

# **PH.D. SCREENING EXAM MANUAL**

**Electrical & Computer Engineering**

**University of California, Santa Barbara  
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## I. INTRODUCTION

The purpose of the Ph.D. Screening Examination (henceforth, the Exam) is to screen candidates for continuation in the doctoral program. This exam is **not** required for admission to the Ph.D. program; however, to remain in the Ph.D. program, all students are required to pass the Exam.

Students should begin planning for this exam immediately after entering the program. Rules for taking the exam are as follows:

(1) must pass screening exam by the end of the second year of matriculation as a graduate student except for those in Signal Processing and Communications (see CSP section about exam below) and Electronics and Photonics (see EP section about the exam below). If a student doesn't take the exam by the applicable deadline, it counts as a failed attempt.

(2) must have a minimum Grade Point Average of 3.3 to qualify to take the exam. Students having a GPA of less than 3.3 at the time that they are required to take the exam shall be considered to have failed the exam. This failure will be counted as one of their allowed attempts at the exam.

Students are allowed two attempts at passing the exam.

For those who are in the M.S./Ph.D. program, the Ph.D. screening exam may be used in lieu of the M.S. comprehensive exam.

## II. THE EXAM FORMAT

Each student must take an oral major examination in the area of his/her intended specialization. Major examinations are given in the following four standard areas:

- **Computer Engineering**
- **Control Systems**
- **Communications and Signal Processing**
- **Electronics and Photonics**

Each area has its own way of doing the exam.

### COMPUTER ENGINEERING:

1. CE decides a list of acceptable CE courses (graduate or senior level).
2. The student must get **an A in 2 courses not in their field of study**.
3. The student forms a committee of 3 faculty (one faculty agrees to serve as the PhD advisor).
4. The student proposes a list of selected papers in the field of study and this list must be approved by the committee. The committee can alter the list.

5. Oral exam: The student does a survey presentation on the study as the oral exam (survey report can be submitted to supplement the oral part as an option).
6. The committee makes a recommendation to pass, pass by taking more courses, or fail to the advisor.
7. After a consensus is reached, the committee writes a letter to **advocate** passing the student. The student office notifies the student. If the committee chooses not to advocate for the student, the student will not pass.

## **CONTROLS:**

The Controls screening exam is to be as follows:

The exam will consist of three 20-minute oral exams, one in each of the following core areas:

- 1) ECE 130A (Signals Analysis and Processing)
- 2) ECE 147A (Feedback Control Systems)
- 3) ECE 230A (Linear Systems I)

The student can pass the exam as follows:

- A) On the first attempt, average a passing score or higher on the 3 exams,
- B) On the second attempt, if necessary, student may either
  - a) take all exams again, or
  - b) take just the exams in which the student received a failing score on the first attempt,and will pass if the average score in the exams taken in the second attempt is passing or higher.

Student will not get the same examiner for the second attempt on an exam for which the student had a failing score in the first attempt.

**Exams will be held on the Friday of the first full week of instruction during Fall and Spring quarters.**

Students will be asked to submit an application for the screening exam to the ECE Graduate Student Office approximately two weeks before the beginning of fall and spring quarters.

Students' exam schedules will be announced the day preceding the exam.

Students must pass the exam by the end of their second year as a graduate student in the Department.

The final outcome is determined by a vote of the Controls faculty.

Results will be released at 5 pm by the ECE Graduate Student Office on the exam date.

## **COMMUNICATIONS AND SIGNAL PROCESSING:**

The Ph.D. screening examination in Communications and Signal Processing (CSP) group tests the student's background in the areas that are related to the student's research and their critical thinking abilities.

Students have to read and understand one or two technical papers (depending on the length and depth of the papers) that determine the examination topical area.

The exam should be scheduled for 45 minutes where the student presents a short talk during the first 20 minutes followed by 25 minutes of questions asked by the committee.

The student is responsible for forming the committee and scheduling the exam. The committee typically includes the student's advisor/temporary advisor and two other ECE faculty members from CSP.

The paper(s) will be chosen by the student and should be approved by the committee.

Students then orally present these papers to a faculty examining committee. The student has to answer detailed questions from the faculty committee. These questions can be about the presented paper(s) and undergraduate-level technical background for the material in the paper(s).

CSP students without an MS degree must take the screening exam for the first time no later than the end of second year after joining the Ph.D. program, and students with an MS degree must take the exam for the first time no later than their 4th quarter after starting the PhD. Students failing the screening exam the first time can take it a second time in the following quarter. The committee may be changed. A student who fails the exam twice must leave the program.

## **ELECTRONICS AND PHOTONICS:**

The E&P group will adopt a committee-based exam to address the breadth of E&P.

The screening exam committee will be composed of a minimum of 3-persons and will cover at least 3 "breadth" areas, and questions will follow a presentation by the student of a research area chosen by the committee. The questions will be triggered by the presentation, but not limited to the presentation, and will enable the committee to cover the breadth requirement of the screening process.

The time for the exam is proposed to be 1.5 hours split relatively evenly between the presentation and questions (the latter being broader in scope than the presentation).

The student's faculty advisor should be on the committee. The Ph.D. advisor, in consultation with the graduate student, will be responsible to ensure that the committee addresses the 3 breadth areas. The Chair of the screening exam committee will be different from the Ph.D. advisor and will run the proceedings of the exam. Once the minimum-3-person screening exam committee is fully formed (the Chair, the Ph.D. advisor, plus at least one more faculty member), the names should be conveyed to the graduate Student Affairs Manager via email by the

graduate student being examined, prior to the date of the exam.

After the exam, the committee will assess the student's performance and determine whether they: (i) passed the exam; (ii) conditionally passed the exam; or (iii) failed the exam.

If the student fails the exam, they must retake it.

If the student conditionally passed the exam, they will be required to take courses assigned by the committee to remedy weaknesses identified by the committee. The student must achieve a minimum grade of A- in each assigned course. Once all courses have been successfully completed, the student must inform the graduate student office and their committee Chair. Once the Chair has verified and signed off on the successful completion of the course requirement, the student will have passed the screening exam.

For students entering the program with a Master's degree, they must take the Ph.D. screening exam by the 4<sup>th</sup> quarter after initial matriculation in the graduate program. For students entering the program without a Master's degree, they must take the Ph.D. screening exam by the end of the 6<sup>th</sup> quarter after initial matriculation in the graduate program.

### **III. CHANGE OF SPECIALIZATION**

If the student, after passing the Ph.D. Screening Examination, changes their area of specialization as indicated by the major examination area to an area in which they were not examined in the Screening Examination, the student must take and pass another oral examination in the new major area of specialization.