THE UNIVERSITY OF ARIZONA®

ATMOSPHERIC SCIENCES

UA SCIENCE

The Accelerated Master's Degree in Atmospheric Sciences

Departmental Requirements

(Updated 8/18/13)

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BASIC INFORMATION

Overview and Timeline

The Accelerated Master's Program (AMP) in ATMO is a program designed to enable advanced UA undergraduate students to complete both the Bachelor of Science degree ***in Physics*** as well as the Master of Science degree in ATMO in a total of 5 years. This program is currently only available to students who are doing a Bachelor of Science in Physics. This program is not open to students who have completed a Bachelor's degree or an advanced degree from another institution.

AMP students focus on completing undergraduate-level courses their first three years. By the midpoint of the junior year (December 1st), students must submit an application to the AMP program. After acceptance to the Accelerated Master's Program (in late December), students register to take PHYS436a during the Spring of their third year, and then a combination of undergraduate and graduate courses during the fourth year to complete their Bachelor's degree. During this time, students complete both undergraduate and graduate courses, and begin to develop their research ideas in preparation for graduate-level research. In the fifth and final year, students focus on graduate course work and their research-based thesis in order to complete the requirements for the Master's degree.

The AMP program is unique in that it permits students to apply up to 12 units of 500-level coursework towards both the Master's and Bachelor's degrees. Hence, the program essentially allows undergraduate students to start on their Master's degree early, before they graduate with their Bachelor's degree. Due to this arrangement, it is imperative that AMP students meet with the ATMO Graduate Director as soon as possible upon acceptance to the program in order to review the steps they need to take to progress effectively through the program. Students must understand that a very strict order of courses must be taken in order to be able to complete the AMP in 5 years. As per College of Science requirements, failure to meet deadlines during the AMP will result in the student being ineligible for graduate assistantships.

Who should pursue the AMP?

The AMP is well-suited for students who wish to pursue courses in atmospheric sciences at the graduate level and for students who wish to move into a career in the atmospheric sciences.

Eligibility Criteria

To be considered eligible to apply for the AMP in atmospheric sciences, students must:

- Be a continuing University of Arizona undergraduate
- Have a minimum cumulative GPA of 3.3
- At the time of application, have completed a minimum of 75 units of undergraduate course work; a minimum of 12 undergraduate units must have been completed in the student's major at University of Arizona's main campus
- At the time of acceptance into the program, have no more than two semesters of undergraduate course work remaining to complete before being granted the Bachelor's and have fulfilled required components of the AMP curriculum to date.
- Demonstrate the maturity necessary to succeed in an accelerated, highly-competitive program.

UA Graduate College's Policies Regarding the AMP

Students will be considered undergraduates until they complete their undergraduate requirements, which should be no later than the end of their fourth year. Students must take at least 12 of their graduate credits while in graduate status. In other words:

- During years 1-3 (or approximately 0-90 credits) students will be taking undergraduate coursework and charged at the undergraduate rate.
- Once admitted to the AMP, they may take up to 12 units of graduate coursework during the senior (or transition year), which may apply toward both the bachelor's and the master's degrees. Students will be charged at the undergraduate rate and retain eligibility for undergraduate scholarships.
- After completion of all bachelors' requirements, students will be granted graduate student status, be charged at the graduate rate, and be eligible for graduate assistantships.
- Should a student have completed 12 graduate credits, but not yet completed the undergraduate degree, they will be considered a graduate student for financial aid and tuition purposes and coded as 'graduate' in UAccess Student. They will no longer be eligible for undergraduate scholarships. Nor will they be eligible for graduate assistantships.
- At least 12 graduate credits must be taken while in graduate status, after completing all degree requirements for the bachelor's. A total of 33 graduate credits should be taken as described in the ATMO Master of Science Handbook.
- Students should be encouraged to complete their undergraduate requirements as soon as possible, but not later than one semester before receiving their master's.

