

Electrical and Computer Engineering

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Graduate study is offered in the Department of Electrical and Computer Engineering leading to the degrees of Master of Science and Doctor of Philosophy in Electrical and Computer Engineering. Both the M.S. and Ph.D. are available via BCoE Learning (online). Major areas of study include, but are not limited to

- Communications,
- Controls,
- Computer Architecture and Digital Computing,
- Electromagnetics,
- Power and High Voltage,
- Microelectronics and VLSI, and
- Signal, Image, and Speech Processing.

Research facilities include

- the High Performance Computing Collaboratory (HPCC),
- the Geosystems Research (GRI),
- the Center for Advanced Vehicular Systems (CAVS),
- the MSU High Voltage Laboratory,
- the Emerging Materials Research Laboratory, and
- the Microsystems Prototyping Laboratory.

Note: Effective Fall 2012 semester, the Department of Electrical and Computer Engineering no longer offers separate electrical engineering (EE) or computer engineering (CPE) degrees at the graduate level.

Admission Criteria

In addition to meeting the requirements set forth by the Graduate School in the admission section of this publication, the basic requirements of the department for admission to the graduate program include

- a 3.00/4.00 GPA on a B.S. degree for admission to the M.S. degree program;
- a 3.50/4.00 GPA on a B.S. or M.S. degree for admission to the Ph.D. degree program;
- a 550 PBT TOEFL score (213 CBT or 79 iBT) or 6.5 IELTS score for the student whose native language is not English (unless he/ she earned a degree from a U.S. institution); and
- a satisfactory performance on the GRE for students with a degree from a program that is not EAC/ABET accredited.

In addition to the requirements set forth by the Department for admission to the graduate program, highly qualified undergraduate students may be directly admitted to the Ph.D. program. Such direct admission requires a minimum undergraduate equivalent GPA of 3.50/4.00 on the last 60 credit hours of undergraduate courses, or a first class with distinction degree classification for students whose degrees are from institutions where no GPA is reported, and a satisfactory performance on the GRE for students with a degree from a program that is not EAC/ABET-accredited.

ECE M.S. students who wish to transfer to the Ph.D. program prior to completing the requirements for the Master of Science degree must submit a new application provided that they have a minimum graduate GPA of 3.80 on the first 15 credit hours of graduate courses taken at MSU.

Provisional Admission

Provisional admission is not typically available to applicants to the Department of Electrical and Computer Engineering.

Academic Performance

To be in good academic standing, a student is expected to maintain a cumulative graduate GPA of 3.00 after admission to the program. If a graduate student's cumulative GPA falls below 3.00, the student will be placed on probation. While on probation, a student will not receive any type of financial support (TA, RA, fellowships, wages, etc.) and is required to raise his/her cumulative GPA to 3.00 by the end of the following semester of enrollment. While on probation, the student must enroll in 9 credit hours of coursework; Directed Individual Study courses are excluded.

A student will be dismissed from the graduate program if

- in any semester subsequent to being on probation, the student's cumulative GPA falls again below a 3.00;
- a student makes grades of D, F, U, or more than two Cs;
- a student fails twice the oral examination (M.S. level) or the preliminary examination (Ph.D. level);
- a student does not pass the Ph.D. qualifying exam in four attempts, within the first four semesters;
- a student receives an unsatisfactory evaluation of a thesis or dissertation;
- a student fails to take a remedial course in the required semester.

In case of a dismissal from the graduate program, a student may appeal his/her academic dismissal according to the following procedure:

- Within four weeks of being notified of the official dismissal, the student must present the request and related explanation in writing to the department head and/or graduate coordinator. The department head/coordinator will review the appeal with the departmental graduate committee and render a recommendation.
- If the appeal at the departmental level is unsuccessful, a student may then appeal to the college dean.
- If the appeal at the college level is unsuccessful, the student may then appeal to the Provost and Vice President for Academic Affairs.

