Bachelor of Science in Interdisciplinary Studies with a Concentration in ENVIROMENTAL SCIENCE

in the

Department of Atmospheric and Environmental Sciences

http://www.albany.edu/atmos/
Bachelor of Science in Interdisciplinary Studies with a Concentration in Environmental Science

Environmental issues are some of the greatest challenges we face as human society. There is increasing demand for environmental scientists to confront these challenges. Environmental science encompasses the Earth’s oceans, atmosphere, surface, and interior as well as how these physical components of the Earth system interact with life (ecology) and human society. Environmental science plays a central role in major current national and world issues (climate change, sustainability, energy, water resources, and biodiversity).

In the Department of Atmospheric and Environmental Sciences (DAES) students gain strong and multifaceted education in environmental science. They build a strong foundation in the fundamental basic sciences that govern environmental phenomena. Students gain hands-on experience taking environmental measurements and using software and statistics to unlock the secrets of environmental data.

Coursework is taught by 20 full time faculty and staff members, most of who are active and prominent researchers in their fields of study. Faculty and staff members pride themselves in their teaching and several have won national teaching awards.

Research and Teaching Facilities

**ETEC building:** Work is underway on a new home for DAES. The new $184 million Emerging Technology and Entrepreneurship (ETEC) building will house DAES starting in 2021. It will have state of the art teaching and research facilities. ETEC will be shared with the Atmospheric Science Research Center, NYS Mesonet, and College of Emergency Preparedness, Homeland Security and Cybersecurity.

**Maproom:** DAES houses an electronic “map room” for interactive display of meteorological and environmental data.

**Field trip and fieldwork destinations:** Class trips and fieldwork opportunities take advantage of many fantastic nearby environmental sites including: The Albany Pine Bush, The New York State Museum, Thacher State Park, Huyck Preserve, and more!

**Whiteface Mtn. Observatory:** The UAlbany Atmospheric Sciences Research Center (ASRC) operates an observation center atop Whiteface Mountain in the Adirondacks, measuring chemical species, cloud properties, acid precipitation, and aerosol content.
## Curriculum

Environmental Science is interdisciplinary, tying together knowledge from many areas to understand the world around us. Majors start by building a solid foundation in basic science. In junior and senior years, curriculum is tailored to specific student interests and goals.

### Students choose from four areas of specialization:
- Geography
- Sustainability Science & Policy
- Ecosystems
- Climate Change

#### Sample four-year plan for an ENV major.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Required classes listed in bold (credits in parentheses)</th>
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<tbody>
<tr>
<td><strong>Semester 1</strong></td>
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<tr>
<td>MAT 112:</td>
<td>Calculus I (4)</td>
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<tr>
<td>CHM 120:</td>
<td>General Chemistry I (3)</td>
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<tr>
<td>CHM 124:</td>
<td>General Chemistry Lab I (1)</td>
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<tr>
<td>BIO 130:</td>
<td>General Biology: Molecular/Cell (3)</td>
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<td>Elective/University Gen. Ed. Requirement</td>
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<td><strong>Semester 3</strong></td>
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<tr>
<td>PHY 140:</td>
<td>Physics I (3)</td>
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<tr>
<td>ENV 221:</td>
<td>Understanding the Earth (3)</td>
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<tr>
<td>BIO 201:</td>
<td>Intro. Biology lab I (1)</td>
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<td>ATM 210:</td>
<td>Atmospheric Structure/Circulation (3)</td>
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<tr>
<td>Elective/Gen-ed</td>
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<td><strong>Semester 5</strong></td>
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<tr>
<td>ENV 302:</td>
<td>Ocean Science (3)</td>
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<tr>
<td>BIO 330:</td>
<td>Principles of Ecology &amp; Evolution (3)</td>
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<tr>
<td>Specialization requirement</td>
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<td>Elective/Gen-ed</td>
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<td>Elective/Gen-ed</td>
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<td><strong>Semester 7</strong></td>
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<td>Specialization requirement</td>
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<td>Specialization elective</td>
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<td>Specialization elective</td>
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<tr>
<td>Elective / Internship / Research</td>
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**Requirements for environmental science specializations (students pick one)**

#### Geography (22 credits):
- Required courses (10 credits)
  - GOUSP 220: Introductory Urban Geography
  - GOG 290: Introduction to Cartography
  - GOG 496/USP 456: Geographic Information Systems (GIS)
- Sample Electives (choose 12 credits)
  - GOG 330: Principles of Environmental Management
  - GOG 344: World Population
  - GOG 354: Environment & Development
  - GOG 375: Methods of Urban Analysis
  - GOG 414: Computer Mapping
  - GOG 430: Environmental Planning
  - GOG 460: People, Place, and Power
  - GOG 484/5: Remote Sensing I/II
  - ENV 250: Environmental Sustainability
  - ENV 404: The Adirondack Environment
  - ATM 301: Surface Hydrology and Hydrometeorology
  - ATM 405: Water and Climate Change

#### Sustainability Science & Policy (21 credits):
- Required courses (9 credits)
  - ATM 304: Air Quality
  - ENV 250: Environmental Sustainability
  - RPOS 399: Topics in Political Science and/or Public Policy
- Sample Electives (choose 12 credits)
  - ANT 418: Culture, Environment, and Health
  - ATM 405: Water and Climate Change
  - ATM 413: Weather, Climate, and Societal Impacts
  - BIO 311: World Food Crisis
  - ENV 404: The Adirondack Environment
  - GOG 220: Introductory Urban Geography
  - GOG 344: World Population
  - GOG 430: Environmental Planning
  - RPOS 399: Topics in Political Science and/or Public Policy
  - RPOS 421: Global Environmental Issues and Their Effect on Human Health
  - HSPH 323: Environmental Laboratory Perspectives in Public Health
  - HSPH 332: Epidemiology and Biostatistics