Applying to the AMP

During the Fall semester of the third year, students will need to officially apply to the Department of Atmospheric Sciences for entrance to the AMP at the UA Graduate College's website at https://apply.grad.arizona.edu/users/login .The deadline for applicants is December 1st and students will be notified by December 31st whether they have been accepted into the program.

Registering For 500-Level Courses as an Undergraduate

Before AMP students have completed their Bachelor's degree, they should register for 500-level courses using an Undergraduate Enrollment in Graduate Courses form (http://grad.arizona.edu/system/files/Undergrad_Enrollment.pdf). Students are to mark that they wish to receive ***undergraduate credit*** for their course work, obtain instructor permission, and have the ATMO Graduate Director sign off on the form before submitting it to the Graduate College and then finally to the Registrar's Office. One form must be used for each semester students wish to register for graduate level courses. Up to 12 units of these courses will be used to apply towards both the Bachelor's degree and the Master's degree.

Research

AMP students should have a research advisor who is either an ATMO tenure-track, joint, or research faculty member. The research project should be started during the student's fourth year and can be taken as a required undergraduate research elective. The research that a student conducts during his or her time as an undergraduate must serve as a foundation upon which the Master's research will be built.

Hence, it is preferable that student's undergraduate research advisor will continue as the student's research advisor, and that the student's thesis/manuscript will be a culmination of the research that the student has done throughout his or her time as an undergraduate and graduate student.

THE FIRST YEAR OF THE ACCELERATED MASTER'S PROGRAM

Curriculum

Students seeking a master's degree in atmospheric sciences must complete 33 units of graduate credit. Twelve units of required graduate core course work should be taken during the student's fourth year of study. These include:

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

The following should be taken during the fifth year of study:

- At least 12 additional units of coursework in atmospheric sciences at the 500/600 level, 3 of which can be ATMO 599 – independent study
- Three elective units of graduate-level, which can be taken in any department at the University of Arizona
- A minimum of three units of ATMO 900/910 for research credit (4 credits maximum)
- 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
- The final credit is at the discretion of the student and can be 1 unit of ATMO 900/910

The minimum total of 33 graduate units, including the Master's research topic and at least 24 regularly graded units of course work, must be completed with a minimum cumulative GPA of 3.000 in order for a student to be granted the Master's degree. In addition, a minimum grade of "B" must be achieved on all core courses in order to be granted the Master's degree. Instructions for steps to be taken if a "C" is achieved on a core course are available in the ATMO Master of Science Handbook. If the student wishes to pursue a doctorate in ATMO, then different standards apply and the minimum requirements for coursework during the Masters should be confirmed in the Master of Science Handbook.

Advisor and Creating a Master's Committee

Once accepted into the AMP, the students' first priority is to find a Research Advisor who will guide the student in selecting elective courses and help them put together their draft Plan of Study. The Advisor will also help to select the student's committee and will serve as the student's Master's Committee Chair.

Next Steps

All subsequent steps toward the completion of the B.S part of the AMP are as per the Department of Physics. Students should consult with the Physics undergraduate Advisor to ensure all requirements for that degree are met.

THE SECOND YEAR OF THE ACCELERATED MASTER'S PROGRAM

Registering for Graduate Courses as a Graduate Student

Once students have been officially accepted by the UA Graduate College as Master's students, they may register for graduate courses through UAccess Student.

Finding Funding for the Second Year of the AMP

In preparation of conversion to graduate student status, students may wish to inquire about funding opportunities, as undergraduate scholarships may not be applied towards graduate standing and funding generally not provided for Master's students. AMP students should contact Dr. Elizabeth Ritchie, the ATMO Graduate Director at ritchie@atmo.arizona.edu regarding any opportunities for teaching assistantships. In addition, students should talk to their Research Advisors for possible research assistantships.

Should an arrangement be made for students to be a teaching assistant, they must complete the Graduate Assistants in Teaching Orientation (GATO) before teaching, and the Teacher Assistant Training Online (TATO). For more information, please visit http://grad.arizona.edu/ta.

