ATMOSPHERIC AND OCEANIC SCIENCES - DOCTOR OF PHILOSOPHY (PHD)

The Department of Atmospheric and Oceanic Sciences (ATOC) is an interdisciplinary program that provides an educational and research environment to examine the dynamical, physical and chemical processes in the atmosphere, ocean and land surface, and the manner in which they interact. A major theme is the establishment of a physical basis for understanding, observing and modeling climate and global change.

ATOC attracts many of the most outstanding graduate students in the field. Our students receive a significant number of fellowships and nationally recognized awards each year, provide excellent instruction to CU Boulder's undergraduates as teaching assistants, and make scientific advances while conducting innovative research. Our graduates go on to successful careers in academia, national research institutes and private industry.

Graduate students, research staff and faculty work together on a wide range of research themes:

- atmospheric & oceanic dynamics
- atmospheric chemistry & physics
- chemical & physical oceanography
- clouds & aerosols
- planetary atmospheres
- radiative transfer & remote sensing
- regional, boundary layer & wind energy meteorology

For more information about ATOC programs and application procedures, call the ATOC office at 303-492-6633 or visit the Atmospheric and Oceanic Sciences (http://www.colorado.edu/atoc) website.

Requirements

Academic Standards

A student is required to maintain a 3.00 (B) average in all work attempted while enrolled in the Graduate School. For the PhD, a course grade of C+ or below is unsatisfactory and will not be counted toward fulfilling requirements for the degree.

Academic Preparation

An undergraduate degree in mathematics, physics, engineering, chemistry or another natural science is recommended. The general prerequisites expected of incoming graduate students include undergraduate courses in calculus, linear algebra, differential equations and computer programming, as well as one-year sequences of undergraduate calculus-based physics and chemistry. Upper-division undergraduate courses in physics, chemistry, engineering and mathematics are strongly recommended. Undergraduate courses in atmospheric and oceanic sciences are useful, but not expected, as part of the undergraduate background.

Course Requirements

A total of 36 credit hours are required, including 18 credit hours in ATOC core courses, as well as a graduate-level course in applied or computational mathematics. In addition, 30 dissertation hours are required. Other specific course requirements are covered in the ATOC Graduate Handbook.

All PhD students are required to take a total of six ATOC core courses, or their equivalent, from one of the two following ATOC core course tracks. Regardless of track chosen, the degree will be in atmospheric and oceanic sciences. The doctoral dissertation topic is not constrained by choice of track.

**Atmosphere Track (A-Track)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATOC 5050</td>
<td>Atmospheric Thermodynamics and Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5051</td>
<td>Introduction to Physical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5060</td>
<td>Dynamics of the Atmosphere and Oceans</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5151</td>
<td>Atmospheric Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5235</td>
<td>Introduction to Atmospheric Radiative Transfer and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5600</td>
<td>Physics and Chemistry of Clouds and Aerosols</td>
<td>3</td>
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</tbody>
</table>

Total Credit Hours 18

**Oceanography Track (O-Track)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ATOC 5050</td>
<td>Atmospheric Thermodynamics and Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5051</td>
<td>Introduction to Physical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5060</td>
<td>Dynamics of the Atmosphere and Oceans</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5200</td>
<td>Biogeochemical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>ATOC 5235</td>
<td>Introduction to Atmospheric Radiative Transfer and Remote Sensing</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
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<td>3</td>
</tr>
<tr>
<td>ATOC/ASEN 5215</td>
<td>Descriptive Physical Oceanography</td>
<td></td>
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<tr>
<td>ATOC/ASTR 5400</td>
<td>Introduction to Fluid Dynamics</td>
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<tr>
<td>GEOL 5270</td>
<td>Marine Chemistry and Geochemistry</td>
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<tr>
<td>GEOL 5430</td>
<td>Paleoceanography and Palaeoclimatology</td>
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<tr>
<td>MCEN 5021</td>
<td>Introduction to Fluid Dynamics</td>
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</table>

Total Credit Hours 18

ATOC offers many graduate elective courses, and students are encouraged to take related electives offered by other departments.

Examinations

Students must pass a two-part comprehensive examination before admission into candidacy. Part I of the comprehensive examination is a written exam based on course material and is normally taken just prior to the second year. Part II of the comprehensive examination is normally taken in the third year and is an oral examination based on an original research paper prepared by the student. After a preliminary copy of the dissertation has been accepted for defense by the student's committee, a final examination on the dissertation and related topics is conducted.