Masters of Science (M.S.) DEGREE
Departmental REQUIREMENTS

(Updated 5/29/13)
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Note: This document is meant to guide the student through the complicated path of obtaining a graduate degree. It is not to be regarded as a legally binding contract. If you have any questions please ask.

**Dr. Elizabeth Ritchie, ATMO Director of Graduate Studies**  
**Lupe Romero, ATMO Graduate Coordinator**  
**Frank Whitehead, Degree Counselor**
General Requirements

1. Students seeking an M.S. degree in Atmospheric Sciences must complete 33 units of graduate credit.

* 24 units of graduate course work in their major field of study
* 3 elective units of graduate-level course work
* 3 units minimum of research (ATMO 900/910)
* 2 units ATMO seminar (ATMO 596A)
* 1 unit additional course (e.g., could be 1 additional unit of research)

33 total credits

a. Students are required to take 24 units of graduate course work 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 12 additional units of course work in Atmospheric Sciences at the 500/600 level.

b. Three elective units of graduate-level coursework are required and can be taken in ATMO or any other department at the University of Arizona.

c. Students are required to take a minimum 3 units of ATMO 900/910 for research credit and may take a maximum of 4 units for credit.

d. Students are also required to take a minimum of 2 credits of seminar (ATMO 596A). These credits are graded S, P, and K, and do not count toward the student’s overall GPA.

Typical Master’s Program:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall: Year 1</strong></td>
<td>ATMO 541A</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO 551A</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO XXX (elective)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring: Year 1</strong></td>
<td>ATMO 541B</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO 551B</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO XXX (elective)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Fall: Year 2</strong></td>
<td>ATMO XXX (elective)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO XXX (elective)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO 900/910 (Research/Thesis)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>ATMO 596A (Seminar)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Spring: Year 2</strong></td>
<td>ATMO XXX (elective)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ATMO 900/910 (Research/Thesis)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>ATMO 596A (Seminar)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td></td>
<td>33</td>
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</tbody>
</table>
2. During the first semester, the student should select a Major Advisor to chair their committee. The student and Major Advisor then select the Master's Committee members for the student. A Master's committee must consist of a minimum of three members: the Chair (Major Advisor) and two UA Faculty members. At least two members must be tenure-track faculty. If the third member is not a tenure-track UA faculty member, he or she must be approved by the Graduate College as a special member. A member who is not tenure-track will not be eligible to serve as sole chair of the committee but can serve as co-chair if approved to do so by the Graduate College.

3. By the end of the second semester, the student and the Major Advisor 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. The student must complete the Application to Transfer Coursework form through GradPath Forms, accessed through your UAccess Student.

b. A maximum of six (6) semester hours of transferred credit may be used to meet degree requirements.

4. Students must meet the following minimum residence/enrollment requirements:

a. A minimum of 12 credits of work must be done in residence at The University of Arizona. The remaining credits required for the master's degree must be met by University credit, graduate-level courses, including on-campus courses, courses offered away from the main campus, and approved thesis credit in absentia.

b. Without Assistantships: Students must enroll with a minimum of nine (9) units of graduate credit each regular semester.

4. With Assistantships: Students must enroll with a minimum of six (6) units of graduate credit each regular semester.
5. Students who wish to enter the doctoral program upon completion of their master's degree must take the **Qualifying Examination** in November/December of their second year (3rd semester) with a second chance in January (within 8-10 weeks). The students must have met all core course requirements with an average 2As and 2Bs in order to take the qualifying exam. Failure to either take the exam or to pass the exam after two attempts means that students may not advance into the doctoral program (Refer to the following section entitled “Qualifying Examination”).

6. Students who have not received an average grade in their core courses of 2 As and 2 Bs, or the transferred equivalents thereof, may be required by their Major Advisor to take a written **Supplementary Examination** covering those core courses where the deficiencies occurred. The supplementary exam would be taken during the last semester of course work of the master's degree (Refer to the following section entitled "Supplementary Examination").

7. After finishing all course requirements, students must continue to register each Fall and Spring for a minimum of 3 graduate units until all degree requirements are met. If the degree program requirements are to be completed in the summer, the student must register for a minimum of 1 unit of graduate credit during that term. If all course work is completed, the student may enroll in ATMO 900 or ATMO 910.

