

# ATMOSPHERIC AND OCEANIC SCIENCES, PH.D.

A Doctor of Philosophy degree is offered with a major in atmospheric and oceanic sciences. Candidates may enter with a Master's degree or for more qualified students, directly after earning a bachelor's degree.

In atmospheric and oceanic sciences, classical physics is applied to describe the behavior of the fluids that compose the atmosphere/ocean/earth system. Influences of solar and terrestrial radiation, clouds and storms, natural and anthropogenic pollution, dynamical forces and turbulence can affect both the weather and longer climatic variations. The department uses computer simulations, passive and active remote sensing, in situ weather instruments, and laboratory experiments to study atmospheric phenomena.

The department has 18 faculty members and many staff involved in large and energetic research programs. Particular strengths include climate/earth system science, geophysical fluid dynamics, remote sensing, planetary boundary layer, atmospheric chemistry, weather systems and prediction, and oceanography. Course concentrations within the existing degree program are offered in the areas of weather prediction, earth system science, remote sensing, and oceanography.

Course and research emphasis of the department's oceanographic component is in physical oceanography, ocean-atmosphere climate dynamics, and marine geochemical cycles. A concentration of courses in oceanography can be used to satisfy the atmospheric and oceanic sciences doctoral minor.

The department has close ties with the Center for Climatic Research, the Nelson Institute for Environmental Studies, Center for Sustainability and the Global Environment, Space Science and Engineering Center, Cooperative Institute for Meteorological Satellite Studies, National Weather Service, and the State Climatologist Office.

Financial assistance is available to qualified students. The typical sources of funding are research and teaching assistantships. All applicants are considered for any available assistantships. Financial aid is handled separately from admission in the department. Students generally hear about their admission status well before any decision about financial aid is made.

Job opportunities have been strong within the United States for people with graduate degrees in atmospheric and oceanic sciences. The government hires a large number of meteorologists with advanced degrees, as do many private forecasting companies and air quality consulting firms. In addition, there are openings for experts at various government and university research labs.

## ADMISSIONS

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet** the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) **of the Graduate School as well as the program(s)**. Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

Requirements	Detail
Fall Deadline	January 1
Spring Deadline	December 1
Summer Deadline	January 1
GRE (Graduate Record Examinations)	Not required but may be considered if available.
English Proficiency Test	Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements ( <a href="https://grad.wisc.edu/apply/requirements/#english-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a> ).
Other Test(s) (e.g., GMAT, MCAT)	n/a
Letters of Recommendation Required	3

## ADMISSION REQUIREMENTS

### Prerequisites for Graduate Work

Math—three semesters college calculus sequence for science/engineering majors plus differential equations

Physics—two semesters calculus-based general college physics

Chemistry—one semester general chemistry

A minimum undergraduate GPA of 3.0 is required for admission.

International students must submit scores from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS).

Prior work in atmospheric or oceanic sciences is not required, but it is beneficial. Knowledge of computer programming is recommended.

Applications are also judged on academic record, letters of recommendation, prior research experience, and the statement of purpose. PhD students must have an advisor identified before they can be recommended for admission.

For additional information on applying for admission, please go to the AOS website. (<http://aoswebsite.aos.wisc.edu/academics/graduate/admission/>)

## FUNDING

## GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School.

Be sure to check with your program for individual policies and restrictions related to funding.

## PROGRAM RESOURCES

Financial assistance is available to qualified students. The typical sources of funding are research and teaching assistantships. All applicants are considered for any available assistantships. Financial aid is handled separately from admission in the department. Students generally hear about their admission status well before any decision about financial aid is made.

Prospective students should see the ATM OCN website (<http://aoswebsite.aos.wisc.edu/academics/graduate/stipends-fees/>) for additional funding information.

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirementstext>), in addition to the program requirements listed below.

### MAJOR REQUIREMENTS

#### MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW–Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

### CURRICULAR REQUIREMENTS

Requirement Detail	
Minimum Credit Requirement	51 credits
Minimum Residence Credit Requirement	32 credits

**Minimum Graduate Coursework Requirement** 26 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy (<https://policy.wisc.edu/library/UW-1244> (<https://policy.wisc.edu/library/UW-1244/>)).

**Overall Graduate GPA Requirement** 3.00 GPA required. This program follows the Graduate School's policy: <https://policy.wisc.edu/library/UW-1203> (<https://policy.wisc.edu/library/UW-1203/>).

**Other Grade Requirements** All grades must be C or better to count towards the degree.

**Assessments and Examinations** Students wishing to pursue a Ph.D. are required to take a qualifying examination prior to forming a Ph.D. committee (see department website for information regarding how to form the committee). For more information about the qualifying examination, please consult the department's Qualifying Exam FAQs ([http://www.aos.wisc.edu/education/Qual\\_ExamFAQ.html](http://www.aos.wisc.edu/education/Qual_ExamFAQ.html)).

