CLIMATE SCIENCE

Graduate Program Head: Michael Mann
Program Code: CLSC
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CLSCI)

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., i.e., Ph.D. in (graduate program name) and Climate Science.

The following graduate program offers the dual-title degree in Climate Science: Meteorology and Atmospheric Science.

The Climate Science dual-title degree program is administered by the Department of Meteorology and Atmospheric Science for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, defines the nature of the candidacy examination and assigns the examining committee, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences and, where appropriate, other graduate programs in the University. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Climate Science, while maintaining a close association with major program areas of application. Climate Science is a field devoted to the study of Earth's climate in the past, present, and future. A particular focus is understanding the effects of human activities (anthropogenic impacts) and natural forcing on climate.

Admission Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs).

Students must be admitted to their primary graduate program and The Graduate School before they can apply for admission to the dual-title degree program. Students must be admitted into the dual-title degree program in Climate Science prior to taking the qualifying examination. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Climate Science dual-title doctoral degree student must include at least one member of the Climate Science Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Climate Science, the member of the committee representing Climate Science

Degree Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in Climate Science, listed below.

The minimum course requirements for the dual-title in Climate Science are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 3 credits of approved 400-, 500-, or 800-level courses in each of two specific areas:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Climate dynamics seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate dynamics and observations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 credits of approved 400-, 500-, or 800-level courses in each of three of the four remaining areas:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Physical climate system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biogeochemistry of the climate system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerical methods and data analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human dimensions of climate change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Students are not eligible to take a 400-level course in any one of the areas if the course is offered by their primary graduate program. All students must take at least one 500-level course, and at least one course must be from outside of their core disciplinary expertise. Finally, all of the courses offered in Climate Dynamics and Observations will include sufficient material in radiative transfer and the greenhouse effect to ensure that the students clearly understand the underlying physics of climate and climate change. A list of the approved courses that will satisfy each of the area requirements is maintained by the graduate program office. Students or faculty may request that the Climate Science Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Climate Science program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Climate Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Graduate students with research and educational interests in climate science may apply to the Climate Science Dual-Title Degree Program. Students must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating the career goals they hope to serve by attaining a Climate Science dual-title, and a statement of support from their dissertation adviser. A strong preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.
must be appointed as co-chair. The Climate Science representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Climate Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-500/gsad-501-credit-loads-graduate-assistants) set by The Graduate School.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Michael Mann