**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 Graduate Coordinator for more information.

8. At the discretion of each student's Master's Committee, either a thesis or a scholarly paper on an original **research topic**, judged to be suitable by the student's Master's Committee, must be submitted (Refer to the following section entitled "Research Topic").

   a. A student planning to submit a thesis is required to enroll in ATMO 910 in their final semester with a minimum 3 credits.

   b. A student planning to submit a scholarly paper is required to enroll in ATMO 900 in their final semester with a minimum 3 credits.

   c. A maximum of four (4) credits of 900/910 are counted toward the degree.

9. 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 as an undergraduate or graduate student.

10. All students, at the discretion of each student's Major Advisor, will be required to present the results of their research in a formal seminar or presentation at a scientific meeting.
11. When the student’s Major Advisor and committee members approve that the student has completed all degree requirements, then the Major Advisor will contact the Graduate Coordinator to process a Master’s Completion Confirmation.

12. **Advancement to the Ph.D. program:** A student must have received an average grade of at least 2 As and 2 Bs in the four core courses at the master’s level and passed the Qualifying Exam in order to advance into the doctoral program. A student with less than that must have their advisor petition the faculty for a waiver before they can continue. Qualified students who have completed the master’s degree in this Department and who wish to continue in the doctoral program must submit a Request for Change of Degree Program form. See the Graduate Coordinator for assistance.

   a. When the form is presented to the Department Head for signature, the student's performance in research and course work will be evaluated by the Department's faculty members. The faculty will then recommend whether the student should or should not be permitted to enroll in the doctoral program in atmospheric sciences.

   b. A student who must take the supplementary master's examination (see The Supplementary Examination section) must obtain a B or better (and have the required minimum 2As and 2Bs in core courses) to be considered for continuation as a candidate for the doctoral program. Such a student would be required to pass the Qualifying Examination in their first semester in the doctoral program.
The Qualifying Examination

1. The Qualifying Examination is required of any student who wishes to continue into the doctoral program. The examination tests the student's breadth of knowledge in the general field of study. It is administered in November/December of every year as required.

2. All Masters students who wish to take the Qualifying Examination will take the exam in November/December of the second year (i.e., 3rd semester) after all core courses have been completed, with a second chance the following January (within 8-10 weeks). Students will be notified of the date of an upcoming examination.

3. Students who wish to take the Qualifying Examination must notify the ATMO Graduate Coordinator no later than September 15 by completing the departmental Qualifying Exam Form as your intent of taking the examination the following November/December.

4. The Qualifying Examination will test breadth of knowledge in the subject area. Representative class syllabi and reading lists are available from the Graduate Coordinator. This exam will comprise of 3 hours of questions, each 10-20 minutes long. Normally, 4 hours will be allowed to finish this exam. Each question will be graded PASS or FAIL. Passing more than half of the questions offered is 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 pass the Qualifying Examination in order to advance into the doctoral program after completion of their master's 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 advance into the doctoral program, and shall finish up their master's degree.
The Supplementary Examination

1. The Supplementary Examination is required when a student has received a grade of C or lower in one or more of the required ATMO core courses, or the transferred equivalents thereof. The supplementary examination will cover those core courses where the deficiencies occurred.

2. All students required to take a Supplementary Examination will be expected to take the examination during the last semester of course work required for the master's degree (normally the 4th semester).
   a. The examination will be offered twice a year, usually late in the Fall and Spring semesters.
   b. Students who are required to take the Supplementary Examination must notify the Graduate Coordinator no later than September 15 (for the Fall examination) and no later than February 15 (for the Spring examination).

3. An oral examination, between one to two hours long, may also be required of individual students whose performance on the Supplementary Examination is considered marginal. If an oral examination is required, it will normally be given within a week of the Supplementary Examination.
   a. The oral examination, when required, will cover the core courses focusing especially on those subject areas on where the student demonstrated weakness in the Supplementary Examination.

4. A grade of B or better on the Supplementary Examination is considered passing, but is not to be considered as an automatic advancement into the doctoral program.

