

# METEOROLOGY AND ATMOSPHERIC SCIENCE

## Degree Requirements

The program differentiates between instruction and research topics appropriate for M.S. students seeking positions of advanced responsibility in government or industry, those appropriate for M.S. students anticipating further study, and those appropriate for Ph.D. candidates who will work in advanced research laboratories or academic institutions.

### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

The M.S. degree is offered with thesis or research paper options, both requiring 35 credits.

A minimum of 35 credits at the 400, 500, 600, or 800 level is required, with at least 29 credits at the 500, 600 and 800 level combined. The required core curriculum consists of 23 credits, including 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology:

Code	Title	Credits
<b>Required Courses</b>		
<i>Dynamic Meteorology Courses</i>		
Select two courses from the following:		6
METEO 520	Geophysical Fluid Dynamics	
METEO 521	Dynamic Meteorology	
METEO 554	Atmospheric Turbulence	
METEO 551	Physical Oceanography	
METEO 570	Climate System Dynamics	
<i>Physical Meteorology Courses</i>		
Select two courses from the following:		6
METEO 532	Chemistry of the Atmosphere	
METEO 533	Cloud Physics	
METEO 535	Radiative Transfer	
METEO 556	The Atmospheric Boundary Layer	
METEO 570	Climate System Dynamics	
<i>Additional Required Courses</i>		
METEO 880	Communication of Research in Atmospheric Science	2
or METEO 596 Individual Studies		
METEO 590	Colloquium	2
METEO 591	Development and Ethics in the Atmospheric Sciences	1
6 elective credits from 500-level Meteorology and Atmospheric Science courses or 500-level courses in related disciplines from a list of approved electives maintained by the program office		6
<b>Total Credits</b>		<b>23</b>

Students can choose to complete either a thesis or a scholarly paper as the culminating experience for the degree. Students who choose the thesis track must select METEO 880 and 6 additional elective credits

from 400- and 500-level course work in Meteorology and Atmospheric Science or related disciplines from a list of approved electives maintained by the program office. In addition, students must complete 6 quality-graded credits in thesis research (METEO 600 or METEO 610) in conjunction with completing the thesis (quality-graded credits count toward the grade-point average). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Students in the scholarly paper track must select 2 credits of METEO 596, 6 additional elective credits from 400- and 500-level course work in Meteorology and Atmospheric Science, and 6 additional credits from 400- and 500-level course work in Meteorology and Atmospheric Science or related disciplines from a list of approved electives maintained by the program office. Students in the scholarly paper track cannot count METEO 600 credits towards degree requirements. Students will complete the scholarly paper while registered for 2 credits of METEO 596 in their final semester. M.S. students in the scholarly paper track must defend their scholarly paper in a public presentation that is evaluated by, and must be approved by, the students' committee.

### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

Studies for the Ph.D. degree are designed to accommodate the interests and capabilities of the student, and they are overseen by a Ph.D. committee, which also administers comprehensive and final oral examinations. The student must have the academic support of a faculty member and the student must pass the Ph.D. qualifying examination. The exam must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. If a student does not pass the exam on their first attempt, then a second attempt may be allowed at the discretion of the Graduate Faculty members of the department.

In addition, Ph.D. degree requirements include successful completion of the following: approved graduate course work, English competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). The student must pass the English competency exam before scheduling the comprehensive exam. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School. For the Ph.D. program, a minimum of 21 credits is required, including a core curriculum of 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology. The student will be tested for mastery of the selected core in the qualifying exam.

Code	Title	Credits
<b>Required Courses</b>		
<i>Dynamic Meteorology Courses</i>		
Select two courses from the following:		6
METEO 520	Geophysical Fluid Dynamics	
METEO 521	Dynamic Meteorology	
METEO 554	Atmospheric Turbulence	
METEO 551	Physical Oceanography	
METEO 570	Climate System Dynamics	
<i>Physical Meteorology Courses</i>		
Select two courses from the following:		6
METEO 532	Chemistry of the Atmosphere	

METEO 533	Cloud Physics	
METEO 535	Radiative Transfer	
METEO 556	The Atmospheric Boundary Layer	
METEO 570	Climate System Dynamics	
METEO 591	Development and Ethics in the Atmospheric Sciences <sup>1</sup>	1
METEO 880	Communication of Research in Atmospheric Science <sup>2</sup>	2
<b>Electives</b>		
A minimum of 6 elective credits from METEO 500-level or related discipline 400- or 500-level courses must be taken that do not count toward any other degree requirement and finished by the semester in which the comprehensive exam is passed.		6
<b>Total Credits</b>		<b>21</b>

<sup>1</sup> Students must take METEO 591 the first semester it is available upon matriculating in the program.

<sup>2</sup> METEO 880 must be taken prior to the department's competency exam in written and spoken technical English.

<sup>3</sup> One credit of METEO 590 is required each semester until the comprehensive exam is passed.

The 12 credits of core curriculum courses, METEO 880, and METEO 591 may be waived as required courses at the discretion of the program if the student has already taken them or equivalent courses, and the total required credits will be reduced accordingly. In addition to the 21 minimum required credits, one credit of METEO 590 is required each semester until the comprehensive exam is passed. A student must pass the department's competency exam in written and spoken technical English before being admitted to the comprehensive exam. There are no minimum quality-graded credit (research credits whose grades count toward the grade-point average) requirements for METEO 600; students may earn up to a maximum of 12 quality-graded METEO 600 credits.