

Department of Applied Physics & Applied Mathematics

Oral Examination and Thesis Proposal

After passing the written Qualifying Examination a doctoral student is required to take and pass an Oral Examination and a Thesis Proposal Evaluation in the same specialty area (Plasma Physics, Solid State and Optical Physics, Applied Analysis, Computational Math, Materials Science, Medical Physics, or Atmospheric Science) as was taken on day two of the qualifying exam, and which is expected to be the student's research area. (If a student's research direction changes after passing the written qualifying exam, the oral examination and the thesis proposal will be in the new research area.) The exact format of these exams is determined by each academic program committee. Students are encouraged to discuss how to best prepare for these exams with their research advisor. All students must pass both the Oral Exam and the Thesis Proposal in order to continue to pursue doctoral studies.

A: A doctoral candidate who passes the written qualifying examination in May of Year 1, must pass the Oral Examination by May 1 of Year 2. A candidate who passes the Oral Exam by May 1 of Year 2, must pass the Thesis Proposal by May 1 of Year 3. (The Oral Exam and Thesis Proposal Evaluation must be taken for the first time no later than March 1 of Years 2 and 3, respectively.)

B: If a candidate passes the written qualifying examination on the second try (in May of Year 2), he/she must pass the Oral Examination by February 1 of Year 3 and the Thesis Proposal by May 1 of Year 3. (He/she must take the Oral and Thesis Proposal Exams for the first time no later than November 1 and March 1, respectively, of Year 3.)

The three members of the Oral Examination Committee and of the Thesis Proposal Committee are chosen by the Chair of the doctoral program and the thesis advisor. Usually these Committees are comprised of APAM faculty members and include the student's thesis advisor. If the student's advisor is not an APAM faculty member, the Department will appoint an internal co-advisor. In this case, both the advisor and the APAM internal co-advisor will serve on both committees. In all cases, at least one APAM faculty member must be present. Ideally, all three persons should be suitable for serving on the student's dissertation defense committee, which must have 3 APAM and 2 outside members. The student will initiate the scheduling process for each exam with the department, and then will be notified of the date of each exam and who will comprise the examination committee.

• Plasma Physics

The Oral Examination is an examination of the student's knowledge of basic plasma physics.

Thesis Proposal: This exam is a presentation and subsequent examination on the student's intended dissertation topic. Five days before the date of the exam, the student will distribute to the members of the examination committee a short written outline of his/her intended thesis research topic. This outline should include which area of plasma physics is to be studied, how the student intends to proceed with the research, and a brief survey of pertinent references in the literature. At the examination itself the student will begin by presenting a short talk (approximately 15 minutes) on the chosen thesis topic, including a discussion of plans needed to proceed, what preliminary results, if any, have been obtained, and giving special emphasis to what new and original plasma physics questions this research will address.

- **Applied Mathematics**

The Oral Exam is an examination of the student's general knowledge of applied mathematics.

Thesis Proposal: No later than five days before the date of the exam a student will provide all committee members with an extended abstract of his or her thesis topic, which need not be in full-sentence prose, but can take the form of an annotated outline of 10-20 pages. This outline should describe which area of applied math is to be studied, how the student intends to proceed with the research, any preliminary results which may have been obtained to date, and a brief survey of pertinent references in the literature. At the exam itself, the student will begin by presenting a short talk (approximately 30 minutes) on the chosen thesis topic, including a discussion of plans needed to proceed and what preliminary results, if any, have been obtained, giving special emphasis to what new and original scientific/mathematical questions this research will address. The committee will then question the student, with 20 minutes of questioning allocated to each committee member. Questioning will cover a) the student's presentation and thesis outline b) the student's general knowledge of applied mathematics, with an emphasis on those aspects which are most relevant to the student's research, and c) if appropriate, disciplinary knowledge from the application area to which the student's research is relevant.

- **Solid State and Optical Physics**

Oral Exam: This exam is comprised of basic questions in the field of specialty (OLP or SS). These questions will be suggested from the "4000" level courses normally recommended for written qualifying examination preparation in the given specialty area.

Thesis Proposal: At least five days before the date the student distributes a one-page summary or outline of his/her proposed work to each committee member. The exam itself starts with a thesis proposal presentation lasting approximately 15 minutes. The exam continues with specific questions on the thesis proposal and related physics.

- **Materials Science & Engineering**

Oral Exam: The candidate's understanding of basic materials science issues, as presented in the 4000-level courses, will be examined. The candidate is expected to demonstrate competence in core subject areas.

Thesis Proposal: Five days prior to this exam the candidate will provide each committee member with a two-page abstract, including two or three literature references. The exam itself starts with a short presentation, lasting no longer than 20 minutes, in which the candidate describes the proposed doctoral research. The proposal must provide concise descriptions of the topic to be addressed by the research, the relevance of the topic to technology, previous work on the topic by other investigators, the experimental or theoretical methods to be used in its study, preliminary experimental / theoretical results if available, and a preliminary experimental / theoretical plan. The candidate must convey above all what is new and unique about his proposed research. In the subsequent examination, the candidate must demonstrate a good understanding of all components of the proposal: relevance, context, methods, results, and plan.

- **Examinations in Atmospheric Science should be discussed individually with Professor Polvani or Professor Sobel.**

Examinations in Medical Physics must be discussed individually with Professor Noyan.

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Evaluation Procedures by the Department

Every doctoral candidate will receive a written evaluation of his/her progress at the end of each academic year.

In May, Year 1, you will receive notification of the results of the written Qualifying Examination.

In consultation with your advisor and members of the examination committees, the Chair of the APAM Department will provide you with written notification of your progress in May of Years 2-x. This evaluation letter states that you have been making either satisfactory or unsatisfactory progress toward the Doctoral degree. Your progress can be judged unsatisfactory if you have not passed the oral exam or the thesis proposal in time or if you have not been making satisfactory progress in your thesis research.

If your performance has been judged unsatisfactory for two years in a row, you must leave the program. (Please speak with your faculty advisor long before you get to this stage. No one should be judged unsatisfactory for two consecutive years!)