ELECTRICAL AND COMPUTER ENGINEERING, PHD

The Ph.D. in Electrical and Computer Engineering is oriented with an emphasis on scholarship and research rather than formal coursework. Our Ph.D. program is designed to be easily tailored to the needs and interests of individual students. There are no lists of required courses. The program is directed at independent, highly motivated individuals who desire to work closely with faculty members at the forefront of research in a variety of scientific areas, such as:

- Computational and Biomorphic Systems
- Computational Systems Biology and Bioinformatics
- Computer & Neuromorphic Engineering
- Control Systems
- Image Processing and Analysis
- Integrated Circuits and Microsystems
- Language and Speech Processing
- Photonics and Optoelectronics
- Signal Processing & Machine Learning
- Artificial Intelligence and Data Science

The Ph.D. requirements apply to all part-time and full-time students in the program. Time limits, however, are stated in the context of full-time graduate study. Time limits for part-time programs must be individually arranged with the student’s advisor and the Associate Chair of Graduate Studies. The Ph.D. degree certifies that the holder has demonstrated research capability. Accordingly, the Ph.D. requirements are used as checkpoints leading the student through this research experience. Because students tend to spend more than ample time on the path to research, several requirements prescribe time limitations. The requirements stated on the requirements tab include university-wide requirements for the Ph.D.

Financial Aid

Once accepted into our program, all Ph.D. candidates are fully funded for the duration of their program while they are in a full-time, resident status, through a fellowship or research assistantship which covers full tuition, health insurance, and a stipend of approximately $33,000 annually. As part of their program, students conduct research in their research advisor’s lab and sometimes serve as a course assistant for undergraduate or graduate classes.

Ph.D. Program Requirements

University requirements for the Ph.D. degree are listed under Academic Information for Graduate Students (https://e-catalogue.jhu.edu/engineering/full-time-residential-programs/graduate-policies/). In addition, the department requires satisfactory completion of the Ph.D. departmental qualifying examination and the university Graduate Board oral examination, preparation of a preliminary research proposal, a departmental seminar presentation, and an oral dissertation defense.

The departmental qualifying examination is offered twice yearly. The student must select and complete the examinations posed by three examiners eligible to supervise doctoral dissertations in the Department of Electrical and Computer Engineering, of which at least two must be tenure-track ECE faculty. Each faculty member prepares a set of questions, and the student must select and complete the sets. The respective examiners grade completed examinations, but it is the ECE Department faculty that makes a collective decision on whether the student has adequately fulfilled the Departmental Qualifying Examination requirement. This decision involves the student’s cumulative academic performance in the graduate program, as well as performance on the examination. This examination must be passed before the beginning of the fourth semester of full-time graduate study. The departmental qualifying examination cannot be taken more than twice. Failure to pass the exam after two attempts will result in the student being dismissed from the Ph.D. program. If the student passes the examination, the student can select one of those faculty members to oversee the student’s research. This selection must be made by the end of the semester after the exam has been passed. This research advisor then guides the remainder of the student’s program leading to the Ph.D. degree. These may include a teaching requirement, particular coursework, a reading program, or a preliminary research project.

The university Graduate Board oral examination is administered by a panel consisting of the research advisor, another faculty member in Electrical and Computer Engineering, and three faculty members from other departments. Even if the research advisor’s primary appointment is outside of ECE, they will still be considered as ECE faculty for this purpose. This examination must be taken before the end of the sixth semester.

In the course of research leading to the Ph.D. degree, the student must submit a preliminary research proposal to the department, and present a departmental seminar. Ph.D. candidates must submit their preliminary research proposal no later than the first week of the seventh semester. The proposal must include a cover page, project summary, project description, and is limited to 15 pages, including references, figures, and tables. This should be scheduled with the academic administrator and on a date chosen that is mutually agreeable to the student and the dissertation committee. It is expected that all committee members will be present during that presentation.

Finally, a public dissertation defense will be conducted before a panel of readers consisting of at least two Electrical and Computer Engineering faculty members. The Dissertation Committee votes on the acceptance of the dissertation. If it is accepted, then the dissertation is submitted electronically to the library. Further details concerning Ph.D. degree requirements are published in a manual for graduate students in Electrical and Computer Engineering.