



A. JAMES CLARK
SCHOOL OF ENGINEERING

Department of Mechanical Engineering

Graduate Handbook

2020-2021

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Committee.

Other Requirements

The thesis requirements, the Graduation Paperwork and timeline for the M.S. Degree in Reliability Engineering are the same as those for the M.S. Degree in Mechanical Engineering. Please see Section IV.1.

IV.3 Ph.D. Program

Advisor

As early as possible, students should identify the faculty member whom they would like to serve as their coursework and research advisor. For research assistants, the faculty providing the financial support is also the advisor. A student's advisor will also serve as chairperson of the student's Dissertation Committee (see below).

Qualifying Exam

All students entering the doctoral program are required to take the qualifying exam. The objectives of the exam are the following: (1) to determine the student's aptitude and ability to do original and independent research at the doctoral level; and (2) to assess the student's mastery of fundamental knowledge in his or her technical area and identify deficiencies. This exam is administered in an oral format.

Mechanical Engineering Qualification Examination

Mechanical Engineering Doctoral students who matriculate into the program with an M.S. degree must take the qualifying examination no later than their second semester of study at the University of Maryland. Those who matriculate with a B.S. degree must take it no later than their fourth semester of study at the University of Maryland, or the semester following the semester in which they have accumulated 24 credits or more, whichever occurs first.

Mechanical Engineering students who do not pass the qualifying examination during their first attempt may, upon the recommendation of their examining committee and review of the Director of Graduate Studies, be allowed to repeat the examination during the same semester. Under no circumstances will a student be permitted to repeat the qualifying examination more than once. Students who have exhausted their opportunities to pass the doctoral qualifying examination will not be allowed to continue in the doctoral program. Such students will be permitted to remain in the program for one additional semester, after which their graduate admission will be terminated. Under no circumstances will such students be considered for readmission into the doctoral program.

For Mechanical Engineering graduate students, the examining committee for the qualifying exam will be formed by three (3) faculty members from the Department of Mechanical Engineering. All committees will be comprised of the student's advisor, a chair, and a third member. The chair of this committee will be selected by the Director of Graduate Studies and the Chair of the Department and must be a full-time, regular faculty member. The second member will be the student's advisor. The third member will be chosen by the Technical Division Leader in consultation with the Director of Graduate Studies. Up to one (1) Professional-Track-Faculty (PTK) member may serve on the qualifying exam committee, subject to the following constraints: The Professional Track-Faculty member cannot chair the qualifying exam committee, cannot serve on a committee with their supervisor, and must be a member of graduate faculty. The names of the members of the examining committee will be sent to the student via e-mail by the ME Graduate Studies Office. Each student must contact their examining committee as soon as possible to schedule the exam during the department's approved dates. Students who fail on their first attempt will be given a second opportunity to take the qualifying exam with a different committee of three faculty members, selected by the Director of Graduate Studies.

The format of the Mechanical Engineering qualifying exam is as follows:

1. **Goals of the Exam:** The qualifying exam will be an oral exam conducted in English. The goals of the exam include the following: i) determine the student's ability to understand and apply fundamental concepts in their technical area, ii) determine the student's aptitude and ability to conduct original and independent research at the doctoral level, iii) assess the student's ability to critically review previous work from the literature, and iv) identify areas in the student's background that need strengthening as the student makes progress in their doctoral studies.

2. **When to take the Exam:** Mechanical Engineering Doctoral students who matriculate into the program with an M.S. degree must take the qualifying examination no later than their second semester of study at the University of Maryland. Those who matriculate with a B.S. degree must take it no later than their fourth semester of study at the University of Maryland, or during the semester following the accumulation of 24 or more credits, whichever occurs first. Under special circumstances (e.g., non-traditional background, health related issues), the student's advisor may petition the Director of Graduate Studies to defer the exam. It is recommended that these petitions be submitted during the beginning of a semester. Along with the Graduate Committee, the Director of Graduate Studies will review each submitted petition and communicate the decision on the petition to the student's advisor.

3. **Exam Schedule:** The first round of the exams will be typically scheduled during February of the spring semester and September of the fall semester. The second round of exams will be typically scheduled during April of the spring semester and October of the fall semester.

4. **Exam Preliminaries and Procedures:**

Exam Subject Areas: In consultation with their advisor and the ME Graduate Studies Office, the student (examinee) will choose at least two and at most three independent, broad exam subject areas that reflect the student's background knowledge and key dissertation fields. Students- will be asked to make this choice at the time they sign up for the exam.

Exam Committee Composition: The composition of the exam committee will be determined by the subject areas chosen by the examinee. The exam committee will consist of three faculty members who are mainly from the Department of Mechanical Engineering of the University of Maryland. When appropriate for the examinee's choice of subject areas, a full-time tenure-track and/or tenured faculty member from outside the Department may be selected by the ME Graduate Studies Office to serve as one of the three members of the examining committee.

