	
PHYS 231	Physics 1 with Calculus	
ENVIRONMENTAL SCIENCE REQ RELATED ELECTIVES		
undefined - Choose 6 hours from:		6
BIOL 211	Concepts of Zoology	
BIOL 221	Concepts of Botany	
BIOL 340	Prspctv in Environm Awareness	
BIOL 343	Principles of Ecology & Evolution	
CHEM 235	Organic Chemistry	
CHEM 265	Quantitative Analysis	
CHEM 375	Environmental Chemistry	
CHEM 476	Environmental Chemistry 2	
ESCI 226	Geology of Earth and Energy Resources	
ESCI 241	Meteorology	
ESCI 245	Environmental Meteorology	
ESCI 322	Environmental Hydrology	
ESCI 326	Sedimentation and Stratigraphy	
ESCI 329	Aqueous Geochemistry	
ESCI 366	Marine Resources and Policy	
ESCI 385	Global Climate Change: Sci & Policy	
ESCI 422	Geological Field Mapping	
ESCI 426	Groundwater Resources and Contamination	
ESCI 466	Environmental Oceanography	
OSEH 435	Environmental Health	
PHYS 132	Physics 2 with Algebra	
PHYS 232	Physics 2 with Calculus	
A minor program of study is highly recommended. Examples include Biology, Chemistry, Computer Science, Earth Sciences, Environmental Chemistry, Environmental Hazards and Emergency Management, Environmental Policy Regulation, General Economics, Geology, Government and Political Affairs, Hydrology, Industrial and Environmental Health, Land Use, Mathematics, Meteorology, Occupational Safety Environmental Health, Oceanography, Physics, Quantitative Methods in Environmental Science, Science Writing, Social Justice, Sustainability Studies, Water Resources.		
Total Hours		**29-30**

Graduates of the B.S. Environmental and Spatial Sciences program will:

1. Describe and analyze concepts and theories of the history, structure, function, interactions, and changes in environmental and human-environment systems.
2. Describe and analyze concepts and theories of the historical, political, and social context of environmental issues, policies, and institutions.
3. Apply appropriate concepts and methodologies to organize, assess, visualize, evaluate, and analyze complex social and environmental processes and problems, interpret relationships and trends, and make predictions about future change.
4. Design independent and team-based scientific inquiries to identify, collect, organize, analyze, integrate, and synthesize complex environmental and spatial data and information from multiple sources.
5. Design integrative and equitable scientific, technological, and policy solutions to environmental issues with a focus on sustainability.
6. Demonstrate proficiency in environmental and geospatial technology and data management.
7. Demonstrate proficiency in critical thinking and written and oral communication skills through a range of media and to diverse scientific, policy decision-makers, and general public audiences.