

## Department of Electrical & Computer Engineering

### *Memo*

**To:** ECE Faculty, Staff, Students  
**From:** Eric Miller, Chair  
**Date:** October 2019  
**Subject:** ECE Ph.D. Qualifying Exams

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**Format:** The ECE Ph.D. qualifying exam is comprised of a comprehensive exam, designed to test if a student is qualified to pursue a PhD degree in Electrical Engineering. Details are provided below.

**Registration:** All students must pre-register by Friday, December 13<sup>th</sup>. A faculty member must sign the application form, indicating a willingness to be the Dissertation Advisor.

### *DETAILS FOR QUALIFYING EXAM:*

**Intent:** The exam is designed to test the student's understanding of topics from an electrical or computer engineering undergraduate curriculum.

**Time:** The ECE Ph. D. Qualifying Exams will be held on January 8, 2020 from 10:00AM – 2:00 PM

**Place:** Halligan Hall, room TBD

**Name Code:** Each student will have a numerical code to be put on the cover page of each bluebook. The grader does not know the code.

**Materials:** Students may bring two 8½ by 11 inch sheets of notes. Physical constants and transform tables, if needed, will be supplied in the examination packet. Textbooks are not allowed. Calculators, if needed, will be provided. Each problem is to be completed in at most two blue books. No scrap paper is allowed so that graders will see all work.

**In Exam:** No questions will be answered during the exam. If in doubt, make your own assumptions based on the problem statement. With the permission of the exam supervisor, you may go to bathroom.

**Grading:** Each problem is worth 25 points and is graded by the faculty member who writes the problem. It is important to do only one problem per blue book so that a grader does not know the grade for other problems.

**Results:** A student must earn a cumulative score of 70% or better to pass. Any student who fails the exam (scores between 45-70%) in January will be offered the opportunity to take an oral version of the exam, the date TBD. At that time, the student will be required to answer questions from a committee of three faculty members for those areas of the written exam where their performance was below average. The results of the oral exam on those subjects will replace those from the written. However, students will only be allowed to answer questions where they scored 30% or greater on the written exam; therefore, a student could have a score over 45%, but be mathematically eliminated from passing. Any student receiving a

score of less than 45% automatically fails the exam. Again, a cumulative grade of 70% is required to pass the exam. Failure to pass the exam after at most two attempts (one written in January and, if applicable, the following oral in February) will result in dismissal from the ECE Ph.D. program

**Preparation:** Sample problems are available on the ECE web page,  
<http://engineering.tufts.edu/ece/graduate/PhD.htm>

**Format:** Students must answer **4 of the 13** problems in the exam packet. Each of the four blue book must have the student's numerical code assigned to them and course number(s) of the question that the blue book is for clearly written on the cover.

**Areas to be tested:**

1. Circuit Theory ES3, EE21
2. Linear Systems Theory EE23
3. Digital Electronics ES4, EE14, EE26
4. Analog Electronics EE21, EE22
5. Electromagnetic Fields and Waves EE18
6. Communications systems EE107
7. Computer Engineering EE126
8. Operating Systems EE128
9. Programming COMP11, COMP15
10. Probability EE 104
11. Semiconductors EE-113, EE-114
12. Feedback-Control Systems EE-105
13. VLSI EE-103