#### Ecosystems (22 credits):
- Required (10 credits)
  - BIO 212: Introductory Genetics
  - BIO 327: Experimental Ecology
  - BIO 401: Ecology
- Sample Electives (choose 12 credits)
  - ANT 418: Culture, Environment, and Health
  - ANT 419: Human Evolutionary and Environmental Physiology
  - ATM 301: Surface Hydrology and Hydrometeorology
  - BIO 329: Genetics of Human Disease
  - BIO 402: Evolution
  - ENV 250: Environmental Sustainability
  - ENV 404: The Adirondack Environment
  - GOG 407: Biogeochemistry
  - GOG 424: Landscape Ecology
  - GOG 433: Urban Ecology
  - GOG 496: Geographic Information Systems
  - HSPH 321: Global Environmental Issues and Their Effect on Human Health

#### Climate Change (21 credits):
- Required (12 credits)
  - ATM 306: Climate Variability and Change
  - ATM 405: Water and Climate Change
  - ENV 415: Climate Laboratory
  - ENV 450: Paleoecology
- Sample Electives (choose 9 credits)
  - ATM 301: Hydrology and Hydrometeorology
  - ATM 304: Air Quality
  - ATM 307: Introduction to Atmospheric Chemistry
  - ATM 335: Meteorological Remote Sensing
  - ATM 413: Weather, Climate Change, and Societal Impacts
  - ATM 414: Air Pollution Meteorology
  - ENV 404: The Adirondack Environment
  - RPOS 399: Topics in Political Science and/or Public Policy
  - RPOS 266: International Political Economic Science
  - HSPH 321: Global Environmental Issues and Their Effect on Human Health
Internship and Research Opportunities

**Internships:**

DAES students have many nearby opportunities for **paid and volunteer internships and seasonal jobs**, all of which can provide students with a valuable learning experience and credit towards the major. Some examples are:

- **NY State Department of Environmental Conservation** is the state agency tasked with protecting and enhancing the environment of New York.
- **NY State Museum** houses a wealth of artifacts on the ecology, geology, anthropology, and culture of the state.
- **New York State Mesonet** is a network of 126 environmental stations across the state based on the UAlbany campus.
- **Albany Pine Bush Preserve Commission** protects and manages open space and wildlife at one of the best remaining examples of an inland pine barrens ecosystem in the world.
- **Huyck Preserve and Biological Research Station** is a non-profit organization with over 2,000 acres of forest, field, and wetland habitat. It is dedicated to research, education, recreation, and conservation.

**Research:**

Many students work on a research project (for credit) with a faculty member during their junior or senior year. Research ideas may come directly from faculty, but students often come up with their own ideas that fit with a specific faculty member’s research interests.

Some recent undergraduate research projects include:

- “Geospatial Energy and Life Cycle Assessment of Oscillating Water Column Systems in the Northeast”
- “Exploring Bird Evolution: An Ornithology Lesson for Middle and High School Students”
- “The impact of ENSO and AMO on selected glaciers in the Andes of South America”
Honors Program:
Students with a cumulative GPA of at least 3.25, and 3.5 in the major, are eligible to apply for a B.S. with honors in environmental science. Students must complete 83-84 credits including two semesters of Undergraduate Research (ENV 498) leading to an undergraduate thesis and oral presentation.

Extra-curricular activities:
There are hundreds of campus groups where you can meet up with others that share your interests, including a number of sustainability and environmental campus groups:
- The UAlbany Outdoors Club
- UAlbany Students for Sustainability
- UAlbany Grow Green
Many of our students also volunteer at the annual DAES Family Earth Day event.

Minors:
While adding a minor isn’t required for ENV majors, it is a great way to diversify your education and learn extra skills that make you more attractive to future employers. Some common minors among environmental science majors include:

- Sustainability
- Informatics
- Atmospheric Science
- Geographic Information Systems (Certificate)

... although dozens of other possibilities exist as well.

Careers:
Many of our undergraduate degree recipients continue their education in graduate school in areas such as environmental engineering, law, teaching, geography/GIS, climate science, or ecology. There are also a significant number of jobs available to students with Bachelor’s degrees. Some of the more common jobs are in:

- Environmental monitoring (air & water quality)
- Environmental consulting
- Renewable energy
- Environmental instrumentation
- Environmental policy
- Environmental education
Faculty Research Interests and Contact Information

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Synoptic meteorology and the weather-climate interface

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Tropical cyclones and lightning

Aiguo Dai, Professor (Ph.D., Columbia Univ.)
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Climate change and the global water cycle

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Paleoclimatology and regional climate change

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Numerical weather prediction and mesoscale meteorology

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Atmospheric electricity

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Synoptic-dynamic meteorology

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Synoptic meteorology and troposphere-stratosphere interaction

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Mountain meteorology and mesoscale meteorology

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Planetary-scale climate dynamics

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Tropical atmospheric waves and midlatitude interaction

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Tropical cyclones and mesoscale meteorology

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West African monsoon and African easterly waves

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Big data, and meteorological data visualization

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Tropical paleoclimatology and climate change

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Climate observations and instrumentation

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Remote sensing and land-climate interactions

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