

MATH 5343 Boundary Value Problem  
MATH 5613 Theory of Matrices  
MATH 5723 Partial Differential Equations  
MATH 5773 Advanced Analysis  
MATH 5903 Modern Algebra

## **DOCTOR OF PHILOSOPHY IN ELECTRICAL AND COMPUTER ENGINEERING DEGREE PROGRAM**

### **PURPOSE AND GOALS**

The Doctor of Philosophy program in Electrical and Computer Engineering is designed to prepare students to be scholars, to develop the students' capacities to understand issues and problems at the frontiers of knowledge and to make significant contributions to that knowledge. The Ph.D. program's overall educational goals are to provide doctoral training in Electrical Engineering research, to develop new knowledge in engineering, and to disseminate the knowledge gained.

The educational objectives of the Ph.D. in Electrical and Computer Engineering program are

1. To produce competent engineering researchers who can communicate new and innovative research findings to engineers and scientists,
2. To train engineers who are well versed in the general body of knowledge in Electrical Engineering,
3. To produce researchers with specialized knowledge in Electrical Engineering, and
4. To increase the number of Electrical Engineering doctorates.

### **PROGRAM REQUIREMENTS**

The minimum required coursework beyond the Master's degree is 53 semester credit hours (SCH). This credit hour requirement includes coursework prescribed for students in support of area of concentration (9 SCH), free electives in support of doctoral dissertation and specialization (15 SCH), doctoral research (12 SCH), dissertation (12 SCH), stochastic process course (3 SCH) and graduate seminars (2 SCH). Courses taken during a master's degree program may not be repeated for credit at the doctoral level

### **Student Advisement and Supervision**

The Electrical and Computer Engineering Graduate Program Administrator will serve as the Graduate Advisor of each student upon admission into the Ph.D. program. After the student completes nine hours of doctoral class work, the student will be required to choose a chairperson of the student's Ph.D. Advisory committee. The student will select the members of the student's Ph.D. committee in consultation with the Graduate Program Administrator and the chairperson of the student Ph.D. committee. The chair of the individual doctoral student's committee is responsible for advising that student for courses taken beyond the first nine credit hours.

### **Doctoral Advisory Committee**

The Graduate Program Administrator will assist the graduate student in securing an Academic Advisor, who will act as the Chair of the Doctoral Advisory Committee and will be responsible for advising and supervising the student. After the student has successfully completed the qualifying examination, the Chair of the Doctoral Advisory Committee and the Graduate Program Administrator will select the Doctoral Advisory Committee, consisting of five graduate faculty members. One member of the doctoral Advisory committee will be chosen from outside the department of Electrical Engineering. The choice of the outside faculty members will be based on the individual student needs and the selected dissertation topic. As soon as a student's program has been determined, the Graduate Program Administrator will recommend the Doctoral Advisory Committee to the Dean of the College of Engineering for approval. The Dean of the College of Engineering may change the Chair of the Doctoral Advisory committee upon request of the doctoral student.

The Doctoral Advisory Committee and the Graduate Program Administrator will develop a tentative timetable for completion of all requirements for the degree program; monitor the student's coursework and research; provide advice and feedback to the student; file an Annual Report of the student's progress with the Office of the Dean of the College of Engineering; approve a research topic; supervise the preparation of the research project; uphold the standards of the College and the University; inform the Dean of the College of Engineering, in writing, if a student's performance is inadequate and provide relevant advisory committee recommendations; and formulate and conduct the preliminary and qualifying examinations. The student's Advisory Committee Chair acts as head of the Doctoral Advisory Committee and takes the lead in completing these duties.

### **Graduate Plan of Study**

Each doctoral student will be required to file a Graduate Study Plan (GSP) with the College of Engineering before completing 18 semester hours of course work. The GSP outlines the curriculum of study and a timetable to be followed by the doctoral student in meeting the graduate degree requirements. The student prepares the GSP in consultation with the Doctoral Advisory Committee.

