# ATMOSPHERIC AND OCEANIC SCIENCES, PHD

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 20 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

# 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 | October 12 |
| 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 exclusively in English, must provide an English proficiency test score earned within two years of the anticipated term of enrollment. Refer to the Graduate School: Minimum Requirements for Admission policy: https://policy.wisc.edu/library/UW-1241 (https://policy.wisc.edu/library/UW-1241/). |
| Other Test(s) (e.g., GMAT, MCAT) | n/a |
| Letters of Recommendation Required | 3 |

## ADMISSION REQUIREMENTS

### Prerequisites

- 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.

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

### Application

Applications are also judged on academic record, letters of recommendation, prior research experience, and the statement of purpose. Applicants for the PhD 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. (https://www.aos.wisc.edu/)

## FUNDING

# FUNDING

## GRADUATE SCHOOL RESOURCES

The Bursar's Office provides information about tuition and fees associated with being a graduate student. Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information 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 (https://www.aos.wisc.edu/academics/graduate/stipends-fees/) for additional funding information.

# REQUIREMENTS

# MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum degree requirements (https://guide.wisc.edu/graduate/#requirementstext) and policies (https://guide.wisc.edu/graduate/#policiestext), 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. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/). |
| Overall Graduate GPA Requirement | 3.00 GPA required.<br>Refer to the Graduate School: Grade Point Average (GPA) Requirement 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 PhD should complete the advancement process prior to forming a PhD committee. For more information about the Advancement Process, see: Advancement Process (https://www.aos.wisc.edu/academics/graduate/advancement-process (https://www.aos.wisc.edu/academics/graduate/advancement-process/)/).<br><br>PhD students are required to complete a preliminary examination by the PhD committee prior to becoming a PhD 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 PhD committee members a few weeks prior to the preliminary examination. |
| Language Requirements | No language requirements. |
| Graduate School Breadth Requirement | All doctoral students are required to complete a doctoral minor or graduate/professional certificate. Refer to the Graduate School: Breadth Requirement in Doctoral Training policy: https://policy.wisc.edu/library/UW-1200 (https://policy.wisc.edu/library/UW-1200/). |

## REQUIRED COURSES

| Code | Title | Credits |
|---|---|---|
| **Core Courses** | | **15** |
| At least 15 credits must be from lecture courses numbered 600 or above in the department. Seminars, research credits, and audited courses are not included. | | |
| **Seminar** | | |
| ATM OCN 900 | Seminar-Meteorology | 1-2 |
| **Breadth** | | **9** |
| These credits may be from the department, but cannot be used to satisfy the Core Courses requirement. | | |
| **Additional Credits** | | **25+** |
| Students choose additional courses in consultation with their advisor. Most additional credits are made up of 990 research credits. | | |
| **Total Credits** | | **51** |

### Supplemental Requirement

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

# POLICIES

# GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy/) serve as the official document of record for Graduate School academic and administrative policies and procedures and are updated continuously. Note some policies redirect to entries in the official UW-Madison Policy Library (https://policy.wisc.edu/). Programs may set more stringent policies than the Graduate School. Policies set by the academic degree program can be found below.

# MAJOR-SPECIFIC POLICIES

## PRIOR COURSEWORK

### Graduate Credits Earned at Other Institutions

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

### Undergraduate Credits Earned at Other Institutions or UW-Madison

With program approval, students are allowed to transfer 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 ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements. Credits earned at other institutions do not transfer.

### Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

### Credits Earned as a University Special Student at UW–Madison

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

## PROBATION

Refer to the Graduate School: Probation (https://policy.wisc.edu/library/UW-1217/) policy.

## ADVISOR / COMMITTEE

A PhD committee is required in order to become a PhD 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 PhD program unless a new committee is formed.

The first meeting of the PhD 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 PhD committee, use results from the qualifying examination as well as additional information about a student's suitability for pursuing a PhD.

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 PhD degree should be completed within five years after establishing a PhD committee. Refer to the Graduate School: Time Limits (https://policy.wisc.edu/library/UW-1221/) policy.

## 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/)
- 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://employeedisabilities.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 Student Assistance and Support (OSAS) (https://osas.wisc.edu/) (for all students to seek grievance assistance and support)
- 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)

## L&S POLICY FOR GRADUATE STUDENT ACADEMIC APPEALS

Graduate students have the right to appeal an academic decision related to an L&S graduate program if the student believes that the decision is inconsistent with published policy.

Academic decisions that may be appealed include:

- Dismissal from the graduate program
- Failure to pass a qualifying or preliminary examination
- Failure to achieve satisfactory academic progress

- Academic disciplinary action related to failure to meet professional conduct standards

Issues such as the following cannot be appealed using this process:

- A faculty member declining to serve as a graduate student's advisor.
- Decisions regarding the student's disciplinary knowledge, evaluation of the quality of work, or similar judgements. These are the domain of the department faculty.
- Course grades. These can be appealed instead using the L&S Policy for Grade Appeal (https://kb.wisc.edu/ls/22258/).
- Incidents of bias or hate, hostile and intimidating behavior (https://hr.wisc.edu/hib/), or discrimination (Title IX (https://compliance.wisc.edu/titleix/), Office of Compliance (https://compliance.wisc.edu/eo-complaint/formal-investigations/)). Direct these to the linked campus offices appropriate for the incident(s).

### Appeal Process for Graduate Students

A graduate student wishing to appeal an academic decision must follow the process in the order listed below. Note time limits within each step.

1. The student should first seek informal resolution, if possible, by discussing the concern with their academic advisor, the department's Director of Graduate Studies, and/or the department chair.
2. If the program has an appeal policy listed in their graduate program handbook, the student should follow the policy as written, including adhering to any indicated deadlines. In the absence of a specific departmental process, the chair or designee will be the reviewer and decision maker, and the student should submit a written appeal to the chair within 15 business days of the academic decision. The chair or designee will notify the student in writing of their decision.
3. If the departmental process upholds the original decision, the graduate student may next initiate an appeal to L&S. To do so, the student must submit a written appeal to the L&S Assistant Dean for Graduate Student Academic Affairs within 15 business days of notification of the department's decision.
    a. To the fullest extent possible, the written appeal should include, in a single document: a clear and concise statement of the academic decision being appealed, any relevant background on what led to the decision, the specific policies involved, the relief sought, any relevant documentation related to the departmental appeal, and the names and titles of any individuals contributing to or involved in the decision.
    b. The Assistant Dean will work with the Academic Associate Dean of the appropriate division to consider the appeal. They may seek additional information and/or meetings related to the case.
    c. The Assistant Dean and Academic Associate Dean will provide a written decision within 20 business days.
4. If L&S upholds the original decision, the graduate student may appeal to the Graduate School. More information can be found on their website: Grievances and Appeals (https://grad.wisc.edu/documents/grievances-and-appeals/) (see: Graduate School Appeal Process).

## OTHER

n/a

## PROFESSIONAL DEVELOPMENT

# 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

# 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.