The PhD program in Electrical and Computer Engineering educates students to do original research on ECE topics and to become technical leaders in their fields. It has a strong and growing reputation, as graduates from the department have become professors at other universities and researchers in various industrial and government research centers. Students may choose a research emphasis in areas such as communications, networking, computer engineering, control and robotics, signal processing, micro/nano-electronics, and bioengineering. The ECE PhD program requires coursework, a qualifying exam, a teaching assignment, a dissertation proposal and research competency exam, a research seminar, dissertation research, and a dissertation defense.

Mason’s general doctoral requirements apply to this program.

Admissions

All general Mason and specific Volgenau School admission requirements apply. Applicants must submit official transcripts, a resume, a goals statement, three letters of recommendation and official GRE General Test results. The GRE requirement is waived for Mason ECE master’s graduates with a 3.0 or greater GPA. Applicants whose native language is not English must demonstrate proficiency by taking the TOEFL or IELTS exam. The minimum score required for admission is 575 on the TOEFL paper-based exam, 230 on the TOEFL computer-based exam, 88 on the TOEFL internet-based exam (with a minimum of 20 in each section), or 6.5 on the IELTS exam. Application materials are reviewed by the ECE PhD committee, which makes a recommendation to the ECE department chair.

Policies

Reduction of Credit

Students must complete a minimum of 72 graduate credits, which may be reduced by a maximum of 30 credits from a completed master’s degree. Reduction of credit requires the approval of the program director or designee and the dean or designee of the school. They determine whether the credits are eligible for reduction of credit and applicable to the degree program and the number of credits to be reduced.

Program Requirements

The 72 hours of required doctoral-level credits typically consist of 48 credits of regular coursework and 24 credits of dissertation research. More than half of the 72 credits applied to the doctoral degree must be earned at Mason. The degree plan outlined in Degree Requirements is based on a student who receives a full 30 credit reduction. Students who do not receive a full credit reduction should choose additional credits in consultation with their advisor.
Upon admission to the program, each student is assigned an ECE faculty for Doctoral Degrees in the Academic Policies section of the catalog. The process of finding a dissertation topic and dissertation director is governed by the university’s policies, as described in the Requirements section. Students who enter the program with an MS degree must take the RQE prior to completing 12 credits in the PhD program. Students who enter the program with a BS degree must take the exam prior to completing 30 credits in the program.

**Evaluation**

After a student has taken both the TQE and the RQE, the ECE PhD Committee reviews the exam results, the student’s transcript, and a letter of recommendation from the student’s advisor. Based on this information, the PhD Committee determines whether the student is qualified for the PhD program. If the student does not qualify on their first try, they may repeat one or both of the exams in the following year. The TQE and RQE may be repeated once. A student who fails to qualify on their second try is removed from the program.

**Dissertation Research**

A maximum of 24 credits of ECE 998 Doctoral Dissertation Proposal and ECE 999 Doctoral Dissertation may be applied to the degree. Students who choose to take fewer than 24 credits of ECE 998 Doctoral Dissertation Proposal and ECE 999 Doctoral Dissertation may earn the remaining credits from approved coursework. Students cannot enroll in ECE 999 Doctoral Dissertation before they have advanced to candidacy. Students advanced to candidacy after the add period for a given semester must wait until the following semester to register for ECE 999 Doctoral Dissertation. Students cannot advance to candidacy and defend their dissertation during the same semester. Once enrolled in ECE 999 Doctoral Dissertation, students must maintain continuous registration in ECE 999 Doctoral Dissertation each semester until graduation, excluding summers. Students who defend in the summer must be registered for at least 1 credit of ECE 999 Doctoral Dissertation during that summer term.

Select 12-24 credits from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>ECE 998</td>
<td>9</td>
<td>Doctoral Dissertation Proposal (minimum 9 credits required)</td>
</tr>
<tr>
<td>ECE 999</td>
<td>3</td>
<td>Doctoral Dissertation (minimum 3 credits required)</td>
</tr>
</tbody>
</table>

**Dissertation Proposal, Research Competency Exam, Advancement to Candidacy**

The student prepares a written dissertation proposal outlining the proposed research and submits it to the dissertation committee for approval. After completing coursework requirements and preparing a proposal, the student takes a research competency exam to demonstrate their preparation for dissertation research. The exam consists of a presentation of the dissertation proposal followed by an oral exam. The exam is administered by the student’s dissertation committee. The purpose of the oral exam is to verify that the student is familiar with the relevant material related to their research. The student is advanced to candidacy when he or she passes the oral exam and the dissertation committee approves the proposal.

**Dissertation Research and Defense**

Students conduct dissertation research under the guidance of their dissertation director, with regular consultation with other members of the dissertation committee. During this period, students must present their research results at least once in the form of a department seminar. The dissertation must represent an achievement in research, must be a significant contribution to its field, and should be deemed publishable in refereed journals or at highly selective conferences. On completion of the dissertation the student may be asked, at the discretion of the dissertation committee, to present a predefense in the presence of the committee members. The dissertation committee and the department chair approve the student’s application for a public defense of the doctoral dissertation. A copy of the dissertation must be placed in the University Libraries four weeks prior to the public defense. After a successful public defense and completion of the final form of the dissertation, the dissertation committee recommends the candidate for the degree of doctor of philosophy.

**Teaching Requirement**

To acquire teaching experience, each PhD student is required to participate in the department’s teaching activity. The requirement is typically satisfied by working as a recitation instructor for one semester, presenting several lectures within a course, or performing other teaching work approved by the department.