

# ELECTRICAL & COMPUTER ENGINEERING - DOCTOR OF PHILOSOPHY (PHD)

The Doctor of Philosophy (PhD) is the terminal degree for those seeking a technical or research career in electrical & computer engineering.

Students typically complete their PhD within 4 to 6 years, depending on whether they enter the program with a master's degree. It is possible for highly qualified students to enter the PhD program directly without a master's degree.

The primary focus of a PhD student is to perform novel research in collaboration with their faculty advisor. At the time of admission, PhD students must have a faculty advisor who agrees to accept the student into their research program and mentor their academic progress. Most of our PhD students are supported through research and teaching assistantships, and are also encouraged to apply for their own source of funding.

For more information, visit the department's Prospective Students (<https://www.colorado.edu/ecee/academics/graduate-programs/doctor-philosophy/degree-requirements/>) webpage and application information (<https://www.colorado.edu/ecee/admissions/graduate-admissions/>) webpage.

## Requirements

### Course Requirements

The program requires 60 credit hours of study, consisting of 30 hours of coursework and 30 thesis/dissertation hours. Students must maintain a minimum of 3.00 GPA, and must earn a B- or higher in any single course for it to count toward degree requirements.

For the required coursework, 18 credit hours of ECEN 5000-level or above courses are required. The remaining 12 credit hours can be ECEN courses or technical courses in science, mathematics or engineering. All of these should be at the 5000-level or above. This can include taking ECEN 5930 one time for a maximum of 3 credits. Non-technical courses will not count toward the degree (i.e. EMEN, CYBR courses).

### Preliminary Examination

The primary purpose of the preliminary examination is to ensure that students are ready to begin independent research. A broader purpose of the examination is to assess and strengthen the student's intellectual breadth as well as their abilities in problem solving, creativity, and written and oral communication.

Students must pass their preliminary exam in order to continue past the coursework stage of the PhD and in order to be eligible for their comprehensive exam.

Students who do not pass after two attempts will be moved to the MS degree and removed from the PhD program. Two attempts is the maximum allowed department wide. (I.e., a student cannot take the preliminary exam twice in Computer Engineering and then twice with Power Electronics.)

Preliminary exams are given by faculty in respective research groups. Depending on the research area, the exam could consist of oral and written parts, or a literature search and an oral report, or some other form

of exam. The outcome of an exam can also be a conditional pass, in which the student is required to carry out additional activities such as problem solving or taking a course to build foundational knowledge.

### Comprehensive Examination

Before admission to candidacy for the doctoral degree, students must pass a comprehensive examination. At a base level, the comprehensive exam is a presentation of what the student has and will contribute to the field, including a demonstration of their understanding of the field and where their contribution fits in; some contribution already made to that field (i.e., theoretical or experimental results that have been submitted/published/presented to the larger field of scientists); and a plan that they convince the committee is feasible to complete their contributions.

A committee of five experts in the field will evaluate the student's presentation of research.

### PhD Dissertation

The dissertation is a work of original research completed by the student with the guidance of their faculty advisor.

A committee of five experts in the field will evaluate the student's presentation of research.

### Time Limit

All work, including the final examination, should be completed within six years from the time of admission. A student is expected to complete the work with reasonable continuity. Extensions must be formally requested from the Graduate School.

## Learning Outcomes

By the completion of the program, students will:

- Gain the necessary understanding to interpret results published within their research field and broader scientific community.
- Acquire the experimental and/or analytical skills essential to a career in their chosen field of study.
- Learn communication skills essential to the dissemination of their technical findings.
- Learn to conduct scientific research effectively and independently.
- Learn to identify opportunities for technical advancements within their chosen field of study.
- Publish research findings in peer-reviewed journals and/or conferences.