Ph.D. students are required to complete a preliminary examination by the Ph.D. committee prior to becoming a Ph.D. candidate. Prior to the preliminary examination the student works with the major professor to define an appropriate research topic. This topic is written into a several page research proposal that is given to the Ph.D. committee members a few weeks prior to the preliminary examination.

**Language Requirements** No language requirements.

**Breadth Requirement** All doctoral students are required to complete two broadening requirements: a doctoral minor or Graduate/Professional certificate, and a supplemental requirement.

Minor requirement:

A minor program consists of Option A (external) 9 or more course credits in one discipline or Option B (distributed) 9 or more credits in one or more departments and can include coursework in the major department. Selection of Option A requires approval of the minor department. Selection of Option B requires approval of the major department. The department monitors minor requirements.

Supplemental requirement:

The supplemental requirement is specified by the Ph.D. committee during the first Ph.D. committee meeting. Examples include (but are not limited to): an augmented minor, substantial foreign language skill, significant professional or field experience, or interdisciplinary coursework.

### REQUIRED COURSES

Code	Title	Credits
<b>Core Courses</b>		<b>15</b>
At least 15 credits are from lecture courses numbered 600 or above in the department. Seminars, research credits, and audited courses are not included.		
ATM OCN 900	Seminar-Meteorology	1-2
<b>Breadth</b>		<b>9</b>

These credits may be from the department, but cannot be used to satisfy the Core Courses requirement.

<b>Additional Credits</b>	<b>25+</b>
Students choose additional courses in consultation with their advisor. Most additional credits are made up of 990 research credits.	
<b>Total Credits</b>	<b>51</b>

## POLICIES

### GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

### MAJOR-SPECIFIC POLICIES

#### PRIOR COURSEWORK

##### Graduate Work from Other Institutions

With program approval, students are allowed to count no more than 19 credits of graduate coursework from other institutions. Coursework earned five or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

##### UW–Madison Undergraduate

With program approval, students are allowed to count no more than 7 credits of graduate coursework taken as an undergraduate at UW–Madison, as long as those credits were not applied toward an undergraduate degree. Coursework earned five or more years prior to admission to a master's degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

##### UW–Madison University Special

This program follows the Graduate School's policy for Transfer from UW–Madison University Special Student Career at UW–Madison. (<https://policy.wisc.edu/library/UW-1216/>)

### PROBATION

This program follows the Graduate School's Probation policy. (<https://policy.wisc.edu/library/UW-1217/>)

### ADVISOR / COMMITTEE

A Ph.D. committee is required in order to become a Ph.D. student. The student, under the guidance of the major professor, must form a committee of five professors consisting of the major professor, three other professors from our department, and one professor from outside the department (often from the minor department). Additional members may be added, if appropriate. Adjunct faculty can be included among the five committee members. If the committee dissolves for any reason, the candidate cannot continue in the Ph.D. program unless a new committee is formed.

The first meeting of the Ph.D. committee should normally occur after the student completes the qualifying examination, but within the same semester as the qualifying examination. Potential committee members, in deciding whether to form a Ph.D. committee, use results from the

qualifying examination as well as additional information about a student's suitability for pursuing a Ph.D.

All students are required to conduct a yearly progress report meeting with their thesis committee after passing the preliminary examination.

### CREDITS PER TERM ALLOWED

15 credits

### TIME LIMITS

The Ph.D. degree should be completed within five years after establishing a Ph.D. committee. This program follows the Graduate School's Time Limits policy (<https://policy.wisc.edu/library/UW-1221/>).

### GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
  - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employee disabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

Students should contact the department chair or program director with questions about grievances. They may also contact the L&S Academic Divisional Associate Deans, the L&S Associate Dean for Teaching and Learning Administration, or the L&S Director of Human Resources.

### OTHER

n/a

## PROFESSIONAL DEVELOPMENT

### GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

## LEARNING OUTCOMES

1. Have an in-depth knowledge of the fields that are relevant to their research areas by taking appropriate courses not only in atmospheric and oceanic sciences, but also in related disciplines including mathematics, statistics, physics, and engineering.
2. Ask the right scientific questions: What are the important scientific problems in this field? Can a problem be solved by the available resources in a reasonable time? How to design a scientific approach to tackle the problem?
3. Read original papers of their research field to understand how previous investigators approach the problem and how they can improve on previous results.
4. Articulate research problems, potentials, and limits with respect to theory, knowledge, or practice within the field of study.
5. Formulate ideas, concepts, designs, and/or techniques beyond the current boundaries of knowledge within the field of study.
6. Fosters ethical and professional conduct.

## PEOPLE

See department website for list of faculty (<https://www.aos.wisc.edu/faculty/>).