

GLOBAL ENVIRONMENTAL SYSTEMS, CERTIFICATE

Requirements for an undergraduate certificate may be completed at any campus location offering the specified courses for the certificate.

Program Description

Global environmental systems students characterize and analyze Earth's physical environment across time and space through the study of physical geography. This 12-credit certificate helps to prepare students for a variety of careers in resource management, ecological restoration, and climate change mitigation where an understanding of geographic patterns and physical processes associated with water, landforms, soils, vegetation, and climate are critical for the survival of life on planet Earth. Learning Objectives: Identify, describe, and analyze the processes that lead to spatial variation on Earth's surface, and the current and historical, physical and biotic processes that shape specific landscapes.

What is Global Environmental Systems?

Physical geographers seek to understand Earth's environmental systems and processes and their interactions with human activities across spatial and temporal scales. Geographers in this concentration conduct field and laboratory work and use geospatial technologies to explore and model environmental phenomena such as vegetation and wildlife, wetlands ecology and management, landscape dynamics, climate systems, and global environmental change. Some topics of study include the burning of fossil fuels and emissions of greenhouse gasses and particulates into the atmosphere, natural gas fracking and earthquakes, river diversion and dam construction, groundwater withdrawal and land subsidence, urbanization and the "heat island" effect, land clearance and deforestation, irrigated agriculture, wildland fire, the introduction of invasive species, and coastal overdevelopment.

You Might Like This Program If...

- You are interested in the integrated ways in which Earth's near-surface atmosphere, hydrosphere, lithosphere, and biosphere interact.
- You would like to address real-world issues of how human activities impact and are impacted by the physical landscape at many scales, from local to international.

Program Requirements

To earn an undergraduate certificate in Global Environmental Systems, a minimum of 12 credits is required.

Code	Title	Credits
Required Courses		
GEOG 210	Geographic Perspectives on Environmental Systems Science	3
Select 9 credits from:		9
GEOG 310	Introduction to Global Climatic Systems	
GEOG 310W	Introduction to Global Climatic Systems	
GEOG 314	Biogeography and Global Ecology	
GEOG 315	Landforms and Geomorphic Systems in the Anthropocene	
GEOG 410		
GEOG 411	Forest Geography	

GEOG 411W	Forest Geography
GEOG 412W	Climatic Change and Variability
GEOG 414	Principles and Applications in Landscape Ecology
GEOG 417	Satellite Climatology
GEOG 431	Geography of Water Resources
GEOG 438W	Human Dimensions of Global Warming

Non-Course Requirements

Per University policy, all credit courses for a certificate require a grade of 'C' or higher, and at least two-thirds (2/3) of the credits used to complete a certificate must be earned at Penn State. If student is completing multiple certificates in Geography, no more than one (1) course may double-count for each.

Certificate Learning Objectives

- **Physical Geography Patterns & Processes:** Students will identify and describe the processes that lead to spatial variation on Earth's surface and the current and historical, physical and biotic processes that shape specific landscapes.
- **Physical Geography Analysis & Problem-Solving:** Students will analyze the processes that lead to spatial variation on Earth's surface and the current and historical, physical and biotic processes that shape specific landscapes.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

University Park

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Career Paths

Students earning the Global Environmental Systems certificate learn a wide range of research and analytical skills that are highly valued by employers. Students trained in physical geography find jobs in all levels of government, nonprofit organizations, and in industry. This is one of several geography-related certificates that students can use to tailor their educational experience in preparation for the job market. In addition to Global Environmental Systems, the Department of Geography offers certificates in Environment and Society Geography; Geospatial Big Data

Analytics; Geographic Information Systems; Human Geography; Justice, Ethics and Diversity in Space; and Landscape Ecology.

Careers

Students earning the certificate in Global Environmental Systems are well-positioned to find employment with diverse organizations spanning business, government, and nonprofit sectors. Such organizations may include (but are not limited to): Conservation International; Federal Emergency Management Agency; NASA; National Oceanic and Atmospheric Administration; National Park Service; Natural Resources Defense Council; Resources for the Future; U.S. Army Corps of Engineers; U.S. Environmental Protection Agency; U.S. Forest Service; U.S. Geological Survey; local, regional, and state planning agencies, environmental and engineering consulting firms; policy research institutes; private corporations; and humanitarian organizations.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES WITH A CERTIFICATE IN PHYSICAL GEOGRAPHY (<https://www.geog.psu.edu>)

Opportunities for Graduate Studies

A certificate in Global Environmental Systems is useful for students who are interested in pursuing graduate degrees in the environmental and social sciences. Alumni enter graduate and professional studies in a variety of programs, including (but not limited to) geography, environmental sciences, ecology, sustainability, public policy, emergency management, planning, and law. They sometimes begin graduate or professional programs directly after finishing undergraduate studies, but often get several years' work experience before returning to school, either full or part-time.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (<https://www.geog.psu.edu>)

Professional Resources

- American Association of Geographers (AAG) (<https://www.aag.org>)
- American Geophysical Union (AGU) (<https://www.agu.org/>)
- Ecological Society of America (ESA) (<https://www.esa.org>)
- American Geosciences Institute (AGI) (<https://www.americangeosciences.org>)

Contact

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