Prerequisite and Core Courses

It is required that all graduate students take the following courses for credit as required remedial undergraduate coursework unless the transcript shows equivalent credit. Additional courses may be required.

ECE 3413	Introduction to Electronic Circuits	3
ECE 3424	Intermediate Electronic Circuits	4
ECE 3443	Signals and Systems	3
ECE 3714	Digital Devices and Logic Design	4
ECE 3724	Microprocessors	3-4
or ECE 4743	Digital System Design	

Program of Study

It is the responsibility of each graduate student to develop a suitable program of graduate study in conjunction with the student's major advisor and graduate advisory committee. Minimum requirements for the M.S. with thesis is 30 credit hours and for the M.S. non-thesis is 33 credit hours past the B.S. Minimum requirements for the Ph.D. is 48 credit hours past the M.S. or 66 credit hours past the B.S. for direct-admit Ph.D. students.

Master of Science in Electrical and Computer Engineering - Thesis

ECE 8XXX	Graduate-level coursework	
ECE XXXX	Additional graduate-level coursework ¹	12
ECE 8000	Thesis Research/ Thesis in Electrical and Computer Engineering	6
Total Hours		18

¹ Students can also take up to 6 hours in ECE 7000, and a minor area outside the department is optional (9 credit hours with a minimum of 3 credit hours at the 8000 level).

Students are required to orally defend their thesis. The thesis document (finished, not a draft) must be read and approved by the major professor and presented to the remaining committee members one week before the scheduled oral defense.

Master of Science in Electrical and Computer Engineering - Non-Thesis

Minimum requirements are 33 credit hours for the non-thesis option (optional project) and passing an oral examination. The oral examination consists of a comprehensive exam related to all the graduate level courses taken toward the degree.

Doctor of Philosophy in Electrical and Computer Engineering

ECE 8XXX	Graduate-level coursework	12
ECE XXXX	Additional graduate-level coursework ¹	12
ECE 9000	Dissertation Research /Dissertation in Electrical and Computer Engineering	24
Total Hours		48

¹ Students can also take up to 6 hours in ECE 7000, and a minor area outside the department is optional (12 credit hours at the Ph.D. level with a minimum of 3 credit hours at the 8000 level).

A doctoral student is required to orally defend his or her dissertation. The dissertation document (finished, not a draft) must be read and approved by the major professor and presented to the remaining committee readers two weeks before the scheduled oral defense.

Doctor of Philosophy in Electrical and Computer Engineering - Direct-Admit

ECE 8XXX	Graduate-level coursework	21
ECE XXXX	Graduate-level coursework ¹	21
ECE 9000	Dissertation Research /Dissertation in Electrical and Computer Engineering	24
Total Hours		66

¹ Students can also take up to 6 hours in ECE 7000, and a minor area outside the department is optional (12 credit hours at the Ph.D. level with a minimum of 3 credit hours at the 8000 level).

A doctoral student is required to orally defend his or her dissertation. The dissertation document (finished, not a draft) must be read and approved by the major professor and presented to the remaining committee readers two weeks before the scheduled oral defense.

Completion Requirements

Examinations

All students enrolled in the doctoral program in Electrical and Computer Engineering are required to pass a written qualifying examination. The purpose of this qualifying examination is to assess the student's broad background in ECE and ensure their capabilities for conducting doctoral work. This exam covers undergraduate ECE coursework. Students who are classified as doctoral students must pass the qualifying examination within the first two years of full-time doctoral enrollment. Students enrolled in the doctoral program part-time have two years to pass the qualifying examination after completing 9 credit hours of coursework.

Additionally, doctoral students are required to pass the oral preliminary examination (dissertation-proposal defense). The oral preliminary examination may be taken only after the student has passed the qualifying examination; in addition, the student must have completed or be within 6 hours of completing the coursework. The oral preliminary exam consists of a presentation of current research activities toward the student's dissertation.