

Duke University, Department of Electrical and Computer Engineering, Graduate Studies

# PhD Qualifying Exam Requirements

## Procedure and Guidelines

**Overview:** The Qualifying Exam consists of two portions: a written report and an oral presentation with Q&A. Each portion will be evaluated separately. Passing the qualifying exam requires a pass on both portions and any failed sections must be retaken the following semester. No more than two attempts are allowed for each portion of the exam; failure of either portion on the 2<sup>nd</sup> attempt will be grounds for dismissal from the PhD program.

**Purpose:** Assess the student's potential to succeed in the PhD program by having them demonstrate the following:

- Reading and deeply understanding three selected papers in the field
- Understanding the strengths and shortcomings of the three papers
- Understanding why the particular problem space defined by the three papers is important
- Generating sound research ideas based on the strengths and shortcomings of the three papers
- Writing and presenting information supporting the points above

**Timing:** The Qualifying Exam should be taken by the end of the 2<sup>nd</sup> semester during the student's 1<sup>st</sup> year in the program.

**Committee:** The committee should consist of three (3) ECE faculty members generally in the student's area of research. The majority of faculty on the committee must be primary faculty members in the ECE Department. The faculty advisor may not serve on the committee. See <https://ece.duke.edu/faculty> for the list of ECE faculty.

**Format & Process:** The exam consists of two parts - a written report and an oral presentation. First, the student works with their advisor to choose a topic, three key papers from their research field,<sup>1</sup> and an appropriate committee. Once these details are determined, approval is obtained by student submission of the [Exam Details Form \(online- found on Sakai\)](#). While the advisor and student choose the papers to be analyzed, the papers must be unanimously approved by the committee (via Qualtrics Exam Details form submission- online). The committee has one week to approve the papers. The student will be notified when papers have been approved.

A written report (10 pages hard maximum, *including references*) is generated by the student, which consists of a review of the three papers in the problem space plus a brief synopsis of suggested future research/directions/projects based on what they learned. Note: the suggested future work does not have to be related to the student's research; rather, it should be based on information learned from the three papers. The formatting of the report should be consistent with that acceptable for professional submission (single-column, minimum of 11-point font and 1" margins).

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<sup>1</sup> Note: Excessive repetition of papers in a group is not allowed and the ECE Graduate Office will maintain a database of papers used. Of the three papers submitted for approval, no more than one may have been used in a qualifying exam affiliated with that research group in the previous three years.

In addition to the three papers being reviewed, a few additional references may be cited as needed, but this is not required.

Upon approval of the QE plan, the oral exam may be scheduled (if it was not already scheduled prior to the QE Exam Details online form submission) and cannot be taken sooner than thirty days after approval was received. **The written report must be provided to the committee two weeks prior to the oral exam date, during which time they will score/evaluate the report.** At the oral exam, the student will give an ~ 30 minute presentation (30 slides maximum) about the material in their report, followed by an ~ 30 minute Q&A. If desired by the student, the oral exam (presentation + Q&A) can be video recorded<sup>2</sup> and made available for review by the student and their advisor.

Each portion of the exam (written and oral) is scored as +1 satisfactory, 0 marginal, or -1 unsatisfactory by each committee member. There should be no corroboration among the committee members on either the written or oral scoring of the exam (e.g., student should not be asked to leave the room for a committee discussion); rather, each committee member scores the exam independently and submits that score to the graduate office. The sum of committee members' scores must be positive (i.e., > 0) in order for the student to pass. Each portion (written and oral) is scored, summed, and passed/failed independently.

Score	Implies:
1	<b>The student has successfully shown readiness for the PhD by demonstrating all elements of the qualifying exam assessment criteria.</b>
0	<b>The student has met some of the criteria for success, but requires improvement in some areas and the overall performance is at the borderline of pass/fail.</b>
-1	<b>The student has not met the requirements indicating readiness for the PhD.</b>

- Committee members must submit their score for the written report to the ECE Graduate Office prior to the oral presentation (an email will be sent to the committee members to solicit submission of these scores).
- Committee members must submit their scores for the oral portion of the exam to the ECE Graduate Office within 24 hours of the presentation (an email link for score submission will be sent to committee members on the morning of the exam).
- The sum of the committee members scores for each part of the exam are sent to the student and faculty advisor within three business days after the exam. When requested, the video recording of the oral presentation and Q&A is also made available.

<sup>2</sup> This must be requested at the time of QE Exam Details submission (online form).

- The advisor can submit a written petition to the DGS requesting reconsideration of the exam outcome within two weeks of the exam date. Students who do not pass one or both portions of the exam are encouraged to discuss the result with their advisor and/or the DGS.
- If the student fails either portion, the student may re-take the exam once during the Fall/Spring semester following the exam.

**Rules for help during preparation of the written report and prior to oral presentation:**

- The student may send any questions they have to the committee.
- The student may seek help (organization/outline) of their document from their advisor; they may seek help from the Writing Center on editing/organization/outline. Otherwise, their writing must be their own.
- After the written document is submitted, the student may give practice talks to anyone they want. They may receive feedback from people on these talks (including their advisor) but must incorporate it on their own (e.g., people can suggest changes to slides, etc. but the student must execute them him/herself).