

# COMPUTER ENGINEERING

Computer engineering (CpE) is a discipline that embodies the science and technology of design, construction, implementation and maintenance of software and hardware components of computing systems and computer-controlled equipment. Studies in computer engineering integrate fields from both computer science (CS) and electrical engineering (EE).

## About this Program

- **College:** Herbert Wertheim College of Engineering
- **Degree:** Bachelor of Science in Computer Engineering
- **Credits for Degree:** 126
- **Additional Information**
- **Related Computer Engineering Programs**

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

Computer engineering (CpE) brings a core competency and unique value of integrated knowledge in both computer software and hardware, providing a balance among computer systems, hardware and software as well as theory and applications. Specialization in computer engineering is provided via technical electives from the Department of Computer and Information Science ([www.cise.ufl.edu](http://www.cise.ufl.edu)) and Engineering and the Department of Electrical and Computer Engineering ([www.ece.ufl.edu](http://www.ece.ufl.edu)). By properly choosing electives, students can specialize in knowledge areas such as computer architecture, computer system engineering, digital signal processing, embedded systems, intelligent systems, networking and communication and security. Also, opportunities for cooperative education provide students a better understanding of the industrial applications of computer engineering technologies. Graduates will be prepared to pursue graduate studies in computer engineering or they can choose from many different careers related to computers and their applications in high technology environments.

## Educational Objectives

The objective of the program leading to the Bachelor of Science in Computer Engineering is to prepare a student such that three to five years after graduation, a CpE graduate will:

- Excel in a career utilizing their education in computer engineering
- Continue to enhance their knowledge
- Be effective in multidisciplinary and diverse professional environments
- Provide leadership and demonstrate professional integrity

## Mission

- To educate undergraduate majors as well as the broader campus community in the fundamental concepts of the computing discipline
- To create and disseminate computing knowledge and technology
- To use our expertise in computing to help society solve problems.

## Admission Requirements

Successful applicants must have earned a 2.5 grade point average, based on the first two attempts, in the eight preprofessional 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, General

Chemistry 1, and Differential Equations. Only the first two attempts (including withdrawals) in each course will be considered for admission to or retention in the department.

## Computer Engineering Requirements

A minimum grade of C is required for each critical-tracking course and the critical-tracking GPA must be a minimum of 2.5.

A minimum grade of C is required in any computer engineering course that is a prerequisite for another computer engineering course. The prerequisite course and its subsequent course cannot be taken the same term, even if the prerequisite course is being repeated.

Minimum grades of C are required in the following:

Code	Title	Credits
COP 3502	Programming Fundamentals 1	3
COP 3503	Programming Fundamentals 2	3
EEL 3701C	Digital Logic and Computer Systems	4
ENC 3246	Professional Communication for Engineers	3
CpE Design 2; select one of the following:		
CEN 4914	Computer and Information Science and Engineering Design 2	
CIS 4914	Senior Project	
EEL 4913	Integrated Product and Process Design 2	
EEL 4924C	Electrical Engineering Design 2	

A CpE major grade point average (GPA) is calculated as the average of the grades of all the CISE and ECE courses taken by the student. CpE students must maintain a cumulative, upper-division and CpE major GPA minimum of 2.0.

Students who do not meet these requirements will be placed on academic probation and will be required to prepare a probation contract with a CpE advisor. Students are normally given two terms to remove their deficit points; however, students who do not satisfy the conditions of the first term of probation may be dismissed from the program.

All graduating seniors must complete an exit survey with their advisor before graduating.

## Related Computer Engineering Programs

- Combined Degree
- Computer and Information Science and Engineering minor

### Critical Tracking

Critical Tracking records each student's progress in courses that are required for entry to 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 may be used for transfer students.

## Semester 1

- Complete 1 of 8 critical-tracking courses with a minimum grade of C within two attempts: CHM 2045 or CHM 2095, CHM 2046 or CHM 2096 or a 2000-level or higher advisor-approved science course, MAC 2311, MAC 2312, MAC 2313, MAP 2302, PHY 2048, PHY 2049
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

## Semester 2

- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

## Semester 3

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

## Semester 4

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

## Semester 5

- Complete all 8 critical-tracking courses with minimum grades of C in each course within two attempts
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

### Model Semester Plan

Students are expected to complete the general education International (GE-N) and Diversity (GE-D) requirements. This is often done concurrently with another general education requirement, typically GE-C, H, or S.

