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 programs and application procedures, contact the ATOC office.

Requirements
Admission Requirements
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.

Program 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.

Course Requirements
A total of 36 credit hours of coursework 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>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 5235</td>
<td>Introduction to Atmospheric Radiative Transfer and Remote Sensing</td>
<td>3</td>
</tr>
</tbody>
</table>

All PhD students are required to take two courses from the following list of courses or their equivalent:

- ATOC 5151 Atmospheric Chemistry
- ATOC 5200 Biogeochemical Oceanography
- ATOC 5600 Physics and Chemistry of Clouds and Aerosols
- ASTR 5400 Introduction to Fluid Dynamics
- GEOL 5270 Marine Chemistry and Geochemistry
- GEOL 5430 Paleoceanography and Paleoclimatology
- MCEN 5021 Introduction to Fluid Dynamics

Total Credit Hours 18

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.