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Home > GRADUATE > Degree Requirements

Degree Requirements

Doctor of Philosophy (Ph.D.) Program

Students entering the program with a B.S. will follow the coursework requirements for the B.S. to Ph.D. Degree Plan while those entering with an M.S. will follow the M.S. to Ph.D. Degree Plan. The remaining requirements are identical for both programs.

1. Coursework for the The B.S. to Ph.D. Degree Plan
   - All structured coursework must follow the Appropriate Coursework Standards
   - At least 84 semester hours of graduate credit beyond the BS, with at least 33 hours in structured course work, and at least 27 hours of research (ECE8x98) and 12 hours of dissertation (ECE8399). The remaining 12 hours may consist of structured course work or research. Additionally,
     - All of the structured coursework must be at the 6000 level or higher.
     - At least 21 of the 33 hours of structured course work must be in ECE courses.
     - Non-ECE courses used to satisfy the structured course requirement must be related to the field of study and be approved by the student’s advisor.
     - If structured coursework is chosen for the remaining 12 hours, the courses may be chosen from inside ECE or outside ECE.
     - Non-ECE courses must be at the graduate level (6000 level or higher) unless approved by the Director of Graduate Studies.
     - Enrollment in a dissertation course (ECE8399) is required during the semester the dissertation proposal is defended.

2. Coursework for the The M.S. to Ph.D. Degree Plan
   - All structured coursework must follow the Appropriate Coursework Standards
   - At least 54 semester hours of graduate credit, of which at least 15 hours should be in structured course work and at least 27 hours in research (ECE8x98) and 12 hours of dissertation
(ECE8399). Additionally,

- All of the 15 hours in structured coursework must be at the 6000 level or higher.
- At least 9 of the 15 hours in structured coursework must be in ECE courses.
- Non-ECE courses used to satisfy the structured course requirement must be related to the field of study and be approved by the student's advisor.
- Non-ECE courses must be at the graduate level (6000 level or higher) unless approved by the Director of Graduate Studies.
- No credit will be given for any course that is equivalent to a course taken in the student's undergraduate degree program.
- Enrollment in a dissertation course (ECE8399) is required during the semester the dissertation proposal is defended.

3. Fulfillment of the Breadth Coursework requirement.
4. Completion of the Qualifying Exam.
5. Preparation of a written dissertation and an oral defense thereof.
6. Completion of all work above in accordance with the procedures described in the Procedures, Requirements, and Standards Section

Master of Science (MSEE, with Thesis) Program

1. To receive the degree of Master of Science in Electrical Engineering, a student is required to complete, on a part-time or full-time basis, a minimum of 30 semester credit hours of graduate studies, to include at least 21 hours of coursework, and 9 hours of thesis and research. Specifically,
   - At least 15 hours of structured coursework in ECE, at or higher than the 6000 level. Out of these, at least 6 hours should be in the area of concentration of the student.
   - Out of the minimum of 21 hours of coursework, at most 6 hours could be in a related technical field. These courses should be graduate level, deemed appropriate for the professional development of the student (i.e., courses related to the thesis topic), and may be from a department outside ECE. Both the student's thesis advisor and the Director of Graduate Studies must approve them. In any case, no credit will be given for courses that are equivalent to courses used in the student's undergraduate degree.
   - Six hours of thesis (ECE 6399 and ECE 7399) and at least 3 hours of research (ECE 6x98).
2. Preparation of a written thesis and an oral defense thereof.
3. Completion of all work above in accordance with the procedures described in the Procedures, Requirements, and Standards Section

Master of Science in Electrical Engineering (MSEE, Non-thesis) Program

To receive the degree, Master of Science in Electrical Engineering, non-thesis, a student must complete, on a part-time or full-time basis, a minimum of 30 semester credit hours of approved graduate courses. There is no thesis requirement. A maximum of two courses (i.e., a maximum of 6 hours of coursework) taken from Course Categories A (Core) and B (Electives) can be replaced by an approved project to be completed under the supervision of a faculty member from the Electrical and Computer Engineering Department.

Specifically:

- Core. A minimum of 18 hours of course work from 6000-level or higher ECE courses.
A maximum of 6 hours of 6000-level courses equivalent to 5000-level courses is allowed in this category.

All the courses in this category must be chosen from one of the four specialization areas, as described below.

Other courses may be used in this category only with the prior approval of the Director of Graduate Studies.

**Electives.** Three to six hours* of course work offered in the College of Engineering or in the College of Business Administration.

