

# ELECTRICAL ENGINEERING

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Electrical Engineering is concerned with all phases and development of the transmission and utilization of electric energy and intelligence. From communication systems to electronic components that run computers and motor vehicles, electrical engineers design products and systems that meet the needs of today and tomorrow's electrical and electronic systems.

## About this Program

- **College:** Herbert Wertheim College of Engineering (<http://catalog.ufl.edu/UGRD/colleges-schools/UGENG/>)
- **Degree:** Bachelor of Science in Electrical Engineering
- **Credits for Degree:** 128

*To graduate with this major, students must complete all university, college, and major requirements.*

## Department Information

Electrical engineers study electricity and design electrical systems that solve problems—how to make your smartphones smarter; how to make your refrigerator run more efficiently; coming up with the optimal temperature to heat pizza in your microwave; designing the audio and visual technology that brings movies to life.

**Website** (<https://www.ece.ufl.edu/>)

## CONTACT

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Map (<http://campusmap.ufl.edu/#/index/0722>)

## Curriculum

- Combination Degrees
- Computer Engineering
- Electrical Engineering
- Electrical Engineering Minor

While it is essential that electrical engineers understand the fundamentals of their chosen fields, they must also understand the role that other branches of engineering play in completed work. The curriculum provides a foundation in basic engineering as well as depth and breadth in electrical engineering and sufficient electives to allow specialization in academic areas including:

- Electronic devices and circuits
- Electromagnetics, power and, photonics
- Computers, communications, and systems and controls

The curriculum also prepares an engineer for professional licensure.

The department's extensive laboratory facilities and varied research programs assist in both experimental and theoretical approaches to electrical and computer engineering.

## Admission Requirements

It is the department's policy to admit the best-qualified students as demonstrated by academic achievement.

To be admitted, a student must have an overall 2.5 grade point average in critical-tracking courses, based on the first two attempts in eight professional courses and have earned a minimum grade of C in each course of Calculus 1, Calculus 2, Calculus 3, Physics with Calculus 1, Physics with Calculus 2, Differential Equations and General Chemistry. Only the first two attempts (including withdrawals and drops) in each course will be considered for admission to or retention in the department.

## Department Requirements

A minimum grade of C is required in any course transferred into the junior-senior years from another institution.

Courses marked below with a footnote<sup>1</sup> must be completed with minimum grade of C. For a course to be used as a prerequisite for an EEE/EEL-prefixed course, a minimum grade of C is required in the prerequisite course. Any 3000/4000 level EEL/EEE-prefixed course not taken to satisfy the

breadth or depth requirement can be applied as EE technical elective, excluding EEL 3834 (only counts for computer programming requirement) EEL 3003, and EEL 3872, which does not apply toward degree requirements.

ECE majors must have an overall 2.0 GPA in all ECE courses to meet degree requirements.

**A student must complete both EEL 3111C and EEL 3701C before taking any 4000-level EEE or EEL course. Electrical Engineering majors must have EEL 3923C completed or in progress to apply for the IPPD program.**

More Info (<http://www.ippd.ufl.edu/>)

Any course taken to satisfy a degree requirement (General Education, required course, or technical elective), with the exception of EGN 4912, EEL 4948, and EEL 4949, cannot be taken S/U.

An electrical engineering student whose cumulative, upper-division or department grade point average falls below 2.0 or whose preprofessional grades do not meet department admission requirements will be placed on academic probation and be required to prepare a probation contract with an ECE academic advisor. If a student is not making normal academic progress, they will be placed on academic probation.

Students normally are given two terms in which to remove their deficit points. Students who do not satisfy the conditions of the first term of probation may be dismissed from the department.

All graduating seniors must complete an ECE Exit Questionnaire with their advisor before graduating.

## Educational Objectives

The objectives of the Electrical Engineering program at the University of Florida are to prepare students to be good citizens engaged in ethical engineering for the betterment of society and enabling them, so that within a few years of graduation, they:

1. Have successful careers providing leadership in a dynamic industry that is global, multi-disciplinary, and evolving;
2. Are excelling in the top advanced studies programs in the world.

## Goals

The baccalaureate program prepares students to embark upon professional careers in electrical and computer engineering or to begin graduate study. The department's educational objectives are consistent with the ABET general criteria for accrediting programs in engineering in the United States.

## Mission

The department offers undergraduate and graduate programs in electrical and computer engineering and conducts research to serve the needs of Florida and the nation.

### Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (<https://cpm.flvc.org/advance-search/>) may be used for transfer students.

