**DOCTOR OF PHILOSOPHY IN THE FIELD OF ELECTRICAL ENGINEERING**

The doctor of philosophy in the field of electrical engineering degree program is designed to engage students in leading-edge research in a variety of areas, including wireless, optical, and data center networking; network security; photonics and nanotechnology; sensors and analog electronics; remote sensing; magnetics; image processing and synthesis; signal processing for communications; and power systems. Within this degree program, students choose one of the following five areas of focus: communications and networks; electrical power and energy; applied electromagnetics; electronics, photonics, and MEMS; or signal and image processing, systems, and controls.

More information is available on the departmental website (https://www.ece.seas.gwu.edu/doctor-philosophy-electrical-engineering/).

**REQUIREMENTS**

The following requirements must be fulfilled:

The general requirements stated under School of Engineering, Doctoral Program Regulations (http://bulletin.gwu.edu/engineering-applied-science/#Doctor_of_Philosophy).

Students with an MS degree must take a minimum of 30 credits, of which at least 18 must be credits from courses available for graduate credit, and at least 12 must be dissertation research credits.

Students with a BS degree must take a minimum of 54 credits, of which at least 36 must be credits from courses available for graduate credit, and at least 12 must be dissertation research credits. The courses to be taken by the student must be approved by the student’s faculty advisor. In some cases, particularly when the student undertakes a doctoral program in a field other than that in which the earlier degree was earned, the program of study may exceed the minimum number of credits. No specific courses are required; the student and faculty advisor design the curriculum to meet the student’s needs and goals.

**Preliminary examination**

The Department of Electrical and Computer Engineering requires students to pass a preliminary examination. Doctoral students who received their MS prior to admission to the doctoral program and direct entry PhD students should take the preliminary examination before the completion of 18 and 27 credits, respectively. The examination, which is offered every spring and fall semester, is guided by, but not limited to, the core material in the ECE master’s programs. Specific details regarding the exam are available on the department’s website. Normally a student is allowed two attempts to pass the preliminary examination. The student selects a research advisor (also called dissertation director) by the end of the semester in which the student passes the Preliminary Examination.

**Doctoral qualifying examination**

After passing the preliminary exam, in consultation with the research advisor, a student prepares for the Doctoral Qualifying Examination (also known as Proposal Defense). The Doctoral Qualifying Examination is the principal means of determining whether a student qualifies as a candidate for the doctoral degree and progress to the next stage of the program. For the Doctoral Qualifying Examination, a written proposal of the doctoral dissertation research is presented to a committee which also conducts an oral examination of the student. Details on the structure of the proposal and the composition of the committee can be found on the departmental website (https://www.ece.seas.gwu.edu/graduate-resources/).

**Publication requirements**

Every doctoral student is required to have a paper based on the student’s dissertation research published or accepted in a scientific journal before the student’s doctoral final examination.

**Doctoral final examination**

Once the dissertation has been completed, the student schedules the doctoral final examination (also known as dissertation defense) in consultation with the research advisor. a doctoral final examination form must be filed and approved by the department chair at least three weeks prior to the examination date. Approval is granted only when all required materials have been submitted to the department. The required materials include a completed form, a copy of the journal article or final acceptance letter, resumes of any outside examination committee members, and electronic and printed copies of the dissertation. Details on the structure of the dissertation and the composition of the examination committee can be found on the departmental website (https://www.ece.seas.gwu.edu/graduate-resources/).

The doctoral final examination is oral and open to the public. The candidate must demonstrate mastery of the special field of study and of the materials and techniques used in the research. The committee of examiners may include qualified experts brought to the University especially to participate in the examination. The research advisor usually serves as advocate for the candidate. The committee assesses the quality and originality of the candidate’s contribution to knowledge as well as the student’s mastery of the scholarship and research techniques of the field. Upon decision to pass, the committee recommends the candidate for the degree of doctor of philosophy. The decision to pass may be provisional based on committee recommendations for changes to the dissertation in terms of additional work, writing, or clarifications.

**Seminar and colloquium requirements**
• Seminar requirement—Students must present one departmental seminar, excluding the dissertation defense, prior to graduation.

• Colloquium requirement—Students are required to attend five colloquia during their time in the program. Each attended colloquium is verified by a faculty member in attendance. Upon the attendance of five colloquia, the student must submit to the department the Colloquium Attendance Form signed by the faculty advisor prior to applying for graduation.

Graduation and scholarship requirements

Students are responsible for knowing the university’s minimum GPA requirement for graduation and scholarships. Consult the Graduation and Scholarship Requirements (http://bulletin.gwu.edu/engineering-applied-science/#graduation_requirements_ms) section of this Bulletin. Contact the department for additional information and requirements.