

# DOCTOR OF PHILOSOPHY WITH A MAJOR IN ELECTRICAL AND COMPUTER ENGINEERING

Programs leading to the master's and doctoral degrees in Electrical and Computer Engineering are provided by the School. Technical interest areas include bioengineering, computer systems and software, digital signal processing, electrical energy, electromagnetics, electronic design and applications, microsystems, optics and photonics, systems and controls, telecommunications, and VLSI systems and digital design.

The doctoral degree program is research-oriented and highly individualized. Typically, at least four years of study beyond the bachelor's degree are required to complete the doctoral program.

## PhD Information

All PhD programs must incorporate a standard set of Requirements for the Doctoral Degree.

## Summary of Requirements

- Core curriculum (18 hours). These courses must be taken in technical interest areas as detailed in the course requirement section.
- Electives (14 hours)
- Minor (9 hours)
- Professional Communications Seminar (1 hour)
- Responsible Conduct of Research training (1 hour). The training consists of two parts: an online training (to be completed in the first 90 days of the program) and a class (PHIL 6000).
- Comprehensive Examination. In ECE, this is the combination of the Ph.D. Coursework Qualifier and the dissertation proposal.
- PhD dissertation

## Course requirements

The Ph.D. course requirements include the course hours normally accumulated during the student's master's degree. The course requirements are as follows:

Code	Title	Credit Hours
<b>Group I</b>		
ECE 6000-level or higher classes in one or two TIAs <sup>1</sup>		9
<b>Group II</b>		
ECE 6000-level or higher classes <sup>2</sup>		9
<b>Group III</b>		
Minor in area outside ECE <sup>3</sup>		9
<b>Group IV</b>		
Electives <sup>4</sup>		14
ECE 8022 <sup>5</sup>		1
PHIL 6000	Responsible Conduct of Research (RCR) <sup>6</sup>	1
<b>Total Credit Hours</b>		<b>43</b>

<sup>1</sup> Three classes in a combination of one or two technical interest areas of the student's choosing (All for letter grade credit). Technical Interest Areas (TIAs) are groups of related courses within electrical

and computer engineering and include: Bioengineering, Computer Systems & Software, VLSI Systems & Digital Design, Digital Signal Processing, Electrical Energy, Electromagnetics, Electronic Design & Applications, Nanotechnology, Optics & Photonics, Systems & Controls, and Telecommunications.

<sup>2</sup> Nine hours of classes, all of which must be outside of and not cross-listed with the TIA(s) of Group I (All for letter grade credit).

<sup>3</sup> Nine hours of classes in a single discipline outside of ECE (All for letter grade credit). The minor is most often in mathematics or in computer science; the School of ECE maintains a list of Math courses and a list of Computer Science courses acceptable for a Ph.D. minor. Minor courses in another area will be considered; however, minor courses in non-technical areas (for example, management) will not be approved.

<sup>4</sup> Up to 12 M.S. thesis hours, recorded as such on an official transcript, may be used in this area.

<sup>5</sup> **Pass/fail.** Permit required. Pass the Coursework Qualifier to receive a permit.

<sup>6</sup> **Pass/fail.** Students entering the Ph.D. program in Fall 2011 or later and M.S. students who were admitted for Fall 2011 or later and then transition to Ph.D. must take an RCR course to fulfill this requirement.

## PhD residency requirement

Student must have at least two semesters of full-time, on-campus enrollment.

In addition, there are a number of requirements imposed by the Institute. These include:

- A minimum of 9 hours for letter grade must be taken at Georgia Tech.
- Student must maintain a 3.0 GPA, and a minimum 3.0 GPA for the minor (Group III) courses.
- Once admitted to candidacy, the student must complete all degree requirements within 7 years.

## Comprehensive Examination

The ECE comprehensive examination is the combination of a coursework qualifier and a proposal exam.

**Coursework qualifier.** The Coursework Qualifier requirement is to obtain a 3.5 GPA in four courses that the student selects from lists prepared by the ECE Technical Interest Groups (TIGs). Further details are available in the ECE Graduate Student Handbook. The Coursework Qualifier requirement must be completed by the end of the second year.

**Proposal exam.** ECE Ph.D. students must complete their Proposal Exam by the end of their 7th term, not including summers. The student is expected to demonstrate background knowledge of their dissertation topic, as well as broader understanding of the discipline. The Proposal must contain a detailed plan for the completion of Ph.D.-level research on the dissertation topic, and preferably some results. However, it is understood that any results will be early and possibly inconclusive; and the dissertation topic, methods, and results may evolve considerably in-between the Proposal and the Ph.D. defense. Students are advised to seek the input of the committee on the research direction, and inform their committee members of significant changes.

## Doctoral Dissertation

The primary requirement of the Ph.D. student is to do original and substantial research that is reported in the Ph.D. Dissertation and at the Final Defense. The School entrusts the standards of the School in this area to the Reading committee.

Joint Doctor of Philosophy with a Major in Electrical and Computer Engineering with the Politecnico Di Milano

The School of Electrical and Computer Engineering (ECE) offers a joint doctorate degree program between the Georgia Institute of Technology (Georgia Tech) and the Politecnico di Milano (PdM).

Politecnico di Milano is a highly ranked technical university located in one of the most industrialized regions of Italy Lombardy. It has close ties with industry at the national, European, and international levels; it shares similar strategic goals as those of Georgia Tech; it has complimentary resources that fully support students and faculty; and it participates in a number of important academic and economic projects within Europe and abroad.

This joint Ph.D. program will afford graduate students from each university the opportunity to: study and conduct research at an international peer engineering, science and computer research institution; gain confidence in working as a member of an international team; and live and study in an environment outside of their home country.

PhD Information

Joint Doctor of Philosophy with a Major in Electrical and Computer Engineering with the Politecnico di Torino (Italy)

The School of Electrical and Computer Engineering (ECE) offers a joint doctorate degree program between the Georgia Institute of Technology (Georgia Tech) and the Politecnico di Torino (PdT).

Politecnico di Torino is a highly ranked technical university located in one of the most industrialized regions of Italy - Piedmont. It has close ties with industry at the national, European, and international levels; it shares similar strategic goals as those of Georgia Tech; it has complimentary resources that fully support students and faculty; and it participates in a number of important academic and economic projects within Europe and abroad.

This joint Ph.D. program will afford graduate students from each university the opportunity to: study and conduct research at an international peer engineering, science and computer research institution; gain confidence in working as a member of an international team; and live and study in an environment outside of their home country.

PhD Information