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>		
Select one:		3
CHM 2045	General Chemistry 1 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	
CHM 2095	Chemistry for Engineers 1 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	
CHM 2045L	General Chemistry 1 Laboratory (Gen Ed Physical Sciences)	1
COP 3502	Programming Fundamentals 1	3
IUF 1000	What is the Good Life (Gen Ed Humanities)	3
MAC 2311	Analytic Geometry and Calculus 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Mathematics)	4
State Core Gen Ed Social and Behavioral Sciences (Writing requirement, 6,000 words)		3
	Credits	17
<b>Semester Two</b>		
Select one:		3
CHM 2046	General Chemistry 2 ( <b>Critical Tracking</b> )	
CHM 2096	Chemistry for Engineers 2 ( <b>Critical Tracking</b> )	

	Gen Ed Biological Sciences ( <b>Critical Tracking</b> ; 2000 level or above)	
COP 3503	Programming Fundamentals 2	3
MAC 2312	Analytic Geometry and Calculus 2 ( <b>Critical Tracking</b> ; State Core Gen Ed Mathematics)	4
PHY 2048	Physics with Calculus 1 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	3
PHY 2048L	Laboratory for Physics with Calculus 1 (Gen Ed Physical Sciences)	1
ENC 1101	Expository and Argumentative Writing (Gen Ed Composition; Writing Requirement: 6,000 words)	3
	Credits	17

<b>Semester Three</b>		
COT 3100	Applications of Discrete Structures	3
EEL 3701C	Digital Logic and Computer Systems	4
MAC 2313	Analytic Geometry and Calculus 3 ( <b>Critical Tracking</b> ; Gen Ed Mathematics)	4
PHY 2049	Physics with Calculus 2 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	3
PHY 2049L	Laboratory for Physics with Calculus 2	1
ENC 3246	Professional Communication for Engineers (State Core Gen Ed Composition; Writing Requirement: 6,000 words)	3
	Credits	18

<b>Semester Four</b>		
CDA 3101	Introduction to Computer Organization	3
COP 3530	Data Structures and Algorithm	4
EEL 3111C	Circuits 1	4
MAP 2302	Elementary Differential Equations ( <b>Critical Tracking</b> )	3
Gen Ed Social and Behavioral Sciences with Diversity or International; Writing Requirement: 6,000 words		3
	Credits	17

<b>Semester Five</b>		
State Core Gen Ed Humanities with Diversity or International		3
EEL 3744C	Microprocessor Applications	4
MAS 3114	Computational Linear Algebra	3
CEN 3031	Introduction to Software Engineering	3
College breadth elective		2-3
	Credits	15-16

<b>Semester Six</b>		
EEL 4712C	Digital Design	4
College breadth elective		3
Engineering ethics course		1-2
Technical electives		6
	Credits	14-15

<b>Semester Seven</b>		
Select one CpE Design 1 course:		3
CEN 3913	Computer and Information Science and Engineering Design 1	
EEL 3923C	Electrical Engineering Design 1	
EEL 4912/ CIS 4912C	Integrated Product and Process Design 1	
COP 4600	Operating Systems	3
EEL 3135	Introduction to Signals and Systems	4
STA 3032	Engineering Statistics	3
Technical elective		3
	Credits	16

<b>Semester Eight</b>		
Select one CpE Design 2 course:		3

CEN 4914	Computer and Information Science and Engineering Design 2	
EEL 4924C	Electrical Engineering Design 2	
EEL 4913/ CIS 4913C	Integrated Product and Process Design 2	
Technical electives		9
	Credits	12
	Total Credits	126

### Approved Electives

#### CpE Technical Electives: 18 Credits

- At least 12 credits must be from the CISE and/or ECE department(s). These courses must be 3000-level or higher.
- Courses not permitted as technical electives: EEL 3003, CGS 3063, and CGS 3065
- A CpE student will have credit for two programming courses (Java and C++). One additional programming language course (not Java or C++) can count as a technical elective. COP 3275 and EEL 3834 are acceptable.
- A maximum of 6 credits can come from the following categories:
  - 4000-level courses in the mathematics department
  - 3000-level courses in the physics department
  - 4000-level courses in the statistics courses
  - 3000-level courses in any Herbert Wertheim College of Engineering department
  - Any advisor-approved course

### Academic Learning Compact

The Bachelor of Science in Computer Engineering is concerned with the theory, design, development and application of computer systems and information processing techniques. Students will be equally proficient working with computer systems, hardware and software, as with computer theory and applications.

Accredited by the Engineering Accreditation Commission of ABET.

## Before Graduating Students Must

- Pass assessment according to department rubric of student performance on a major design experience.
- Pass assessment in one or more core courses of individual assignments targeted to each SLO.
- Complete requirements for the baccalaureate degree, as determined by faculty.

## Students in the Major Will Learn to

### Student Learning Outcomes (SLOs)

#### Content

1. Apply knowledge of mathematics and science to computer engineering problems.
2. Design and conduct computer-engineering experiments, analyzing and interpreting the data.

#### Critical Thinking

3. Design a computer engineering system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

### Communication

4. Communicate technical data and design information effectively in writing and in speech to other computer scientists and engineers.

### Curriculum Map

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

Courses	SLO 1	SLO 2	SLO 3	SLO 4
CEN 3031				I, A
CEN 4914 or EEL 4924C	A	A	A	A
COP 3504			I	
COT 4501 or EEL 3135	I, A	I, A		

### Assessment Types

- Assignments
- Exams
- Reports
- Exit survey