

Electrical and Computer Engineering, PhD

The Department of Electrical and Computer Engineering stimulates excellence in scholarship and research through close contact with the faculty and programs tailored to fit students' individual needs.

Students select an advisor and, with the advisor, plan an individual program bounded only by the broad guidelines of the Graduate College and the program. The department maintains close interdisciplinary ties with other University of Iowa departments, especially with the departments of Physics and Astronomy and Computer Science (College of Liberal Arts and Sciences); the Roy J. Carver Department of Biomedical Engineering and the departments of Industrial and Systems Engineering and Mechanical Engineering (College of Engineering); and the Carver College of Medicine. The principal areas of graduate study include medical image analysis, signal and image processing, control systems and systems theory, wireless communications, waves and materials, computer systems, and computational genomics. View principal areas of study under Research and Study Areas in the Electrical and Computer Engineering section of the catalog.

Learning Outcomes

Graduates will:

- demonstrate a detailed knowledge of electrical and computer engineering topics and a mastery of advanced concepts within their specific area of study;
- master the analytical and methodological skills needed to identify, evaluate, and analyze novel discovery in their areas of specialization;
- be able to employ experimental methods to investigate and generate reports for research-oriented problems; and
- demonstrate professional skills, including concise and effective communication of complex technical ideas to both general and specialized audiences through verbal, visual, and written formats; leadership in their field of study; and ethical conduct in professional, social, and scholarly activities.

Requirements

The Doctor of Philosophy program in electrical and computer engineering requires a minimum of 72 s.h. of graduate credit. At least 45 s.h. must be earned in formal coursework (not in thesis work or other independent study), including 30 s.h. from an approved list of electrical and computer engineering courses. For the list of approved courses, see the Department of Electrical and Computer Engineering Graduate Handbook on the department's website. Each student's study plan must be approved by the student's advisor and by the graduate committee. Students must maintain a UI cumulative grade-point average (GPA) of 3.25 or higher in all graduate coursework.

Students take a qualifying examination and a comprehensive examination. Then they must successfully complete a research program that includes a minimum of 18 s.h. of PhD research and culminates in the preparation of a thesis. Finally,

the candidate must present a successful oral defense of the thesis.

Qualifying Process

Acceptance to the PhD program requires successful completion of the PhD qualifying process. The qualifying process consists of two parts—an examination and a course breadth requirement. The half-day written exam is given once a year, late in the spring semester. It covers two subjects chosen by a student from a list of nine. Students normally are expected to take the qualifying examination within the first 30 s.h. of their graduate studies. A cumulative GPA of at least 3.25 is required for admittance to the exam. Students who fail the examination may retake it only once the next time it is offered.

To complete the breadth requirement, students must take two courses associated with the same list of nine subjects that the examination is drawn from and complete the courses with grades of at least A-minus. The breadth courses must not duplicate the subjects chosen for the examination and must be completed within the fourth semester of graduate study.

Comprehensive Examination

Following successful completion of the qualifying examination and invitation to the PhD program, a student must complete the two-part comprehensive examination. The first part is a written research proposal that includes a thorough literature survey providing the motivation and background for the proposal. The second part is an oral examination.

Students must pass the qualifying examination before they may take the comprehensive exam, and they must complete the comprehensive exam no later than three calendar years after passing the qualifying exam. Students who fail to meet this deadline must retake the qualifying exam. The qualifying exam and the comprehensive exam may not be taken in the same semester.

Thesis

The final requirement for completion of the PhD program is the preparation and successful defense of the thesis. This must be completed no sooner than six months but no longer than three years after the completion of the comprehensive examination.

Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations on the Graduate College website.

Applicants must have a grade-point average of at least 3.25 on all electrical and computer engineering, mathematics, and physics coursework.

Each application is reviewed individually. Extenuating circumstances may permit deviations from the usual standards.

Career Advancement

Engineering is a well-respected profession that is used as a foundation for a variety of careers in industry, medicine, law, government, and consulting.

Engineering Career Services develops and promotes experiential education and professional opportunities for

students. Professional staff coordinate the college's co-op and internship program, engage in employer outreach, and provide opportunities for students to network with employers, including an engineering career fair and other career-development programming each semester. Engineering Career Services also offers individual advising and class presentations on résumé and cover letter preparation, job and internship search strategies, interviewing skills, and job offer evaluation.

Academic Plans

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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Course	Title	Hours
Academic Career		
Any Semester		
72 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. ^a		
Hours		0
First Year		
Fall		
ENGR:7270	Engineering Ethics ^b	1
ECE required course ^c		3
ECE required course ^c		3
ECE required course ^c		3
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		10
Spring		
ECE required course ^c		3
ECE required course ^c		3
ECE required course ^c		3
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		9
Second Year		
Any Semester		
Qualifying Exam ^e		
Hours		0
Fall		
ECE required course ^c		3
ECE required course ^c		3
ECE required course ^c		3
Other required course ^c		3
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		12
Spring		
ECE required course ^c		3
Other required course ^c		3

Other required course ^c		3
Other required course ^c		3
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		12
Third Year		
Fall		
ECE:7999	Research: Electrical and Computer Engineering PhD Thesis	3
Other required course ^c		3
Elective course ^f		3
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		9
Spring		
ECE:7999	Research: Electrical and Computer Engineering PhD Thesis	3
Elective course ^f		2
Elective course ^f		3
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		8
Fourth Year		
Any Semester		
Comprehensive Exam ^g		
Hours		0
Fall		
ECE:7999	Research: Electrical and Computer Engineering PhD Thesis	6
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Hours		6
Spring		
ECE:7999	Research: Electrical and Computer Engineering PhD Thesis	6
ECE:5000	Graduate Seminar: Electrical and Computer Engineering ^d	0
Final Exam ^h		
Hours		6
Total Hours		72

a At least 45 s.h. must be earned in formal coursework (not in thesis work or other independent study), including 30 s.h. from an approved list of Electrical and Computer Engineering courses. Work with faculty advisor to determine appropriate graduate coursework and sequence.

b Must be completed during first semester.

c Work with faculty advisor to determine appropriate coursework and sequence.

d Required attendance every semester until degree completion.

e Typically completed no later than the end of second year spring semester; consists of two parts: an examination and a course breadth requirement. See the department website for more specifics.

f Work with academic advisor to determine appropriate elective coursework and sequence.

g Includes both written and oral components. See the department website for more specifics.

h Dissertation defense.