

THE UNIVERSITY OF ARIZONA®



Doctor of Philosophy (Ph.D.) DEGREE

Departmental REQUIREMENTS

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Note: This document is meant to guide the student through the complicated path of obtaining a graduate degree. It is subject to change and is not to be regarded as a legally binding contract. If you have any questions please ask.

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General Requirements

All doctoral students are personally responsible for taking the following steps at the proper times. All forms must be submitted before the deadline dates as scheduled by the Graduate College. See the ATMO Graduate Coordinator for information on these deadlines and all forms required by the Graduate College Degree Certification office. For assistance with **any** problems, students are encouraged to meet with their Major Advisors, the Graduate Director, the Graduate Coordinator, the Department Head, and/or the Graduate Student Representatives.

All students seeking a Ph.D. must complete a minimum of 68 units of graduate credit.

- 36** units of graduate course work in their **major** field of study
- 2** units of seminar
- 12** units of graduate course work in their **minor** field of study (typical)
- 18** units of dissertation credit (ATMO 920)
- 68** total credits

Students are required to take 36 units of graduate coursework in Atmospheric Sciences. The following core courses, or their equivalents at other institutions, are required of all students:

ATMO 541A	Dynamic Meteorology	I	3 units
ATMO 541B	Dynamic Meteorology	II	3 units
ATMO 551A	Physical Meteorology	I	3 units
ATMO 551B	Physical Meteorology	II	3 units

AND at least 24 additional units of course work in Atmospheric Sciences at the 500/600 level

- a. Students are required to complete a **Minor Program**, which typically includes 12 credits of coursework. However, the requirements are determined by the minor department and may include a written minor examination.
- c. Students are required to take a minimum 18 units of ATMO 920 for dissertation credit. These units cannot be taken until after the Comprehensive Examination has been passed and are ***in addition to*** the 36 units of graduate course credit described in (a).
- d. Students are also required to take a minimum of 2 credits of seminar (ATMO 596a). These credits DO NOT count toward the 66 total credits required for the dissertation.

Typical Doctoral Program:

Semester	Course	Units
Fall: Year 1	ATMO 541A Dynamic Meteorology I	3
	ATMO 551A Physical Meteorology I	3
	ATMO XXX (elective)	3
Spring: Year 1	ATMO 541B Dynamic Meteorology II	3
	ATMO 551B Physical Meteorology II	3
	ATMO XXX (elective)	3
Fall: Year 2 Qualifying Exam	ATMO XXX (elective)	3
	ATMO XXX (elective)	3
	ATMO 596A (Seminar)	1
	Minor Course	3
Spring: Year 2	ATMO XXX (elective)	3
	ATMO 596A (Seminar)	1
	Minor Course	3
Fall: Year 3	ATMO XXX (elective)	3
	Minor Course	3
	Minor Course	3
Spring: Year 3 Comprehensive Exam	ATMO XXX (elective)	3
	ATMO 900 (Research)	3
Fall: Year 4	ATMO 920 (Dissertation)	9
Spring: Year 4 Final Oral Defense	ATMO 920 (Dissertation)	9
Total Units		68

- During the first semester, the student should select their Major Advisor. The student and Major Advisor decide on the student's Doctoral Committee members. The examining committee must consist of a minimum of four members. The Major Advisor and two additional members must be tenured, or tenure track. The fourth member may be tenured or tenure-track, or a special approved member. Special members must be pre-approved by the Dean of the Graduate College. Any members beyond the fourth can also be tenured or tenure-track, or special approved members.
- By the second semester, the student and their Major and Minor Advisors should have decided on the student's **Plan of Study (POS)** through departmental and GradPath forms procedures. The **POS** identifies (1) courses the student intends to transfer from other institutions; (2) courses already completed at The University of Arizona which the student intends to apply toward the graduate degree; and (3) additional course work to be completed to fulfill degree requirements. The

POS must have the approval of the student's major professor and department head (or chair of the Graduate Committee) before it is submitted to the Graduate College. Once the Graduate College approved the **POS** a \$35 fee will be billed to your Bursar's Account. The POS can be accessed through your UAccess Student. Credits from other institutions the student wishes to transfer should be discussed and may be approved by the Graduate Director and Major Advisor at this time. Any changes to the original POS must be re-submitted to Graduate College during the final semester.

