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AOSC Graduate Student Guidebook

This guide provides AOSC M.S./Ph.D. students with a brief overview of Department organization and student requirements for the M.S. and Ph.D. degree programs. It is a complement to the detailed academic requirements also on our website (www.atmos.umd.edu/education/gradcurr.php).

1. General

AOSC Administrative structure

AOSC is run by the AOSC faculty. The academic (A.K.A. tenure track) faculty have specific responsibility to teach courses, advise students, and serve on academic committees. The research faculty have primary responsibility to manage their research projects. Many AOSC faculty also have appointments in other units, particularly ESSIC, which means that they have responsibilities in those units as well. The Department Chair is appointed by the Dean of CMNS to serve as the head of AOSC (formally the Chair serves the Dean). The Chair organizes AOSC faculty meetings, held typically 5 times a year, where AOSC policies are developed. The Chair also oversees the front office staff, who handle most of your paperwork needs. The Associate Chair has primary responsibility for the teaching program and personally oversees the graduate program.

Advisors

All AOSC graduate students are assigned an academic advisor from among the academic faculty by the Graduate Director upon their joining AOSC. This person is chosen based on the research interests of the student as well as their funding source. In addition, students may have a research advisor who is a member of the research faculty, or perhaps an adjunct faculty member. The former serves as their advocate with the University and should ensure that University rules are satisfied. The latter is primarily focused on research. Students are free to change advisors, of course, but are encouraged to make their transition minimally disruptive and to make sure of any necessary financial arrangements.

Metograds

Metograds (www.atmos.umd.edu/~gcm/) is organized and led by AOSC students. Among its roles is to be a contact point between the graduate students and the AOSC faculty and Chair. It organizes social activities (e.g., parties, Ping-Pong tournament) as well as professional activities (student seminars, participation on Department and University committees, visits to government labs, invitations to seminar speakers, travel to national meetings, etc.).

Classwork

The purpose of coursework is to help the student 1) develop a comprehensive background in AOSC, and 2) develop sufficient background in their specialty area to get started on their research. The CORE courses address the former, while the specialty courses the latter. Students who are unfamiliar with the materials covered by the CORE courses should take them. Students who are familiar with those materials could skip one or more and focus on their specialty area (but please talk to your advisor). Graduate students supported on a Graduate Research

Assistantship are considered fulltime by the University if they register for 4 graduate credits (6 for a TA), however most 1st year AOSC students register for three graduate courses per semester. Discussion of the coursework expectations for particular degrees as well as sample course plans is provided here: www.atmos.umd.edu/education/gradcurr.php.

AOSC Weekly seminars

AOSC is a diverse, interdisciplinary field. AOSC weekly seminars play the critical role of informing faculty and students about developments outside their specialty areas, and thus are a way we develop common intellectual ground. Other benefits for students include providing a chance to meet leading researchers and providing examples of effective (and sometimes ineffective) talks. Students are expected to attend the AOSC weekly seminars.

AOSC Student Seminars

We also require students to give a seminar on their research once a year, and submit an annual report each year summarizing their research progress. In case of unsatisfactory performance, the student's advisor or thesis committee could provide advice for improvements.

Who to talk to in case of trouble

The first person to talk to is your Advisor. Fellow graduate students can also be helpful, but they may be unaware of the rules. The Graduate Program Coordinator is another important source of information. If you have issues that cannot be resolved by talking to your advisor, the Chair is the next person to talk to. If you have an issue that cannot be resolved by the Chair the next step is to talk to the Graduate Student ombudsman. Of course for a really serious issue that needs quick resolution (such as sexual harassment) you should go straight to the campus lawyers and the Dean of CMNS.

2. M.S. Degree

AOSC offers a non-thesis M.S. degree (as well as a separate M.S. degree through Professional Studies, not described here). The M.S. degree is a good option if a comprehensive knowledge of atmospheric and oceanic science is needed, but not such extensive training in independent research. The requirements include:

1. Coursework: Successful completion of a minimum of 30 credits, exclusive of any registration for research, with at least 18 at the 600-level or above. These will normally include the CORE courses unless other evidence (such as passing the Qualifying Examination) demonstrates that the material has been mastered.
2. Scholarly paper/seminar: This is a paper written independent of and in addition to course requirements and is evaluated by your Advisor for style and content. The scholarly paper should follow the format of a research paper (e.g. follow AMS guidelines). It may describe an independent research project (frequently it is the first draft of a manuscript to be submitted for publication), or be a review article. Students are expected to present a seminar related to their scholarly paper.
3. Pass the Comprehensive Examination (described below) at the master's level. We require that the students pass the required core courses before taking the written exam.

4. Maintain an overall grade point of 3.00 (B) or above.

3. Ph.D. Degree

The Ph.D. degree is a research degree. You should get started on your research as quickly and intensively as possible. Successful research needs to be communicated to have impact. Learning to communicate science through talks and papers are key aspects of your education at AOSC.

Qualifying Examination

The first part of the Qualifying Examination is the Comprehensive Examination. We require that the students pass the required core courses before taking the written exam. The second part of the Qualifying Examination is the Specialty Examination, successful completion of which advances the student to Ph.D. candidacy. M.S. candidates only take the Comprehensive Examination.