## Semester 1

- Complete 1 of 7 tracking courses. MAC 2311, MAC 2312, MAC 2313, MAP 2302, PHY 2048, PHY 2049, and CHM 2045 or CHM 2095 must be completed with minimum grade of C in each course within two attempts (including withdrawals).
- 2.5 GPA required for all 7 critical-tracking courses
- 2.0 UF GPA required

## Semester 2

- Complete 1 additional critical-tracking course with the appropriate minimum grade within two attempts
- 2.5 GPA required for all 7 critical-tracking courses
- 2.0 UF GPA required

## Semester 3

- Complete 2 additional critical-tracking courses with the appropriate minimum grades within two attempts
- 2.5 GPA required for all 7 critical-tracking courses
- 2.0 UF GPA required

## Semester 4

- Complete 2 additional critical-tracking courses with the appropriate minimum grades within two attempts
- 2.5 GPA required for all 7 critical-tracking courses
- 2.0 UF GPA required

## Semester 5

- Complete remaining 7 critical-tracking courses with the appropriate minimum grades within two attempts
- Complete first Electrical Engineering Breadth course
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

## Semester 6

- Complete the 2 remaining Electrical Engineering Breadth required courses.
- Complete first Electrical Engineering Depth course
- 2.0 UF GPA required

## Semester 7

- Complete EEL 3923C
- Complete the second Electrical Engineering Depth course
- Complete 3 EE Technical Electives (9 credits)
- 2.0 UF GPA required

## Semester 8

- Complete EEL 4924C
- Complete remaining Electrical Engineering Technical Electives (7-10 credits)
- 2.0 UF GPA required

### Model Semester Plan

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

*This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.*

Course	Title	Credits
<b>Semester One</b>		
Quest 1 (Gen Ed Humanities; Writing Requirement)		3
Select one:		3
CHM 2045	General Chemistry 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Biological and Physical Sciences)	
CHM 2095	Chemistry For Engineers 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Biological and Physical Sciences)	
CHM 2045L	General Chemistry Laboratory (Gen Ed Physical Sciences)	1
MAC 2311	Analytic Geometry and Calculus 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Mathematics)	4
State Core Composition (Writing Requirement)		3
	<b>Credits</b>	<b>14</b>
<b>Semester Two</b>		
Quest 2 (Gen Ed Social and Behavioral Sciences (Writing Requirement))		3
EEL 3000	Introduction to Electrical Engineering <sup>1</sup>	2
MAC 2312	Analytic Geometry and Calculus 2 ( <b>Critical Tracking</b> ; Gen Ed Mathematics)	4
PHY 2048 & 2048L	Physics with Calculus 1 and Laboratory for PHY 2048 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	4
Computer Programming elective		3
	<b>Credits</b>	<b>16</b>
<b>Semester Three</b>		
MAC 2313	Analytic Geometry and Calculus 3 ( <b>Critical Tracking</b> ; Gen Ed Mathematics)	4
PHY 2049 & 2049L	Physics with Calculus 2 and Laboratory for PHY 2049 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	4

EEL 3850	Data Science for ECE	4
State Core Gen Ed Humanities ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> )		3
<b>Credits</b>		<b>15</b>
<b>Semester Four</b>		
EEL 3111C	Circuits 1 <sup>1</sup>	4
EEL 3135	Introduction to Signals and Systems <sup>1</sup>	4
MAP 2302	Elementary Differential Equations ( <b>Critical Tracking</b> )	3
State Core Social and Behavioral Sciences with International (Writing Requirement)		3
<b>Credits</b>		<b>14</b>
<b>Summer After Semester Four</b>		
EEL 3701C	Digital Logic and Computer Systems	4
ENC 2256	Writing in the Disciplines	3
<b>Credits</b>		<b>7</b>
<b>Semester Five</b>		
EEL 3008	Physics of Electrical Engineering <sup>1</sup>	3
EEL 3112	Circuits 2 <sup>1</sup>	3
EEE 3308C	Electronic Circuits 1 <sup>1</sup>	4
State Core Social and Behavioral Sciences-Approved Writing Course (Writing Requirement)		3
Interdisciplinary Elective #1 ( <b>Critical Tracking</b> ) <sup>1</sup>		3
<b>Credits</b>		<b>16</b>
<b>Semester Six</b>		
EEL 4837	Programming for Electrical Engineering 2	3
Electrical Engineering Breadth electives #1 and #2 ( <b>Critical Tracking</b> ) <sup>1</sup>		6
Electrical Engineering Technical Elective		3
Interdisciplinary elective #2		3
<b>Credits</b>		<b>15</b>
<b>Semester Seven</b>		
EEL 3923C	Electrical Engineering Design 1 ( <b>Critical Tracking</b> ) <sup>1</sup>	3
Electrical Engineering Depth elective #1 ( <b>Critical Tracking</b> ) <sup>1</sup>		3
Electrical Engineering Technical electives ( <b>Critical Tracking</b> )		6
Electrical Engineering Breadth electives #3		4
<b>Credits</b>		<b>16</b>
<b>Semester Eight</b>		
Select one EE Design 2 course:		3
EEL 4924C	Electrical Engineering Design 2 ( <b>Critical Tracking</b> ) <sup>1</sup>	
EGN 4952	Integrated Product and Process Design 2 ( <b>Critical Tracking</b> )	
Electrical Engineering Technical electives ( <b>Critical Tracking</b> )		9
Electrical Engineering Depth elective #2		3
<b>Credits</b>		<b>15</b>
<b>Total Credits</b>		<b>128</b>

<sup>1</sup> Completed with a minimum grade of C. In order to use a course as a prerequisite course for course used as a prerequisite for an EEE/EEL-prefixed course, a minimum grade of C is required in the prerequisite course. Any 3000/4000-level EEL/EEE-prefixed course not taken to satisfy the breadth or depth requirement can be applied as an EE technical elective, excluding EEL 3834 only counts for computer programming requirement, EEL 3003, which does not apply toward degree requirements.

