ELECTRICAL ENGINEERING (PHD)

Program Description

A century ago, the radio offered mass entertainment; 50 years later, television replaced it. Today we watch movies on handheld devices. Each evolutionary step was made possible by advances in electrical engineering. The Ph.D. in Electrical Engineering program is filled with students and faculty keenly aware of this cycle of progress. They prize the School of Engineering's emphasis on invention, innovation, and entrepreneurship — what we call i2e — and they maintain that emphasis through top-flight laboratories and a fierce dedication to advanced research.

Your studies with us will prepare you for a research career in electrical engineering after graduation. But you'll also be capable of sharing these lessons with your own students, should you choose to teach at the university level.

General

Graduate students who have exhibited a high degree of scholastic proficiency and have given evidence of ability for conducting independent research may consider extending their goals toward the doctorate. The Ph.D. degree is awarded after completing the program of study and research described below, and upon preparation and defense of a dissertation representing an original and significant contribution deemed worthy of publication in a recognized scientific or engineering journal.

Thesis Advisor and Academic Advisor

Many factors enter into a student's choice of an advisor for his/her research. In addition to the scientific, intellectual and personality factors which influence the pairing of student and professor, financial aspects must also be considered. For most full-time students, the ideal situation is to find an advisor who has a research topic of mutual interest, as well as funds available from research grants and contracts which can support the student as a Research Assistant (RA). A prospective student is encouraged to contact faculty members in his/her research area regarding the possibility of advising before applying to the Ph.D. program. A student who joins the Ph.D. program without securing a thesis advisor will be assigned an academic advisor, who will guide the student in terms of course selection and research activities before the qualifying exam. A Ph.D. student candidate must obtain the commitment of a faculty member in the student's chosen area of major research interest to be the student's thesis advisor before taking the qualifying exam.

Usually, the thesis advisor is a full-time faculty member in the Electrical and Computer Engineering Department and as such is considered chair of the student's Guidance Committee. If a student wishes to have someone outside the ECE department to serve as his/her advisor, the student should submit the CV of the person and a letter of commitment from the person to serve as the advisor to the Ph.D. EE Program Director for approval. The thesis advisor must have a Ph.D. degree in the student's proposed area of research.

Graduate Manual

For further information, please refer to the graduate manual, which can be found on the student resources page: https://engineering.nyu.edu/academics/departments/electrical-and-computer-engineering/student-resources (https://engineering.nyu.edu/academics/departments/electrical-and-computer-engineering/student-resources/)

Admissions

Admission to graduate programs in the Tandon School of Engineering requires the following minimum components:

- Résumé/CV
- Statement of Purpose
- Letters of Recommendation
- Transcripts
- Proficiency in English

The NYU Tandon Graduate Admissions website (https://engineering.nyu.edu/admissions/graduate/apply/requirements/) has additional information on school-wide admission.

Some programs may require additional components for admissions.

See the program's How to Apply (https://engineering.nyu.edu/admissions/graduate/how-apply/) for department-specific admission requirements and instructions.

Entrance Requirement

Students entering the doctoral program with a Bachelor's degree must meet the entrance requirements for the Master's program in the appropriate area of concentration. Students entering at the Master's level for the Ph.D. in Electrical Engineering program are normally expected to have a Master's in Electrical Engineering. Generally, admission to these Ph.D. programs is conditional on a student achieving a 3.5 grade point average in prior B.S. and M.S. programs. GRE is required for all applicants.