- a. If the student obtained their Master's in ATMO then a maximum of 30 units of coursework from the Master's degree taken at the University of Arizona may be applied to the 36 units of course work required for the doctoral program.
 - b. No more than 12 credits listed on the POS may be taken while in non-degree-seeking status. None of the total units listed on the POS can be in courses graded S or P rather than a regular letter grade.
 - c. The transfer of credit form must be filed before the end of the first year of study. The student must complete the **Application to Transfer Coursework** form through GradPath Forms, accessed through your UAccess Student.
 - d. A full program of study, including approved transferred credits, will not be provided to the Graduate College Degree Certification until the student files the POS form.
4. Students who have not yet passed the written **Qualifying Examination** must notify the ATMO Graduate Coordinator no later than September 15th in their first semester to schedule the examination for November/December of the first year.
- a. Students who enter the doctoral program with a master's degree in a discipline other than Atmospheric Sciences must take the qualifying exam in November/December of their second year after first passing the ATMO core courses with a minimum 2 As and 2 Bs.
 - b. Students who enter the doctoral program without having a master's degree are first required to take the necessary steps to acquire a master's degree. Please refer to the Department's ***Master's of Science Degree Requirements*** handbook.
5. Students must meet the following **minimum** resident/enrollment requirements:
- a. To meet the minimum Graduate College residence requirements, at least 30 units of graduate credit, in the student's major and/or minor field of study, must be completed at The University of Arizona.
 - b. **Without Assistantships:** Students must spend at least two (2) regular semesters in residence with a minimum of nine (9) units of graduate credit each semester.

- c. **With Assistantships:** Students must complete four (4) semesters of residency during which they enroll for a minimum of six (6) credits per semester.
- 6. After completion of all, or almost all, non-dissertation credits required at The University of Arizona including minor requirements, the student must take and pass the **Comprehensive Examination**. (Refer to the following section entitled "The Comprehensive Examination").
 - a. The student must provide the ATMO Graduate Coordinator with at least four (4) weeks notice of his/her intent to take the written Comprehensive Examination (and, subsequently, the oral Comprehensive Examination).
 - 7. Students must continue to register each Fall and Spring semester for a minimum of 3 graduate units until all degree requirements are met. If all coursework and dissertation credit requirements have been met then students must continue to register for a minimum 1 credit.
 - a. Doctoral students who have maintained continuous enrollment, fulfilled all their other degree requirements as well as the 18 hours of dissertation and were enrolled in the prior semester may defend in the summer or winter term without registration.
- N.B.** If the student enrolls in **only** 900-level courses during his/her final semester, s/he may be entitled to a "900-Level Graduate Tuition Waiver" if living out of state and not using University resources. Please see the ATMO Graduate Secretary for more information.
- 8. All students must demonstrate, to the satisfaction of each student's Major Advisor, proficiency in both statistics and computer programming. This may be done by the successful completion of approved courses in these subjects, either at the undergraduate or graduate level.
 - 9. Students must complete and defend a **Dissertation** based on original research (Refer to the following section entitled "The Oral Defense Examination").

The Qualifying Examination

1. The Qualifying Examination is required of any student who wishes to continue in the doctoral program. The examination tests the student's breadth of knowledge in the general field of study. It is administered in November of every year as required.
2. All doctoral students who did not take the Qualifying Examination during their Masters must take the exam in the Fall semester of the first year (i.e., 1st semester), with a second chance the following January (within 8-10 weeks). Students will be notified of the date of an upcoming examination. A doctoral student entering the program with a master's in a discipline other than Atmospheric Sciences will be required to take the Qualifying Examination in November of their 2nd year (i.e., 3rd semester) after all ATMO core courses have been passed with a minimum of 2 As and 2 Bs.
3. Students who are required to take the Qualifying Examination must notify the ATMO Graduate Coordinator no later than September 15 of their intent to take the Qualifying examination (for the examination the following November/December).
4. The Qualifying Examination will test breadth of knowledge in the subject area. Representative core-course syllabi, reading lists, and old exams are available from the Graduate Coordinator for checkout. The exam will comprise 3 hours of questions, each 10-20 minutes long, and normally 4 hours are allowed to finish the exam. Each question will be graded PASS or FAIL. Passing more than half of the questions offered is a necessary (but not sufficient) requirement to be awarded a PASS on the Qualifying Examination. The final grade is determined by the faculty.
5. The student must have passed the Qualifying Examination in order to continue in the doctoral program. Two attempts are allowed with the second attempt occurring the January after the first attempt (i.e., within 8-10 weeks). If neither attempt is successful, the student will not be allowed to continue in the doctoral program and will finish up their studies by the end of the semester.

