

# COMPUTER SCIENCE | HERBERT WERTHEIM COLLEGE OF ENGINEERING

The Computer Science program combines a strong engineering-oriented technical basis with a flexible interdisciplinary component and an emphasis on communication skills. This flexibility is increasingly important as computers become more important tools in an ever-increasing number of disciplines.

## About this Program

- **College:** Herbert Wertheim College of Engineering (<http://catalog.ufl.edu/UGRD/colleges-schools/UGENG/>)
- **Degree:** Bachelor of Science in Computer Science
- **Credits for Degree:** 120
- **More Info**

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

## Department Information

The mission of the Department of Computer & Information Science & Engineering is to educate students, as well as the broader campus community, in the fundamental concepts of the computing discipline; to create and disseminate computing knowledge and technology; and to use expertise in computing to help society solve problems. Website (<https://www.cise.ufl.edu/>)

### CONTACT

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Map (<http://campusmap.ufl.edu/#/index/0042>)

### Curriculum

- Combination Degrees
- Computer and Information Science and Engineering Minor
- Computer and Information Science and Engineering Minor UF Online
- Computer Science UF Online
- Computer Science | CLAS
- Computer Science | Herbert Wertheim College of Engineering
- Digital Arts and Sciences | Bachelor of Science

Students in the engineering computer science (EG-CSE) program will satisfy the same requirements for general education and obtain the same engineering preprofessional background in mathematics and science as other engineering students. The program contains a strong technical component comprising a set of required courses covering essential areas in computing and a set of technical electives enabling students to deepen their knowledge in chosen areas of computer science and engineering.

In addition, the program includes a set of interdisciplinary electives in an area of the student's choice from anything the university offers. Students may choose an established minor, a predefined track or if nothing meets their needs, they can work with an advisor to develop their own program.

Thus, students will not need to wait for an interdisciplinary program to be established; they can create their own.

To answer the demands of industry for employees with both technical competence and the ability to communicate effectively, the program requires communication courses beyond the usual general education requirements for engineering.

## Department Requirements

Students must complete all critical-tracking courses with minimum grades of C in each course and the critical-tracking GPA must be 2.5 minimum. A minimum grade of C is required in all other courses that are prerequisites to a required course: CDA 3101, COP 3502C, COP 3503C, COP 3530, COP 4600, and COT 3100. In addition, CISE requires all computer science students to maintain a cumulative, upper-division and department grade point average 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 CISE 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 department.

Students may opt to take COP 3504C in lieu of COP 3502C and COP 3503C. If elected, students will need to complete an additional 4 credits to complete the degree program.

## Placement

Students who have scored at least a 4 or 5 on the AP Computer Science exam are eligible to start the programming fundamentals sequence with COP 3503C. Students will need to see an advisor in the major to adjust their degree audit.

## Required Courses

Code	Title	Credits
<b>Foundational</b>		
ENC 3246	Professional Communication for Engineers	3
MAC 2311	Analytic Geometry and Calculus 1	4
MAC 2312	Analytic Geometry and Calculus 2	4
MAC 2313	Analytic Geometry and Calculus 3	4
MAS 3114	Computational Linear Algebra	3
PHY 2048	Physics with Calculus 1	4
& 2048L	and Laboratory for Physics with Calculus 1	
PHY 2049	Physics with Calculus 2	4
& 2049L	and Laboratory for Physics with Calculus 2	
STA 3032	Engineering Statistics	3
Writing or public speaking course, as approved by department		
<b>Computing Core</b>		
COP 3502C	Programming Fundamentals 1	4
COP 3503C	Programming Fundamentals 2	4
COP 3530	Data Structures and Algorithm	3
COT 3100	Applications of Discrete Structures	3
<b>Major Core</b>		
CDA 3101	Introduction to Computer Organization	3
CEN 3031	Introduction to Software Engineering	3
CIS 4301	Information and Database Systems 1	3
CIS 4914	Senior Project	3
or EGN 4952	Integrated Product and Process Design 2	
CNT 4007	Computer Network Fundamentals	3
COP 4020	Programming Language Concepts	3
COP 4533	Algorithm Abstraction and Design	3

COP 4600	Operating Systems	3
EGS 4034	Engineering Ethics and Professionalism	1
or CGS 3065	Legal and Social Issues in Computing	
<b>Major Electives</b> <sup>1</sup>		<b>18</b>
Select from:		
CIS 4905	Individual Study in CISE	
CIS 4930	Special Topics in CISE	
CIS 4940	Practical Work	
CIS 4949	Co-Op Work in CISE	
EGN 4912	Engineering Directed Independent Research	
EGN 4951	Integrated Product and Process Design 1	
EIN 3354	Engineering Economy	
EEL 3701C	Digital Logic and Computer Systems	
EEL 4744C	Microprocessor Applications	
Any 4000-level or higher CISE course, beyond the Core Requirements		
<b>Interdisciplinary Electives</b>		<b>14</b>
<b>Total Credits</b>		<b>100</b>

<sup>1</sup> Students should check prerequisites when planning their major electives. Students should discuss electives with an advisor in the department. Individual study, co-op, internship, research, and special topics credits must be approved by an advisor in the department.