Program Requirements

The program requires the completion of 75 credits, comprised of the following:

Course	Title	Credits
Major Requirements		
ECE-GY 5253	APPLIED MATRIX THEORY	3
ECE-GY 6303	Probability and Stochastic Processes	3
ECE-GY 6023	Wireless Communications	3
ECE-GY 9900	Seminar in Electrical and Computer Engineering	0
ECE-GY 6233	System Optimization Method	3
ECE-GY 7143	Advanced Machine Learning	3
ECE-GY 6013	Digital Communications	3
ECE-GY 6063	Information Theory	3
ECE-GY 9133	SEL TOPCS IN SIGNAL PROCESSING	3
ECE-GY 6183	Digital Signal Processing Laboratory	3
MATH-GA 2901	Essentials of Probability	3
ECE-GY 6333	Detection and Estimation Theory	3
ECE-GY 6813	Medical Imaging I	3
GA-GY 9993	Writing and Communication for Engineers and Scientists	3
ECE-GY 7363	Network Design and Algorithms	3
CS-GY 9223		3
Dissertation Research		

ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT (this course is taken over 6 terms, for a total of 30 credits)	3-9
Total Credits		**75**

Additional Program Requirements

Qualifying Examination

Students must pass the PhD qualifying examination before the deadline to continue in the program and register in ECE-GY 999X PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT. This is an oral exam and students must have completed certain course and project requirements before taking the oral exam. Results of the exam will be recorded in the student's transcript as RE-GY 9990 PHD QUALIFYING EXAM. Detailed information about the requirements to be satisfied before taking the qualifying exam including both course requirement, project scope and application process can be found in ECE graduate student manual, available under the ECE department webpage.

Formation of Guidance Committee

Upon passing the qualifying examination, students should consult with their thesis adviser to identify additional members and form a guidance committee. The committee should be composed of at least three members with the thesis adviser usually acting as Chairperson. If the dissertation adviser is not a tenured or tenure track (T/TT) Tandon faculty member of the Department, then a T/TT Tandon faculty member of the Department in the student's research area must be invited to serve as the Committee Chair. The committee should include at least two ECE T/TT faculty (including the adviser, and the NYUAD and NYUSH T/TT faculty), and may include at most two external members from outside the Department who are in the student's area of major research interest. Students must submit the names of the members of their Guidance Committee to the Office of Graduate Studies with a copy to the ECE Graduate Office within 6 months of passing the qualifying exam. The Guidance Committee conducts the area examination and thesis defense, and approves the final thesis. The Guidance Committee appointment form can be obtained from the Office of Graduate Studies.

Area Examination

In the area exam, students review prior research in the chosen dissertation topic and present preliminary research results and an additional research plan. The area exam is conducted by the Guidance Committee, but may be open to other interested faculty and students. The Guidance Committee attends and evaluates the student's performance and determines whether the student demonstrates the depth of knowledge and understanding necessary to carry out research in the chosen area. Results of the exam will be recorded in the student's transcript as ECE-GY 9980 Electrical Engineering Area Exam.

Students must submit a written report that summarizes prior research and the future plan at least one week before the scheduled exam time. The report should follow the PhD dissertation template and be at least 25 pages long. The student must take and pass the area exam within 2 years after passing the PhD qualifying exam. Students who fail to pass the exam by the deadline will be disqualified from the program.

Thesis and Thesis Defense

Upon completion of the doctoral dissertation, the candidate undergoes an oral thesis defense. The defense is conducted by the Guidance Committee, but is open to all members of the ECE faculty and other invited people. The student must submit a complete draft of the dissertation to the Guidance Committee members at least one week before the scheduled defense. The student should consult the Office of Graduate Studies regarding how to submit, reproduce and bind the final manuscript.

Seminar Attendance

Students are required to register in ECE-GY 9900 Seminar in Electrical and Computer Engineering for at least 4 semesters. Satisfactory grade is given only if the student attends more than 2/3 of the seminars offered in a semester. Part-time students who have difficulty attending the seminar because of work conflict may be exempted from this requirement upon approval of the Ph.D. EE program director. Students should submit the approval note when applying for graduation.

Publication Requirement

PhD candidates must either have a peer-reviewed journal paper (accepted or published), or have at least one paper under review by a peer-reviewed journal on the thesis research subject.