Comprehensive Examination the Comprehensive Examination is a written examination currently being offered twice a year in January and June[1]. The requirements are somewhat different for the Advanced Special Students. The examination is closed book and typically given over the course of three days. Its purpose is to test AOSC students' broad understanding of the physical and chemical processes important in AOSC, and their ability to integrate this knowledge as well as their background in math, physics, and chemistry. Helpful guidance on topics emphasized is provided separately. Students should bear in mind that since the goal of the Comprehensive Examination is to explore *comprehensive* knowledge questions may extend beyond the narrow guidelines provided. The Examination Committee has provided students with copies of some past examinations.

Each written examination is graded by multiple faculty (with student names redacted). The written examinations and student scores, student performances in their courses, and reports from their advisor(s) are all discussed at a meeting called by the Examination Committee. The Examination Committee oversees a vote of the faculty. The outcome for each student may be:

- Pass of this first part of the Qualifying Examination at the Ph.D. level,
- Pass at the M.S. level,
- Conditional Pass, or
- Fail.

If the faculty identify an area of weakness they may add conditions (qualifications) attached to a pass such as required additional coursework or working as a Teaching Assistant. Students are allowed to take the written examination twice.

Specialty Examination The Specialty Examination normally follows a pass at the Ph.D. level of the Qualifying Examination by about one year. It is conducted as a seminar by the student based on the student's written dissertation prospectus (provided to the Committee in advance) followed by an oral examination run by the Specialty Examination Committee. The oral examination will

[1] The Comprehensive Examination is typically taken after the second or third semester of courses. Normally students are in good academic standing with the Graduate School when they register (with the Graduate Program Coordinator) to take the test.

cover the student's research and can also include questions from weak areas of the candidate's comprehensive exam or questions of a general scientific nature. AOSC requires five members of the Graduate Faculty of which three must be AOSC tenure-track faculty. The Specialty Exam Committee will evaluate the written prospectus (i) quality of presentation: clarity, organization, literature review, figures and tables; (ii) quality of research plan: background preparation, preliminary results, experiment design, possible significance, and timelines to finish; and the oral presentation quality in terms of organization, clarity, general knowledge, and ability to defend. The examination is followed by a vote of the Specialty Examination Committee and a grade of pass advances the student to (Ph.D.) candidacy. Again, the students are given two official opportunities to pass the candidacy exam.

Note of caution: advancement to candidacy must precede the final public oral (Dissertation Defense) by at least six months, but no more than four years.

The dissertation prospectus should not exceed ~15 pages, single-spaced, 12 point font (excluding references, appendices, tables and figures). Elements of the dissertation prospectus may consist of:

1) Abstract of less than 1 page to state clearly what motivates you to do, what preliminary results are, what goal(s) of your study are, and what potential significance you may expect.
2) Introduction of 2-3 pages to provide a literature review appropriate to your research question(s), and to summarize major research achievements, remaining scientific issues or limitations, and your research the questions and/or hypotheses, with goals and objectives. These hypotheses should be well thought and they should be original and testable.
3) Methodology/Data/Tool/Experiment Design of 2-4 pages to describe the methodologies and techniques used to test your hypotheses.
4) Preliminary Results of 3-5 pages to show what you have achieved thus far, and describe what tasks/questions remain to be completed.
5) Work Plan of 2-3 pages to describe realistically what you plan to do in the few years to complete the objectives of your Ph.D. dissertation. Work plans often look too ambitious.
5) Timeline of less than 1 page for completing your work.

Dissertations

The focus of the Ph.D. degree is the dissertation. Many AOSC faculty think of the dissertation as a compilation of multiple research studies (e.g., 3-4) forming individual chapters, with an introduction chapter describing the common theme and a conclusions chapter discussing broader implications and the future of the research. The dissertation needs to be formatted consistent with University rules (gradschool.umd.edu/students/academic-progress/thesis-and-dissertation-filing).

Many advisors expect one or more chapters to have been published with the student as the lead author in the refereed literature prior to defending the dissertation. The reasons for the desirability of this include: 1) it provides additional research community feedback on the quality of the work, 2) it introduces the student to all aspects of the publication process, 3) it introduces the student to some of his/her future colleagues, 4) it provides the student with material that can help with finding his/her first job after graduating, and 5) it helps justify the project for the

funding source. The only downside is that it takes time so the student should get started on this as quickly as possible. We also expect each Ph. D. student to give an oral presentation on his/her research at a conference or workshop at least once.

Defending a dissertation also requires forming a dissertation committee. Frequently (but not necessarily) there is complete overlap in membership between this committee and the Specialty Examination Committee. The dissertation committee is arranged for with the approval of, or by, the dissertation advisor and must 1) have a minimum of five voting members of the Graduate Faculty, including three Full Members, 2) the Advisor should Chair (or co-chair) this committee and should be and a Full Member of the Graduate Faculty, and 3) one member must be a Dean's Representative. The Dean's Representative must be a tenured member of the Graduate Faculty and must be from a tenure home other than AOSC. Frequently AOSC dissertation committees have outside experts from government laboratories or other universities. Outside experts require temporary appointment as special members of the graduate faculty. The dissertation committee must be approved by the Graduate School and is normally submitted to them *at least six weeks* before the defense. Be sure to provide your dissertation committee with a copy of the dissertation at least two weeks in advance of your defense (we suggest talking to each of the committee members about any questions they have about the dissertation after they receive it, but prior to the defense) and announce the date/time and location of the defense to the Department on a similar schedule.