5. A student who fails these examinations is expected to petition to take them a second time, normally after a lapse of one (1) semester.
The Research Topic

1. The choice of a research topic is one of the most important decisions confronting the student. The guidance and advice of the student's Major Advisor should help in making the decision. Although there are no specific rules, the following principles may be helpful:

   a. The problem should require the use of material covered in at least some part of the graduate course program.

   b. Although master’s-level research is carried out under the close supervision of a faculty member. Some element of originality on the student's part should be involved. In other words, the problem itself may be new, or a new approach or new method of analysis may be applied to an old problem.

   c. The problem should be carefully limited in scope. A thorough piece of work on a small problem is generally satisfactory, while a sketchy development of a large problem is not generally acceptable.

   d. The research problem cannot be secret or classified in the military sense.

   e. Except in certain special cases, collaboration of two or more students on one thesis is not allowed.
The Thesis

1. The Graduate College has prepared a detailed Manual for Theses and Dissertations for use by graduate students at http://grad.arizona.edu/academics/degree-certification/diss-theses/manuals. To be accepted, all theses must comply with these instructions.

2. In general, a thesis should be written in as concise a manner as possible, never exceeding a few tens of pages in length. A lengthy, "padded" manuscript will not be accepted. Note, also, that responsibility for adequate writing standards rests with the student.

3. Each student should be aware that all members of their Master’s Committee must read the thesis and approve it prior to its being accepted by the Department. Therefore, the student must allow ample time for their master’s committee to accomplish this prior to the student’s proposed graduation date which may otherwise be delayed if the student fails to do so. The Department requires a minimum of two weeks before the end of the semester.

4. A copy of the final approved thesis must be provided to the Department.

5. Neither the Department nor the Graduate College requires that the thesis be submitted to the Graduate College. Should the student choose to submit their thesis to the Graduate College, two (2) copies of the completed thesis, conforming to the requirements of the Graduate College and approved by the Department, and an abstract of 150 words or less must be deposited with the Dean of the Graduate College at least 15 days before the date on which degrees are awarded.
   a. A thesis fee is paid to the University Cashier to cover the cost of microfilming which becomes the archival copy in the UA Library.
The Scholarly Paper for Publication

1. An alternate procedure for satisfying the master’s research requirements, one preferred by most students, is to write a paper that is judged by the student's Master's Committee to be acceptable for publication in a scientific journal.

2. Such a paper is generally much shorter in length than the usual master’s thesis and must be written in accordance with the format of the U.S. journal to which it will be submitted. The student's Master's Committee will not normally judge a paper to have satisfied the master's requirement until this procedure has been followed.

3. Graduate students are expected to write clear and logical accounts of their work in the English language. The Master’s Committee may reject a manuscript that is poorly written. The best way a student can learn to write an acceptable paper is through practice, coupled with a careful review of papers on a similar topic that have appeared in the literature. Detailed derivations and explanations are necessary only when they are original and do not appear elsewhere. Another option to improve writing is by attending the Graduate Writing Institute offered in June for three weeks, see their website for further information at http://grad.arizona.edu/gwi or attend Graduate/International Writing Workshops offered each semester by the Writing Skills Improvement Program, http://wsip.arizona.edu/workshop-series.

4. Figures should be limited and carefully selected for information content. Generally, there should not be more than one figure per typewritten page.

5. Although the requirement states that the paper has only to be suitable for publication and not actually submitted for publication, the latter is implied. It is certainly to the student's advantage to have a paper published, especially if s/he plans to make a career 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. Full graduate credit will be given to graduate courses taken no more than six (6) years before the completion of degree requirements. Course work more than 6 years old will not be accepted toward meeting the degree requirements.

3. Validation of work by examination is not permitted. No courses taken by correspondence can be used for graduate credit.

4. The cumulative grade point average required for granting the master's degree is 3.000, based on A = 4.000, B = 3.000, C = 2.000, D = 1.000, and E = 0.000.

5. The grades of D and E do not carry graduate credit, but are included in the grade-point average.

6. The grades of S (Superior) and P (Passing) given for ATMO 900/910 and ATMO596A are not included in the overall grade point average, but are included for graduate credit. In special circumstances, grades of C, D or E may be given for ATMO 910; such grades will be used in computing the overall grade point average.

7. Students who change their plans regarding submission of a thesis versus a manuscript must proceed as follows:

   a. To change from manuscript to thesis, students should enroll in 3 credits of ATMO 910 in their final semester. Nothing else needs to be done.

   b. To change from thesis to manuscript, students should enroll in ATMO 900 in their final semester for a minimum 3 credits. ATMO 910 credits must be deleted from the Plan of Study when the Completion of Master’s Degree Requirements form is submitted to the Department Head for signature.