### **Preliminary Examination**

When the student has completed 9 semester hours of coursework in the doctoral program, he or she will be required to take a preliminary examination. The preliminary examination will be taken at the beginning of the second semester of the student's doctoral program. The preliminary examination will be a written test of knowledge in at least three areas of electrical engineering. The student will choose from the following areas: Microelectronics, Computer Networks, Power Engineering, Control Systems, Communications, Digital Systems, Engineering Mathematics, and Signal Processing. The preliminary examination will be prepared and administered by the Graduate Program Administrator and graduate faculty. Students failing any portion of the preliminary examinations must consult with the Graduate Program Administrator to determine the steps to be taken. Two consecutive failures on the examination will result in the student's dismissal from the Ph.D. program.

### **Qualifying Examination**

A doctoral student will be required to successfully pass a qualifying examination. The qualifying examination consists of a research proposal, written and oral examinations on the student's area of research. The doctoral student must take a qualifying examination by the time he or she has completed 36 semester hours of coursework. The qualifying examination will be prepared and administered by the Graduate Program Administrator and the student's Doctoral Advisory Committee.

The student must pass either unconditionally or conditionally. A conditional pass indicates specific weaknesses in the student's background that must be remedied before degree requirements are completed. All remedies should be completed within a year after the first attempt at passing the Qualifying examination. Two consecutive failures on the examination will result in the student's dismissal from the Ph.D. program. The Graduate Program Administrator will recommend the doctoral students who pass the qualifying examinations to the Dean of the College of Engineering for admission to candidacy.

### **Advancement to Candidacy**

Following successful completion of the qualifying examinations, it is the student's responsibility to petition for advancement to candidacy. To be advanced to candidacy, students must have completed all of the following requirements and/or procedures:

1. Achieved a cumulative grade-point average of 3.0 or above in program course work.
2. Successfully passed the preliminary examination.
3. Successfully passed the qualifying examination.

The doctoral student is required to submit the application for advancement to candidacy at least one semester before the doctoral degree is awarded. The admission to graduate study does not imply "advancement to candidacy" for the doctoral degree.

### **Doctoral Dissertation**

Successful completion of the doctoral dissertation is required. Every doctoral student would be required to pass an oral defense of the dissertation project. Two attempts at passing the dissertation defense are permitted. Failure to pass the dissertation defense will result in the student's dismissal from the program.

Having met other requirement for the degree, students who successfully defend their dissertations and complete the submission process will be granted the degree of Doctor of Philosophy in Electrical Engineering. The determination of completion requirements for the Doctor of Philosophy degree in Electrical Engineering is solely the province of the program faculty.

The dissertation will not be recommended for final submission to the Dean of the College of Engineering until it has been successfully defended and approved by at least four members of the student's Doctoral Advisory Committee.

**Transfer of Graduate Courses from Other Universities**

A maximum of six (6) units of electrical engineering related course work may be transferred from other accredited universities. A minimum grade of "B" is required in any such courses. Transfer credit is granted by petition to, and approval by, the Doctoral Advisory Committee, with final approval by the Dean of the College of Engineering. It is the student's responsibility to initiate the petition and justify the acceptance of the course. Courses presented for transfer credit must be the equivalent of courses in the doctoral program.

**Special Requirements: Residency and Refereed Papers**

Every doctoral student will be required to complete, on campus, at least nine (9) months of graduate study beyond the master's degree. The residence requirement is fulfilled through completion of a full schedule (at least 9 semester hours) of graduate course work in each of two consecutive semesters (excluding summer months).

Each candidate is required to have submitted at least two papers for publication in refereed journals. The candidate should be the first author of the one of the papers submitted for publication. The papers should be based on results of the candidate's doctoral research.

**Good Standing**

Ph.D. students remain in good standing when they maintain a minimum cumulative GPA of 3.0 for graded courses in the doctoral program. Only grades of "B" or better count toward required course work of the program. If a grade lower than "B" is received in a required course, the course must be retaken. If a second grade lower than "B" is earned, the student will be dismissed from the program, but may petition the Graduate Program Administrator and Doctoral Advisory Committee for readmission. After reviewing the petition, the committee may allow readmission under such conditions, as it deems appropriate. A third grade lower than "B" will result in permanent dismissal from the program with no recourse to petition.

**Time Limit**

A student must complete all requirements for the Ph.D. degree within nine (9) consecutive years after the first date of enrollment in the program. Any exception to this policy requires the approval of the Graduate Program Administrator and the Dean of the College of Engineering.