

MSEG Qualifying Exam Policy

APPROVED 11/27/2018

Purpose

MSEG Ph.D. students follow a curriculum that includes both required “core” courses and technical electives. Student mastery of the content presented in these courses is assessed through the course exams and grades, enforced by the minimum GPA (3.0) requirement for continuation in the Ph.D. program. The purpose of the qualifying exam is to assess students’ ability to 1) synthesize the knowledge gained from separate courses and 2) apply that knowledge to a) understand the background of the research problem they will pursue and b) propose an informed and feasible approach to addressing open scientific questions. In so doing, students will demonstrate that they have mastered the scientific foundations of their dissertation research topic and that they are prepared for increasingly independent research. The qualifying exam therefore serves dual purposes: it both determines whether a student is prepared to conduct PhD-level research and also allows the committee to review the proposed work.

Format

The MSEG Qualifying Exam has two parts: a written paper and an oral presentation. Both are evaluated by the student’s exam committee.

Exam committee composition: The dissertation committee is chaired by the student’s primary advisor and must include at least two (three if the advisor does not have a primary appointment) other professors with primary appointments in MSEG (i.e. at least three professors with primary appointments in MSEG in total) and at least one external member, who should be a professor from another department or other Ph-D scientist/engineer who is not primarily appointed in the MSEG department. External committee members are expected to respect the dual role of the examination as a proposal defense (in which they are expected to take an active role) and as the exam for qualification to doctoral candidacy, which should be based on departmental standards and expectations. Additional members, for example Ph.D.-level technical staff, corporate collaborators, and professors from other institutions, are welcome. Students are expected to work with their advisor to identify potential members of the dissertation committee who are familiar with the research topics to be considered and thus able to provide maximally-useful feedback. The examination committee for the qualifier is intended to be the same as the dissertation committee, but the membership of the committee can change between the qualifier and the conclusion of the PhD if such a change is warranted.

Students contact these potential members of the committee with a tentative timeline for the qualifying exam and ask if they are willing to serve on the committee. Once the membership of the committee is confirmed, students circulate potential dates and times to secure an exam time that will work for the entire committee. Students then request assistance from the MSEG department office to secure a conference room for the exam time. Reservations should be made for two hours.

Written paper: The written paper, which serves as a dissertation proposal, is prepared by the student. The student’s advisor should review the paper to ensure that it conforms with these requirements and may offer constructive feedback to the student. After this review, the paper

should be sent to the student's dissertation (exam) committee at least two weeks before the date of the qualifying exam. The paper should be no longer than 12 pages in length (single space, 12 pt font, Times New Roman or equivalent) including figures. Substantial references, demonstrating that students are familiar with the background literature in the field, should be included in the paper and are not included in the 12 page maximum. References should be in a standard format that complies with NSF guidelines (complete list of authors, title included, etc.)

The paper must include the following sections:

- Introduction and Motivation explaining the importance of the research problem
- Background summarizing the scientific foundations and important prior work in the field.
- Statement of the Research Problem that will be the focus of the student's dissertation research, including a statement of hypotheses to be tested.
- Proposed Approach describing the methods to be employed in conducting the research. This section should include citations to references that established the techniques to be employed and a description of why these techniques are appropriate for the proposed research.
- Timeline of the proposed research
- Progress to Date describing the student's efforts on the project thus far. Demonstration of substantial progress and/or results is not required.

Additional sections as appropriate to the proposed topic and field are welcome.

Oral Presentation: The student should prepare an oral presentation with slides. The slides should cover all of the required sections of the written paper and should include a final slide with a tentative project timeline. The presentation should be designed to be 30 minutes in length if delivered without interruption. Students should expect frequent interruptions to discuss the slide content and to probe the student's knowledge of the material presented and how it relates to underlying scientific principles. To ensure the examination adequately tests the student's ability to synthesize knowledge from courses and apply it to a research project, examiners are free to ask questions about any scientific topic related to the proposed project, including topics covered in either the written paper or oral presentation. All background knowledge probed should be germane to the proposed project. Exams typically take between 90 and 120 minutes. This should include a hard stop at least 10 minutes prior to the end of the examination to permit time for the faculty to deliberate without the student in the room.

Evaluation Criteria

Students will be evaluated according to the following criteria:

- Has the student demonstrated the ability to integrate foundational material and concepts in order to understand the scientific foundations of the research problem?
- Does the student understand the scientific underpinnings of the approaches to be employed?
- Has the student demonstrated knowledge of the important prior results in the field?
- Has a clear research problem or objective been identified and clearly explained?
- Does the proposed approach describe a feasible path to addressing this research problem?

Based on these evaluation criteria, the committee shall form a consensus on whether the student Passes, Passes Provisionally, or Fails the examination. Feedback should be provided to the student. A “Passes Provisionally” shall entail whatever provisions and timeline the committee deems necessary to address the shortcomings that resulted in that outcome. The advisor is responsible for ensuring these provisions are met and shall notify both the student’s committee and the graduate program director in writing how the provisions were met. In the event a student fails the examination, s/he should be explained the reasons for the failure. The student shall, at the discretion of his/her advisor, be permitted to retake the exam one additional time within six months.

Timeframe

Students are expected to demonstrate the ability to understand the content of both core and technical elective courses and to apply this knowledge to the research problem of their dissertation. For this reason, qualifying exams should not be taken before students have completed the relevant courses. Moreover, students are often better able to synthesize course and background material in the context of the research project after spending several months working on the problem. For this reason, qualifying exams are typically taken after the student’s third semester in the Ph.D. program (e.g., no earlier than January of a student’s second year in the Ph.D. program). Substantial research results are not required. The qualifying exam provides the opportunity to receive valuable feedback from the dissertation committee. For this reason, a student (with consent of his/her advisor) who wishes to delay the qualifying exam past the beginning of a student’s third year in the Ph.D. program should submit a written explanation of the reason for the delay and the expected timeline for the exam to the graduate committee with at least two months’ notice. After considering this request, the graduate committee, led by the graduate program director, will inform the student of their decision to approve/decline this request within two weeks.

Students should work with the graduate program coordinator to ensure that the timing selected meets constraints set by pre-candidacy credits. Students should register for MSEG 964 the semester in which they intend to complete the examination. Students who register for MSEG 964 within the fall semester have fall and winter to complete the examination. Students who register in spring semester will have spring and summer to complete the examination. The graduate program coordinator will ensure students have all the logistical information they need for the qualifier, including the forms below.

Attachment: Forms Needed

The forms needed for the qualifier are:

1. The University form: “Recommendation to Candidacy”
http://www1.udel.edu/gradoffice/forms-new/Doctoral_Degree_Recommendation.pdf

Complete Section 1 and ask each of your Committee Members to sign in section II at the time of your exam. Print your Committee member’s names on the lines in Section III. The signed document is to be returned to the graduate program coordinator.

2. MSEG Department form (attached). This should be brought to the examination to be completed by the committee at their option.

**MATERIALS SCIENCE AND ENGINEERING
Ph.D. QUALIFIER EXAMINATION REPORT**

NAME: _____

PASS PASS-PROVISIONAL FAIL

WRITTEN REPORT: Satisfactory Unsatisfactory

GENERAL

PERCEIVED STRENGTHS

PERCEIVED WEAKNESSES

RECOMMENDATIONS