Technical Electives may also be:

- Any 4000-level or higher ECE or PHY course not taken to fulfill some other requirement, excluding EEL 4384 and most CGS courses.
- MAP 2302 or any 4000-level math or statistics course with the prefix STA, MAA, MAD, MAP, MAS, or MHF not fulfilling another requirement.
- Up to two 3000-level CAP courses.
- EGN 4038, EGN 4641, EGN 4643, EGS 4038, EGS 4641, or EGS 4643.

## Interdisciplinary Electives | Select one option

### Option A

14 credits applicable toward formal minor and not counting for other requirements; completion of minor not required if it exceeds 14 credits. If completed minor contributes less than 14 credits, remaining credits can be fulfilled with additional 3000-level coursework in the area of the minor, 3000-level CISE courses, or 3000-level Engineering courses.

### Option B

14 credits in a concentration area outside of CISE at 3000-level or higher (advisor approval required).

### Option C

14 credits arranged with a department of interest which does not offer a formal minor.

## 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 (<http://www.flvc.org/cpp/displayRecord.jsp?cip=140901&track=01>) may be used for transfer students.

## Semester 1

- Complete 1 of 6 critical-tracking courses with a minimum grade of C within two attempts: MAC 2311, MAC 2312, MAC 2313, COP 3502C, 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 1 additional critical-tracking course 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 6 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

## Semester 6

- Complete COP 3503C and COT 3100
- 2.0 departmental GPA required
- 2.0 UF GPA required

## Semester 7

- Complete COP 3530
- 2.0 departmental GPA required
- 2.0 UF GPA required

## Semester 8

- Complete COP 4600 and COP 4020
- 2.0 departmental GPA required
- 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>		
Quest 1 (Gen Ed Humanities)		3
COP 3502C	Programming Fundamentals 1 ( <b>Critical Tracking</b> )	4
EGN 2020C	Engineering Design & Society (Gen Ed Physical Sciences)	2
MAC 2311	Analytic Geometry and Calculus 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Mathematics)	4
<b>Credits</b>		<b>13</b>
<b>Semester Two</b>		
COP 3503C	Programming Fundamentals 2	4
COT 3100	Applications of Discrete Structures	3
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 Physics with Calculus 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Physical Sciences)	4
<b>Credits</b>		<b>15</b>
<b>Summer After Semester Two</b>		
ENC 1101 or ENC 1102	Expository and Argumentative Writing (State Core GE Composition; Writing Requirement: 6,000 words) or Argument and Persuasion	3
State Core Gen Ed Biological or Physical Sciences ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> )		3
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>9</b>
<b>Semester Three</b>		
CDA 3101	Introduction to Computer Organization	3
COP 3530	Data Structures and Algorithm	3
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 Physics with Calculus 2 ( <b>Critical Tracking</b> ; Gen Ed Physical Sciences)	4
<b>Credits</b>		<b>14</b>
<b>Semester Four</b>		
CEN 3031	Introduction to Software Engineering	3
CIS 4301	Information and Database Systems 1	3
ENC 3246	Professional Communication for Engineers (Gen Ed Composition; Writing Requirement: 6,000 words)	3
MAS 3114 or MAS 4105	Computational Linear Algebra or Linear Algebra 1	3-4
Gen Ed Social and Behavioral Sciences with Diversity or International		3
<b>Credits</b>		<b>15-16</b>
<b>Semester Five</b>		
Qyest 2 (Gen Ed Social and Behavioral Sciences OR Gen Ed Biological or Physical Sciences OR Gen Ed Humanities)		3
COP 4600	Operating Systems	3
STA 3032	Engineering Statistics	3

Technical elective		3
<b>Credits</b>		<b>12</b>
<b>Semester Six</b>		
COP 4020	Programming Language Concepts	3
COP 4XXX	Algorithm Abstraction and Design	3
Interdisciplinary electives		6
Technical elective		3
<b>Credits</b>		<b>15</b>
<b>Summer After Semester Six</b>		
Internship / Co-op (if desired)		
<b>Credits</b>		<b>0</b>
<b>Semester Seven</b>		
CNT 4007	Computer Network Fundamentals	3
EGS 4034 or CGS 3065	Engineering Ethics and Professionalism or Legal and Social Issues in Computing	1-3
Technical electives		6
Interdisciplinary elective		3
<b>Credits</b>		<b>13-15</b>
<b>Semester Eight</b>		
CIS 4913C or CIS 4914	Integrated Product and Process Design 2 (4EG) or Senior Project	3
Technical electives		6
Interdisciplinary electives		5
<b>Credits</b>		<b>14</b>
<b>Total Credits</b>		<b>120</b>

### Academic Learning Compact

The Herbert Wertheim College of Engineering's computer science program combines a strong engineering technical basis with a flexible interdisciplinary component and strong communication skills. This program emphasizes the technical aspects of computer science and is less flexible than the computer science program in the College of Liberal Arts and Sciences.

### 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 science problems.
2. Design and conduct computer-science experiments, analyzing and interpreting the data.

#### Critical Thinking

3. Design a computer science 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
CDA 3101			I	
CEN 3031				I, A
CIS 4914	A	A	A	A
COP 4600	I, A	I, A		

**Assessment Types**

- Assignments
  - Exams
  - Reports
  - Exit survey
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