- The non-ECE courses must be graduate level.
- Courses in ECE must be at the 6000 level or higher.
- In all cases, no credit will be given for courses that are equivalent to courses used in the student’s undergraduate degree.
- Business courses should be selected from the approved list (see below).
- Other courses may only be used in this category with the prior approval of the Director of Graduate Studies.

**Breadth.** Six to nine hours* of course work outside of your chosen specialization area in the College of Engineering or in the College of Natural Sciences and Mathematics (NSM).

- NSM courses must be at the graduate level and should be selected from the approved list (see below).
- Other courses may only be used in this category with the prior approval of the Director of Graduate Studies.

*Elective and Breadth course hours must add up to 12 hours.

**Special Projects**

Special projects are sometimes initiated by an advisor or by the graduate director. These projects require a committee consisting of at least two regular, tenure-track, ECE faculty, one of which will serve as project advisor. A student desiring to complete a special project needs to identify a project advisor and committee member(s). The student should prepare a project description and secure approval from the committee members. A Special Project Proposal form should be filed, along with a description of the project, well in advance of the start of the semester in which the special project will take place. Once the Director of Graduate Studies has approved the project proposal and committee, the student may enroll in ECE 6393.

At the end of the semester, the student must prepare a written report, which must be successfully defended in the presence of the committee. If desired, and warranted by the progress made, the student may request to enroll in ECE 7393 for another semester to continue work on the project. This request should be petitioned by a general petition, accompanied by the approved progress report and a statement of work. Such requests must be made at least three weeks before the start of the semester.

Please use the special project request form.

**Approved List Of Non-ECE Courses**

- **College of Engineering**
  - All courses at the 6000 level or higher unless approved by the Director of Graduate Studies.

- **College of Natural Sciences and Mathematics**
  - All Graduate level courses, with the exception of the following:
    - COSC 6301, 6302, 6303, 6304, 6305, 6306, 6308, 6309, 6310
    - GEOL 6321, 6322
- MATH 5310
- PHYS 5311, 5312, 5397

- **College of Business Administration:**
  - All courses at the 6000 level or higher, with the exception of any courses in General Business Administration (GENB).
  - Reminder: course(s) that do not receive a letter grade, but are graded S, U, or W will not be counted towards the degree plan.

### Table of Specialization Areas in the MSEE Non-thesis Program

<table>
<thead>
<tr>
<th>COURSE NUMBER</th>
<th>COURSE TITLE</th>
<th>CONTROL AND POWER SYSTEMS (POWER &amp; ENERGY SYSTEMS)</th>
<th>ELECTROMAGNETICS AND MICROELECTRONICS</th>
<th>ELECTRONICS AND COMPUTERS</th>
<th>SIGNALS AND COMMUNICATIONS</th>
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<td>Fundamentals of Ferromagnetic Materials and Devices</td>
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<td>Engineering Analysis I</td>
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<td>MICROELECTRONICS &amp; ELECTRONICS</td>
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<td>Topics In Communication Systems</td>
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<td>ECE 6388</td>
<td>Micro-Nano-Electro-Mechanical Systems and Nano Devices</td>
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<td>Advanced Batteries</td>
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<td>ECE 6397</td>
<td>Graphene and Related Materials</td>
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<td>ELECTRONICS AND COMPUTERS</td>
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<td>Robust Control Systems</td>
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<td>Advanced Topics in Electromagnetic Waves</td>
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<td>PES 6314</td>
<td>Adjustable Speed Motor Drive Systems</td>
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Master of Science in Computer & Systems Engineering (MSCSE) Program

To receive the degree of Master of Science, the student is required to complete (on a part-time or full-time basis), with a grade point average of at least 3.0, a minimum of 30 semester credit hours for the non-thesis option or a minimum of 30 semester hours for the thesis option. Upon admission to the program, the student will meet with the Director of the CSE Program to develop a plan that involves any required prerequisite courses as well as the appropriate courses for the degree plan. If the student follows the thesis option he/she will be advised to find an advisor who will supervise and direct his/her research. The thesis advisor will subsequently advise the student about his/her degree plan.

