

Revised ECE Ph.D. Qualifying Exam – Format and Description Fall 2020

The Ph.D. Qualifying Exam is the first of three exams required by the University of New Mexico and the Electrical and Computer Engineering Department.

Effective Date of New Exam Format

The new exam format is effective beginning Fall semester, 2020. In August, 2020, students will have the choice of taking either i) the old exam format (offered on August 13, 2020), or ii) the new exam format (sometime during the Fall 2020 semester, in accordance with dates and deadlines given below).

Overview

The Ph.D. Qualifying Exam will now take the form of an oral presentation and short written proposal, based on an assigned reading of a publication in the student's area of research (emphasis). Following the presentation, there will be a question and answer period, which will include topics relevant to the presentation, as well as fundamental concepts in the student's emphasis area. The purpose of the exam is to assess the student's ability to understand and present basic research in his or her field, and to outline a cohesive plan for continuing that research. The basic process will be as follows.

1. A Qualifying Exam Committee will be formed when the student announces his or her intent to take the exam. The committee will consist of 3 – 5 members, all of whom are regular (tenured or tenure track) faculty in the ECE Dept. The area chair in the student's emphasis area will be responsible for forming the committee.
2. The Exam Committee will compile a list of at least three significant publications in the emphasis area, one of which will be the basis of the exam.
3. The student will pick one publication from this list.
4. After reading the paper, and any necessary background, the student will give a 30-minute oral presentation to the committee, with a concise description of the background, methods, and results of the selected paper. In addition, the student must present the results of his/her critical analysis of the paper and hypothesis about future directions. A question and answer period will follow the presentation.
5. Additionally, the student must prepare a short (no more than three pages) research proposal, describing his or her plan for extending or continuing the research described in the publication.
6. In the event that the student does not pass the exam, he or she will have one additional chance to retake it and pass. In the event of a second failure, the student will not be allowed to continue in the ECE Ph.D. Program (EE or CompE).

Purpose

The Ph.D. qualifying exam recommendations are meant to measure

- the student's potential to conduct independent research,
- the student's ability to express and defend technical ideas both in writing and orally,

- the student's fundamental understanding in the chosen area of research,
- the student's breadth of view of the general area of research,
- the student's scholastic competence,
- the student's ability to provide constructive criticism and support to peers in the context of writing a professional paper and in an oral discussion.

Format

The exam will consist of a written report and an oral presentation followed by an oral exam. The student will choose a paper from a list of **at least three peer-reviewed articles** or papers. The student will also be responsible for informing the Ph. D. Qualifying Committee of the selected paper. **These papers should be broadly based on the student's potential area of research and representative of the state-of-the-art in said field.** The list of papers will be determined by the **Ph. D. Qualifying Exam Committee** that that will also administer the exam.

The **oral presentation** will be in the form of a private seminar. Within the private seminar, the student must present a concise description of the background, methods, and results of the selected paper. In addition, the student must present the results of his/her critical analysis of the paper and hypothesis about future directions. The oral presentation must use PowerPoint or equivalent presentation software. The oral presentation must lead with a 15-minute review and critical analysis of the paper followed by a 15-minute presentation of a novel research proposal related to the focus of the selected paper and the student's potential area of research.

The Ph.D. Qualifying Exam Committee will then conduct an **oral exam** that does not exceed 1 hour. The oral exam will include both questions related to the oral presentation, as well as testing general knowledge covered in the core courses within the student's area of research.

The **written report** must be in the format of an original research proposal, and it is not to exceed three single-column pages. Margins in all directions must be 1 inch. The student must use one of the typefaces identified below:

Arial at a font size of 10 points or larger or Times New Roman at a font size of 11 points or larger.

Prerequisites

A student will be allowed to take the Ph.D. qualifying exam if he/she meets the following requirements:

- enrollment in the ECE Ph.D. program,
- completion of all required core courses,
- approval by his/her graduate study advisor.

In certain circumstances, with approval of the ECE Graduate Committee, a student may: (i) replace the required core courses by equivalent courses taken at other institutions, or (ii) by taking advanced courses that are above the level of the core courses, or (iii) a combination of (i) and (ii).

Criteria for Assessment

The Committee must determine whether the student is ready to pursue Ph.D. level research and the Ph.D. degree based on the written report, graduate course grades to date, and this Exam. The Ph.D. Qualifying Committee will assess the student based on the rubric below

| Criteria | Does not meet expectations (1) | Meets expectations (2) | Exceeds expectations (3) |
|---|-----------------------------------|---------------------------|-----------------------------|
| Ability to present a succinct oral synopsis of the assigned paper | | | |
| Ability to critically evaluate the assigned paper | | | |
| Ability to express and defend technical ideas both in writing and orally | | | |
| Fundamental knowledge and understanding in the chosen area of research. | | | |
| Ability to clearly and concisely articulate the proposed research direction in writing and orally. | | | |
| Ability to correctly answer fundamental knowledge questions drawing on material covered within the core courses of the student's concentration. | | | |

Exam outcomes and recommendations

The Committee will review each student's case and conduct the oral exam to make recommendations:

- Exam outcomes after the first try will be: *pass* or *fail*. A fail recommendation in the first attempt of the Ph.D. Qualifying Exam will require that the Ph. D. Qualifying Exam Committee provides the student with a specific set of remedial actions he/she should pursue before re-taking the exam.
- Exam outcomes for the second try can only be *pass* or *fail*. A fail recommendation precludes the student from retaking the exam, resulting in the student to be eliminated from the Ph. D. program.