Comprehensive Examination

1. The Comprehensive Examination is intended to test the student's comprehensive, in-depth knowledge of the major subject of study and area of specialization. It is composed of:
 - A written examination; and
 - An oral examination
2. Students must complete all, or almost all, of their non-dissertation credits required at The University of Arizona including the minor requirements before taking the Comprehensive Examination.
3. The student is expected to take the Comprehensive Examination no later than the semester following completion of non-dissertation course requirements for the doctoral degree. Except under unusual circumstances, the student typically takes the Comprehensive Examination no later than the 6th semester. If the student received a master's degree from this department, the Comprehensive Exam should be taken no later than the 4th semester.
4. The written and oral portions of the Comprehensive Examination should normally take place within 6 weeks of each other, but no more than two successive semesters apart, not including summer sessions.
5. The written Comprehensive Examination is offered upon pre-arrangement between the student and his/her Major Advisor and Doctoral Committee. To schedule the written Comprehensive Examination, the student must consult with his/her Major Advisor to set an initial date for the written portion of the exam. Once arranged:
 - a) The Major Advisor must notify the Graduate Coordinator the names of the all the Doctoral Committee.
 - b) The student must then notify the ATMO Graduate Coordinator ***in writing the date and time of the exam*** (e-mail is accepted) *at least 6 weeks in advance* to schedule a room.
 - c) The student must complete the **Comprehensive Exam Committee Appointment Form** in GradPath.
6. The written Comprehensive Examination is composed as follows:

Research Prospectus: Submission of the Research Prospectus or Dissertation Proposal is mandatory to initiate the Comprehensive Examination process. The prospectus is reviewed by the Major Committee who will acknowledge receipt and provide written comments. Once the committee has approved the research topic (usually approved by the oral comprehensive exam):

- a) The student must complete and submit the **Departmental Dissertation Proposal Form** along with a one page summary to the Graduate Coordinator.
- b) The student must also complete **Prospectus/Proposal Confirmation Form** in GradPath.

Written Examination: The written examination will test depth of knowledge on specialized material associated with the students acknowledged area of expertise. The examination will be assembled by the Major Advisor and student's Doctoral Committee. Students should consult with members of their Doctoral Committee for guidance on exam material. Students will be required to attempt eight 15-minute questions although more may be provided. Normally, 3 hours will be allowed to complete this part. Each question is graded PASS or FAIL. Passing at least 6 questions attempted is a necessary (but not sufficient) requirement to be awarded a PASS on the written exam. The final grade is determined by the Major Advisor and Doctoral Committee.

- 7. In order to pass the written Comprehensive examination, a student **must** submit the Research Prospectus, and **must** PASS the written exam. If the student FAILS the written Comprehensive Examination in his/her initial attempt, he/she will be granted one chance to re-take that portion within 4 weeks. The student will be terminated from the program if the second attempt is also a FAIL or if the student fails to re-take that portion within 4 weeks of the first offering.
- 8. Upon successful completion of the written Comprehensive Examination, the Oral Comprehensive Examination is conducted before the student's doctoral committee comprising both Major and Minor members. To schedule the Oral Comprehensive Examination, the student must consult with his/her Doctoral Committee to set a date for the oral portion of the exam. It is the student's responsibility to ensure that the date of the oral exam suits the schedules of his/her Doctoral Committee. All members of the doctoral committee must be present at the exam. Once arranged:
 - a) The student must then notify the ATMO Graduate Secretary ***in writing the date and time*** (e-mail is accepted) ***at least 4 weeks in advance*** to schedule a room.
 - b) The student must complete the **Announcement of Doctoral Comprehensive Exam Form** in GradPath.
- 9. The student is responsible for downloading and filling in the **Departmental Results of Oral Comprehensive Exam Form** and obtaining the required signatures. The Major Advisor will complete the **Results of Comprehensive Exam Form** in GradPath.
- 10. The Oral Comprehensive Examination will be a minimum two hours long and will cover general fundamental knowledge of both atmospheric sciences and the minor field. No student will be permitted a second attempt to pass the oral examination except upon the recommendation of his/her Doctoral Committee, endorsed by the Department and approved by the Graduate College.

The Dissertation Defense Examination (Final Oral Defense)