1. Non-thesis Option:

   - A student that follows the non-thesis option should complete a minimum of 30 semester credit hours of coursework (10 courses).
   - Four of these courses should be from the List of Required ECE Courses while the remaining can be from

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<table>
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<tr>
<th>COURSE NUMBER</th>
<th>COURSE TITLE</th>
<th>CONTROL AND POWER SYSTEMS (POWER &amp; ENERGY SYSTEMS)</th>
<th>ELECTROMAGNETICS AND MICROELECTRONICS</th>
<th>ELECTRONICS AND COMPUTERS</th>
<th>SIGNALS AND COMMUNICATIONS</th>
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<td>PES 6316</td>
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</tbody>
</table>
the List of Suggested Elective ECE courses.
- A minimum of six courses should be from the Department of Electrical & Computer Engineering.
- A maximum of four courses can be from outside the ECE department. These courses must be from the Department of Computer Science, College of Engineering, or College of Business Administration. No courses from the College of Technology can be used on the Degree Plan.

Before graduation the student's degree plan will have to be approved by the ECE Academic Advisor and the Director of the Computer and Systems Engineering Program.

2. Thesis Option:

- A student who follows the thesis option should complete a minimum of 30 semester hours (10 courses).
- A minimum of 21 semester credit hours of coursework (7 courses)
- Four of these courses should be from the List of Required ECE Courses
- Six hours of thesis (ECE 6399 and ECE 7399) and
- Three hours of research (ECE 6398)

Before graduation the student's degree plan will have to be approved by the thesis advisor, the ECE Academic Advisor, and the Director of the Computer and Systems Engineering Program.

List of Required ECE Courses

Choose 4 courses from the following required course list:

ECE 6370 Advanced Digital Design
ECE 6346 VLSI Design
ECE 6373 Advanced Computer Architecture
ECE 7373 Advanced Topics in Computer Architecture
ECE 6371 Fundamental Hardware Design
ECE 6372 Advanced Hardware Design
ECE 6328 CMOS Analog Integrate Circuits
ECE 6321 Principles of Internetworking

To satisfy the coursework requirements and form a meaningful coherent program of study, a student may choose the remaining ECE courses from the following list of Approved ECE Elective Courses.

List of Approved ECE Elective Courses

ECE 6313 Neural Networks
ECE 6315 Neural Computation
ECE 6316 Computational and Biological Vision
ECE 6321 Principles of Internetworking
ECE 6322 Introduction to Spread Spectrum Communications
ECE 6323 Optical Fiber Communications
ECE 6324 Digital Telephony
ECE 6328 CMOS analog ICs
ECE 6325 State Space Control systems
ECE 6330 Mobile Radio Communication Systems
ECE 6331 Advanced Telecommunications Engineering
ECE 6332 Wireless Telecommunication Systems
ECE 6335 Digital Control Systems
ECE 6336 Advanced Microprocessor Systems
ECE 6337 Introduction to Stochastic Processes and Random Variables
ECE 6342 Digital Signal Processing
ECE 6347 Advanced Topics in MOS Devices
ECE 6353 RF and Microwave Electronics
ECE 6354 Digital Video in Telecommunications
ECE 6356 Electronic Circuit design
ECE 6364 Digital Image Processing
ECE 6372 Advanced Hardware Design
ECE 6376 Digital Pattern Recognition
ECE 6390 Linear Multivariable Control Systems
ECE 6397 Robotics in Healthcare
ECE 6397 Introduction to Cybersecurity
ECE 6466 Integrated Circuit Engineering
ECE 7342 Advanced Topics in Signal Processing
ECE 7349 Advanced Topics in Microelectronics
ECE 7366 Advanced Process Integration for VLSI

*The above list is subject to change, and other graduate ECE courses can be taken with the approval of the Director of the CSE Program.

*In all cases no credit will be given for courses that are equivalent to courses used in the student? s undergraduate degree.

Restrictions for Courses Outside the ECE Department:

- All CS courses should be at the graduate level.
- COSC 6301, 6302, 6303, 6304, 6305, 6306, 6308, 6309, and 6310 cannot be used on the degree plan.
- All courses from the College of Business Administration should be at the 6000 level or higher.
- Courses from the General Business Administration (GENB) cannot be used on the degree plan.
- All the courses of the College of Engineering should be at the 6000 level or higher.
- Courses that do not receive a letter grade but are graded S, U or W will not be counted towards the degree plan.
- Non-ECE courses with similar content as ECE courses: In case a graduate level (6000 or above) course is offered in another department with similar content to a regularly offered ECE graduate course; graduate ECE students must take the ECE version. If the course in question is not offered regularly, or in the graduating semester, then the students may be allowed to take the non-ECE version by submitting a general petition. Under no circumstances will graduate credit be awarded for both the ECE and the non-ECE on of the course.

**IMPORTANT NOTE
Students must refer to ECE department policies and procedures for any information not covered in this document, including those found at http://www.ee.uh.edu/graduate/procedures-requirements-standards.

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