## Approved Electives

### Computer Programming | Select One

Code	Title	Credits
COP 2274	C++ Programming for Engineers	3
EEL 3834	Programming for Electrical Engineering 1	3

### Electrical Engineering Breadth | 10 Credits

Code	Title	Credits
EEL 3211C	Basic Electric Energy Engineering	4
EEE 3396	Solid-State Electronic Devices	3
EEE 4260	Bioelectrical Systems	3
EEE 4306	Electronic Circuits 2	3

or EEE 4310	VLSI Circuits and Technology 1	
EEL 3472	Fundamentals of Electromagnetic Fields	3
EEL 4514C	Communication Systems and Components	4
EEL 4657C	Linear Control Systems	4
EEL 4744C	Microprocessor Applications	4
EEL 4750	Foundations of Digital Signal Processing	3
EEE 4773	Fundamentals of Machine Learning	3

## Electrical Engineering Depth | 6 Credits

Select one EE Depth course from 2 different EE Breadth areas.

More Info ([https://www.ece.ufl.edu/sites/default/files/pictures/EE Curriculum breadth-depth chart.pdf](https://www.ece.ufl.edu/sites/default/files/pictures/EE%20Curriculum%20breadth-depth%20chart.pdf))

## Interdisciplinary Technical Electives | 6 Credits

Students are able to select courses that are 3000-4000 level from the Biology/Biochemistry courses (prefixes of BSC, BCH, CHM, PCB, and ZOO); Mathematics courses (prefixes of MAA, MAD, MAP, and MAS); Physics courses (prefixes of PHY and PHZ). Students are able to count CHM 2046, CHM 2210, and CHM 2211. Students are able to select courses that are 3000-4000 level from HWCoe (non-ECE) courses. Students can count EEL 3872, EML 2023, EGM 2511, and PHI 3681.

## Electrical Engineering Technical Electives | 18 Credits

Any 3000 level or above course in ECE, with the exception of EEL 3003, EEL 3008, and EEL 3872.

The total credits of EE breadth and EE technical electives should equal 28 credits.

## Academic Learning Compact

Electrical Engineering emphasizes development of the transmission and utilization of electric energy and intelligence. Electrical engineers design products and systems that meet the needs of today and tomorrow's electrical and electronic systems. Students will be able to design communication systems; design the electronic components that run computers, motor vehicles, TVs, stereo systems, and robots for automated factories; design aircraft and spacecraft control systems; design utility and industrial power systems; and design biological and biomedical systems.

The Electrical Engineering BS Program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org> (<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.abet.org%2F&data=05%7C01%7CDMAYH%40eng.ufl.edu%7C71f1da0d2bb2405acf0908db1519ea82%7C0d4da0f84a314d76ace60a62331e1b84%7C0%7C0%7C638126973271573797%7CUnknown%7CTWFPbGZsb3d8eyJWljoimc4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IklhaWwILCJXVCi6Mn0%3D%7C3000%7C%7C&sdata=Dc6bpEcUU8fM3vMsOTj6pGPQyLzoSeoS8v2s%2BFVnBE%3D&reserved=0>), under the General Criteria and the Program Criteria for Electrical, Computer, Communications, Telecommunication(s) and Similarly Named Engineering Programs.

## Before Graduating Students Must

- Pass an assessment of performance on a major design experience. Assessment will be provided by two or more faculty and/or industry practitioners.
- Pass assessment in two courses of individual assignments targeted to each learning outcome. Assessment will be provided by the instructor of the course according to department standards.
- Complete an exit interview in your final semester.
- Complete requirements for the baccalaureate degree, as determined by faculty.

## Students in the Major Will Learn to

### Student Learning Outcomes | SLOs

#### Content

1. Identify, describe, and interpret mathematics, science, and engineering principles to electrical engineering problems.

#### Critical Thinking

2. Design and conduct electrical engineering experiments as well as analyze and interpret data.
3. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

#### Communication

4. Convey technical data and design information effectively for a range of audiences using a variety of methods and media.

## Curriculum Map

*I = Introduced; R = Reinforced; A = Assessed*

Courses	SLO 1	SLO 2	SLO 3	SLO 4
EEL 3000				I, A
EEL 3008	A			
EEL 3135	A			
EEL 3701C		A	I	R
EEL 3923C			A	R
EEL 4924C		A	A	A

## Assessment Types

- Homework assignments
  - Exam questions
  - Design projects and reports
  - Presentations
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