Ph.D. Qualifying Exam Committee

The Ph. D. Qualifying Exam Committee will be comprised of at least three, but no more than five faculty members. For an Exam Committee of three, all members must be tenured or tenure-track faculty from the ECE department. For an Exam Committee of four or five, additional members may be selected from UNM tenured, tenure-track, or research faculty related to the student's potential area of research. **The student's advisor may be on the Ph. D. Qualifying Exam Committee for one of his/her students, but he/she is not to serve as Chair.**

It is the student's responsibility to file the Form for Ph. D. Qualifying Exam Committee Formation with the ECE Graduate Office before the deadline.

Schedule

- Students are expected to take the Ph. D. Qualifying Exam for the first time before the end of the fourth regular semester of study (not including summer sessions).
- ***The Ph.D. Qualifying Exam can be administered any time prior to the last four weeks of the semester (i.e., no later than November 15th for the fall semester and April 15th for the spring semester).***
- ***Eight weeks before the end of the semester prior to the Ph.D. Qualifying Exam semester,*** the student must finalize his/her Ph. D. Qualifying Exam Committee. The student will also be responsible for scheduling the exam, confirming that all the Ph. D. Qualifying Exam Committee members can attend.
- Students must file a Qualifying Exam Proposal Form ***four weeks before the end of the semester prior to the Ph.D. Qualifying Exam semester.*** The Ph. D. Qualifying Exam Proposal Form will be available on the UNM-ECE website for download, and it will include the student's name, UNM ID number, contact information, emphasis area, Committee Chair's and other Committee members' names. The form will also specify the date, time, and location of the exam. The form must be signed by both the student and the Committee Chair and should be submitted to the ECE Graduate Office.
- The ECE Graduate Office will send a notice to the student's Ph. D. Qualifying Exam Committee, confirming the details of the scheduled exam before the end of the semester prior to the exam.
- Four weeks before the assigned examination day, each student will be given the shortlist of papers and will be asked to choose one paper from that list for the exam. On the day of

the examination, each student will be examined by the Ph. D. Qualifying Exam Committee.

- The student must email the Ph. D. Qualifying Exam Committee members his/her written report, approved by the Ph. D. Qualifying Exam Committee Chair, *at least one week prior to the exam date*.
- The Exam Committee Chair must present the outcome of the exam with justifications and recommendations (if necessary) to the Graduate Committee for a vote. The Graduate Committee will formulate a recommendation on the exam outcome, and it will bring it to the ECE faculty for a vote.
- The student will be notified of the outcome of the exam before the last day of the semester of the Ph. D. Qualifying Exam.

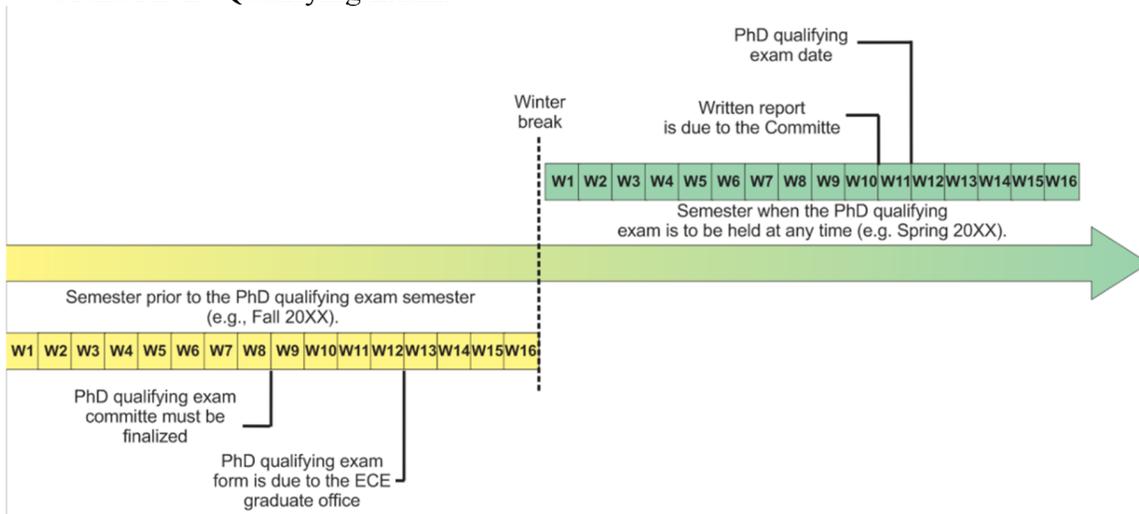


Figure 1. Example timeline for the completion of the Ph.D. Qualifying Exam (W stands for week).