Exam Committee Selection: Each exam committee for the first attempt will be composed of the following persons: the student's advisor, a chair, and a third member. Co-advisors will be allowed to participate as silent observers during the first attempt. The members of this committee will be selected by the Director of Graduate Studies and the Chair of the Department in consultation with the student's advisor and the Technical Division Leader. For the second exam administered to students who fail on their first attempt, the Director of Graduate Studies and the Chair of the Department in consultation with the student's advisor and the Technical Division Leader will form an entire new committee of three faculty members.

Exam Venue and Date: The student and the committee chair are responsible for scheduling the exam date and venue in consultation with the committee and the ME Graduate Studies Office, and for notifying the committee in a timely manner. In the event an exam cannot be administered as originally scheduled, due to extenuating circumstances(subject to approval by the Graduate Director and Chair of the exam committee), the student will provide copies of their presentation to the committee as per the originally scheduled date and time. The exam will then be rescheduled for the earliest available date, preferably the next business day, but no more than two business days after the originally scheduled date. Should a time not be agreed upon for the exam to be held within two business days, the whole examination process will be reinitiated with a new topic assigned to the student.

Student's Background: Each student must contact the chair of their examining committee no later than two weeks before the Monday of the week that the qualifying examination is to be held, to make the necessary arrangements. The student should also provide the chair of the examining committee a folder that contains the following: i) transcripts of undergraduate and graduate course work, ii) M.S. thesis research topic if applicable, and iii) Ph.D. proposal topic if known.

Research Topic: Ten (10) calendar days before the date that the qualifying examination is to be held, each student will be assigned a research topic and one to two references related to some aspect of one or more of the subject areas selected by the student. The topic will be selected by the chair of the examination committee in consultation with both the student's advisor and the third committee member. This topic cannot be from the student's M.S. research area, but it can be from an area that the student might address later during their doctoral dissertation research. A different exam topic must be selected for each student.

Written Summary Report: The student should study the assigned and other pertinent literature on the assigned topic in order to be able to formulate research questions within the topic, suitable for doctoral-level investigation. The student should be able to outline their approach for carrying out such an investigation. The results of this study are to be summarized on one page, formatted as follows: single-spaced, 12-point type, and one-inch margins all around. The summary must consist of the following three paragraphs: (i) a paragraph reviewing the pertinent literature on the assigned topic, (ii) a paragraph identifying a research issue related to the assigned topic area, that the student feels is worthy of doctoral-level research, and (iii) a paragraph describing a suitable research approach (experimental, numerical, and/or analytical) to address the research issue proposed by the student. The summary is to be submitted to each member of the examining committee by noon, three days prior to the scheduled examination.

Oral Exam: The student will prepare a brief presentation (using appropriate media) describing their literature review, statement of appropriate research problem and proposed approach for addressing the stated research problem. The exam will begin with a 15 to 20 minute presentation by the student, and this will be the starting point for the oral exam discussion. The presentation may lead to questions (based on the student's chosen exam subject areas and potentially broader than the assigned exam topic) related to the goals of the exam. In general, the exam should take approximately one hour.

5. Exam Outcome: The examining committee will confer immediately after the exam, carry out deliberations about the exam outcome, reach a decision, and convey this decision through the Examination Committee Chair to the Graduate Office. The student will be notified of the outcome of the exam in writing, by the ME Graduate Studies Office. This notification may include conditions that a student would need to fulfill before attaining candidacy. Examples of these conditions include courses to be taken in a certain area. The committee may also provide other constructive feedback to the student on areas or skills that need to be strengthened. This is a possible outcome for students who are found to be qualified to conduct doctoral-level research but who do not fare well on some aspect(s) of the exam, for reasons that can be remedied.

The student taking the exam is considered to have passed the exam only if the committee decides unanimously in favor of the student.

Reliability Engineering Qualification Examination

Reliability Engineering Doctoral students are eligible to take the qualifying exam after the completion of the equivalent of 24 credits of graduate course work including the completion of the reliability core course requirement with a GPA of 3.5 or better. The following core courses must be completed within a doctoral student's first four semesters.

1. ENRE 600 Fundamentals of Failure Mechanisms
2. ENRE 602 Reliability Analysis

Reliability Engineering students who do not pass the qualifying examination during their first attempt may repeat the examination during the following semester. Under no circumstances will a student be permitted to repeat the qualifying examination more than once. Students who have exhausted their opportunities to pass the doctoral qualifying examination will not be allowed to continue in the doctoral program. Such students will be permitted to remain in the program for one additional semester, after which their graduate admission will be terminated. Under no circumstances will such students be considered for readmission into the doctoral program.