Full-Time Status

Full-time status as a graduate student is defined in any of the following ways:

a) Taking 9 units of graduate credit
   OR
b) Taking 6 units and holding a teaching or research assistantship

Satisfactory Academic Progress

In order to remain in good academic standing, students must maintain a cumulative GPA of 3.000 or higher. If a student's cumulative GPA falls below 3.000, then they will be placed on probationary status. If in the following semester, the student is not able to regain a 3.000 or higher GPA, they will be converted to non-degree seeking status by the UA Graduate College. At this point re-admission to the AMP may be possible at the discretion of the ATMO department.

Submitting the Plan of Study

Once a student has completed their undergraduate degree, the student will be officially accepted to the UA Graduate College as a graduate student, and they must complete their Plan of Study (POS). AMP students will submit their POS during the Fall semester of their fifth year. 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.

The Research Topic

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.

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.

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.

Graduation

Students are welcome to participate in the College of Science Commencement Ceremony and/or the University of Arizona Commencement Ceremony. Students will be sent information directly from the Dean's Office regarding the College of Science Commencement; students may find information on the University commencement at http://commencement.arizona.edu/index.html.

Continuing into the Doctoral Program

AMP students planning on continuing into the ATMO doctoral program must reapply to the Graduate College. All doctoral students must pass the qualifying exam in their first semester of the doctoral program. The Qualifying Examination is given during each Fall semester in November/December 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" in ATMO Master of Science Handbook).

CONTACT INFORMATION

Any questions regarding ATMO's Accelerated Master's Program may be directed to:

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Recommended Schedule of Classes for the Entire 5-year Program

Semester 1		Semester 2	
PHYS 161H - Intro Mechanics	4	PHYS 162H - Thermo, Optics	4
MATH 125 - Calculus 1	3	MATH 129 - Calculus 2	3
ENGL 101	3	ENGL 102	3
Tier I Gen Ed	3	Tier I Gen Ed	3
Tier I Gen Ed	3	Tier I Gen Ed	3
		PHYS 105A	1
	16		**17**
Semester 3		**Semester 4**	
PHYS 261H - Intro Elec & Magn	4	PHYS 263H - Mod Phys, Rel	3
MATH 223 - Vector Calc	4	PHYS 321 - Theor Mech I	3
MATH 254 - Intro Diff Eqn	3	PHYS 204 - L Alg, Math Meth	3
Tier II Gen Ed	3	Tier II Gen Ed	3
Elective	3	Elective	3
	17		**15**
Semester 5		**Semester 6**	
PHYS 305 - Comput Phys	3	PHYS 332 - Intermed E & M II	3
PHYS 331 - Intermed E & M I	3	PHYS 436a – Intro Atmo Sci	3
PHYS 381 - Advanced Lab I	2	PHYS 371 - Quantum Theory I	3
Tier II Gen Ed	3	PHYS 382 - Advanced Lab II	2
Elective	3	Tier II Gen Ed	3
	14		**14**
** application to AMP due 1 December* ** notification by 31 December*		** Take required course PHYS 436a*	
Semester 7		**Semester 8**	
PHYS 426 – Thermo & Stat Mech	3	Elective	3
PHYS elective	3	PHYS 472 – Quantum Theory III	3
		Research Elective - ATMO	3
ATMO 541A – Dynamics I	*3*	*ATMO 541B – Dynamics II*	*3*
ATMO 551A – Physical I	*3*	*ATMO 551B – Physical II*	*3*
	12		**15**
		** Bachelor's degree awarded at end of this semester; formal application to Grad College*	
Semester 9		**Semester 10**	
ATMO 599 – independent Study	*3*	*ATMO 900/910 – research/thesis*	*4*
ATMO Elective	*3*	*ATMO Elective*	*3*
ATMO Elective	*3*	*Elective*	*3*
ATMO 596a - seminar	*1*	*ATMO 596a - seminar*	*1*
	10		**11**
** Masters Program of Study due*		** Masters degree awarded end of this semester*	