1. Upon following successful completion of the compressive exams, the Doctoral Dissertation Committee is allowed by the Graduate College to be changed if necessary.
 - a. The Major Advisor must email the Graduate Coordinator to confirm the Doctoral Dissertation Committee members.
 - b. The student must complete the **Doctoral Dissertation Committee Appointment Form** in GradPath.
2. Upon completion of his/her dissertation, the student will take an oral examination in defense of the dissertation. The student must submit copies of the draft dissertation to his/her Doctoral Committee no less than one (1) month before taking the Oral Defense Examination.
3. The student must make all necessary arrangements to schedule the Dissertation Defense with his/her examining committee. Note that members of the examining committee representing the minor department may waive their right to be present at the Dissertation Defense. It is the student's responsibility to contact the examining committee members from the minor department to ascertain whether they wish to be present at the Dissertation Defense. They do not need to approve the **Announcement of Final Oral Defense Form** if they will not be present.
4. The student must complete the **Announcement of Final Oral Defense Form** through GradPath allowing enough time (2-3 weeks) in advance for all the approvers can grant their approval in time for the form to be completed a minimum of seven (7) working days before the actual exam date and time. This allows the Graduate College to make an announcement on the UA master calendar to invite the public to attend the candidate's presentation of his/her work.
5. There is no minimum time for the examination, but the entire proceedings, including public seminar, may not exceed three (3) hours.
6. If the committee requires revisions, those must be done in a timely manner, not to exceed one year. If the revisions are not completed by the dissertation submission deadline for the term when the student defends, the student will be required to register for the next semester and will graduate in the semester when the revisions are complete and approved. If revisions are not done by the end of the time to degree period, the student will have to re-take comprehensive examinations to demonstrate currency of knowledge.
7. The Major Advisor will submit the exam results in GradPath and return required departmental and Graduate College paperwork into the Graduate Coordinator.

The Dissertation

8. A dissertation, to be acceptable, must contribute something useful to the general fund of knowledge in atmospheric sciences. It should be considerably broader in scope than a master's thesis and should present an exhaustive analysis of the problem under consideration. A useful guide is that a dissertation should comprise material for a minimum three publishable papers.
9. The Department will accept dissertations which include published/publishable papers in the format described in Appendix A of *A Manual for Theses and Dissertations*, but acceptance is contingent upon written agreement to this format from the student's Major Advisor.
10. Upon successful completion of the Final Dissertation Defense Examination, the student must submit the dissertation electronically for forwarding to the library of the University of Arizona and to University Microfilms, Inc. The Department requires a third copy of the approved dissertation and abstract for its library.
11. The dissertation **must** comply with all formatting requirements. The Format Check Process is available on the Graduate College website <http://grad.arizona.edu/academics/degree-certification/diss-theses/format-check-process>.
12. The student must submit draft copies of the dissertation to their Graduate Committee at least one (1) month before the Dissertation Defense.
13. Both copies of the dissertation submitted to the Graduate College Degree Certification will be delivered to the UA Library by GDC. Dissertations are published by University Microfilms in Ann Arbor, Michigan, and a fee is charged to cover this expense. Upon certification by the student's Major Advisor, members of his/her examining committee and the Dean of the Graduate College, one copy of the dissertation will be forwarded to University Microfilms, along with the Agreement form. The second copy of the dissertation remains in storage at the UA Library.
14. Publication by microfilm does not preclude publication by other methods later, and successful candidates are urged to submit dissertation material for publication in a scholarly or professional journal. Suitable acknowledgement must always indicate the publication to be a dissertation, or portion of a dissertation, submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at The University of Arizona.

Minor Degree Program in Atmospheric Sciences

1. Students from other departments who wish to Minor in Atmospheric Sciences must complete 12 credits of atmospheric sciences at the 500 level or higher of which three units must be from ATMO 536a. The other 9 graduate units are to be chosen from any of the ATMO electives whose home department is ATMO. Any pre-requisites for electives must be satisfied before the electives are taken. The written examination may be waived by the student's Minor Committee if an average GPA of 3.5 is achieved for all 4 courses. Otherwise students may be required to take a written minor exam.
2. Students minoring in ATMO must arrange with the Director of Graduate Studies to select a Minor Advisor for their Doctoral Committee. The Minor Advisor is required to sign off on the minor "plan of study" to ensure an appropriate program is selected.
3. A student entering the doctoral program in Atmospheric Sciences with a Master's degree in another field is permitted to minor within the Department, subject to the approval of the student's Graduate Committee or the Director of Graduate Studies. These courses are in addition to those required for the doctoral program. Subject to the approval of the student's Graduate Committee, the student can take up to six (6) credits of minor courses in other departments that relate to his/her area of research.

Special Notes

1. Please become familiar with the Departmental forms and procedures located on the ATMO website, as well as the Graduate College forms located in GradPath forms accessed through your UAccess Student.
2. Validation of work by examination is not permitted. No courses taken by correspondence can be used for graduate credit.
3. The cumulative grade point average required for granting the Ph.D. degree is 3.000, based on A = 4.000, B = 3.000, C = 2.000, D = 1.000, and E = 0.000.
4. The grades of D and E do not carry graduate credit, but are included in the grade-point average.
5. The grades of S (Superior) and P (Passing) given for ATMO 920 are not included in the overall grade point average, but are included for graduate credit.