

CLIMATE AND ENVIRONMENTAL CHANGE, CERTIFICATE

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

Program Description

The Climate and Environmental Change Certificate is intended for students seeking to understand the spatial patterns and physical processes of climate change and variability, and to hone their skills of environmental data collection, analysis, and interpretation. Upon completing this certificate, students will be able to explain the environmental processes and patterns associated with climate change; identify and distinguish between natural climate variations and observed processes of climate change; utilize data from field experiments, satellite and aerial imagery, observation archives, and computer modeling to analyze climate change patterns across space.

Program Requirements

Code	Title	Credits
Required Courses		
<i>Required Courses: Require a grade of C or better</i>		
GEOG 310	Introduction to Global Climatic Systems	3
or GEOG 310W	Introduction to Global Climatic Systems	
Select 9-10 credits from the following (may not choose more than 1 course from GEOG 362, GEOSC 482, or METEO 477)		
EARTH 402	Modeling the Earth System	
GEOG 362	Remote Sensing and Image Analysis	
GEOG 410		
GEOG 412W	Climatic Change and Variability	
GEOG 417	Satellite Climatology	
GEOG 438W	Human Dimensions of Global Warming	
GEOSC 320	Geology of Climate Change	
GEOSC 450	Risk Analysis in the Earth Sciences	
GEOSC 482	Satellite Remote-Sensing For Earth Observation	
METEO 436	Radiation and Climate	
METEO 469	From Meteorology to Mitigation: Understanding Global Warming	
METEO 470	Climate Dynamics	
METEO 477	Fundamentals of Remote Sensing Systems	

Non-Course Requirements

Prerequisites not included in certificate:

- EARTH 402 Prerequisites: (EARTH 2 or EARTH 103) and (CHEM 110) and (MATH 83 or MATH 110 or MATH 140)
- GEOG 310/GEOG 310W Prerequisite: GEOG 10 or GEOG 210 or METEO 3 or METEO 101 or METEO 201
- GEOG 362 Prerequisite: GEOG 160 or GEOG 260
- GEOSC 450 Prerequisites: introductory Earth Science or Geosciences course and introductory statistics course and (MATH 110 or MATH 140)
- METEO 436 Prerequisite: METEO 300, concurrent: METEO 431

- METEO 469 Prerequisite: STAT 200 or MATH 110 or MATH 140
- METEO 470 Prerequisites: METEO 300, METEO 421, METEO 431
- METEO 477 Prerequisite: METEO 436 or EE 330

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 (including Global & Environmental Change), no more than one (1) course may double-count for each.

Certificate Learning Objectives

- **Climate Change Patterns & Processes:** Students will understand the environmental processes and patterns associated with climate change.
- **Analyze Natural & Human-Induced Climate Change:** Students will identify and distinguish between natural climate variations and observed processes of climate change.
- **Data Analysis and Modeling:** Students will utilize data from field experiments, satellite and aerial imagery, observation archives, and computer modeling to analyze climate change patterns across space.

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/>)

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