For the journal paper(s), a letter of acceptance by a journal, or a letter of submission to a peer-reviewed journal along with acknowledgment of its receipt by the journal, will constitute the required evidence. If there is no accepted/published journal paper, the student should have at least one accepted conference paper that appeared in the proceedings of a peer-reviewed conference.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
ECE-GY 5253	APPLIED MATRIX THEORY	3
ECE-GY 6303	Probability and Stochastic Processes	3
ECE-GY 6023	Wireless Communications	3
ECE-GY 9900	Seminar in Electrical and Computer Engineering	0
	Credits	**9**
2nd Semester/Term		
ECE-GY 6233	System Optimization Method	3
ECE-GY 7143	Advanced Machine Learning	3
ECE-GY 6013	Digital Communications	3
ECE-GY 9900	Seminar in Electrical and Computer Engineering	0
	Credits	**9**
3rd Semester/Term		
ECE-GY 6063	Information Theory	3
ECE-GY 9133	SEL TOPCS IN SIGNAL PROCESSING	3
ECE-GY 6183	Digital Signal Processing Laboratory	3
ECE-GY 9900	Seminar in Electrical and Computer Engineering	0
	Credits	**9**
4th Semester/Term		
MATH-GA 2901	Essentials of Probability	3
ECE-GY 6333	Detection and Estimation Theory	3
ECE-GY 6813	Medical Imaging I	3
ECE-GY 9900	Seminar in Electrical and Computer Engineering	0
	Credits	**9**
5th Semester/Term		
RE-GY 9990	PHD QUALIFYING EXAM [1]	0
	Credits	**0**
6th Semester/Term		
GA-GY 9993	Writing and Communication for Engineers and Scientists	3
ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT	3

CS-GY 9223		3
	Credits	**9**
7th Semester/Term		
ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT	3
ECE-GY 9980	Electrical Engineering Area Exam	0
ECE-GY 7363	Network Design and Algorithms	3
	Credits	**6**
8th Semester/Term		
ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT	6
	Credits	**6**
9th Semester/Term		
ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT	6
	Credits	**6**
10th Semester/Term		
ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT	6
	Credits	**6**
11th Semester/Term		
ECE-GY 999X	PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT	6
	Credits	**6**
	Total Credits	**75**

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RE-GY 9990 PHD QUALIFYING EXAM is the prerequisite for GA-GY 9993 Writing and Communication for Engineers and Scientists and ECE-GY 999X PHD DISSERTATION IN ELECTRICAL ENGINEERING DEPT. This course is often taken in the Summer of the second term.

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Be prepared for a research career in electrical engineering and/or university-level teaching.
2. Gain strong fundamental knowledge in several electrical engineering disciplines, skills for independent research in a sub-discipline and the ability to prepare and defend a dissertation representing an original and significant contribution for publication in a recognized scientific or engineering journal.
3. Have acquired breadth and depth across a number of electrical engineering sub-disciplines.

Policies

Transfer Credit Policy

For PhD students with a prior MS degree, they are allowed to transfer up to 36 credits, of which 30 credits must be from their prior MS degree in ECE or a closely related field. For PhD. students admitted without a prior MS degree, they can transfer at most 6 credits. For the blanket transfer of 30 credits from a prior MS. degree in ECE or a closely related field toward the PhD degree in EE, the student must provide a copy of his or her prior MS degree and the official academic transcripts. For individual course transfer, the student must provide an official transcript in a sealed envelope as well as catalog descriptions of the courses to be transferred, for evaluation and approval by the department graduate advisor. The official transcript and/or diploma submitted during the student's admission process can be used in place of new submission. Graduate courses taken at other schools of NYU or taken as an undergraduate student at NYU Tandon School of Engineering are exempt from this policy, but are subject to the general polity of the Tandon School of Engineering regarding such courses. This policy is effective for students entering in Spring 2018 and later.

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/graduate/engineering/academic-policies/).