This program combines the study of computer science with a liberal arts education. It prepares students for employment as computing professionals while offering significant freedom to choose coursework in other areas. The major is especially popular with students who want the technical education in computer science with the flexibility to take other non-technical courses, sometimes in the form of a minor or certificate.

**About this Program**

- **College:** Liberal Arts and Sciences [link]
- **Degree:** Bachelor of 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 [link]

**CONTACT**

Email (nemo@cise.ufl.edu) | 352.505.1578 (tel) | 352.392.1220 (fax)

PO. Box 116120
E301 CSE BUILDING
GAINESVILLE FL 32611-6120
Map [link]

**Curriculum**

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

Computer science majors in CLAS take a solid foundation of core computer science courses while fulfilling requirements for a liberal arts education, including courses from the humanities, social and behavioral sciences, and the study of a foreign language. Questions about the major should be directed to a department advisor.

**Coursework for the Major**

This major requires a minimum of 29 credits in foundation coursework, 35 credits in core coursework, and 6 credits of major electives. A student can transfer in a maximum of four courses toward required core or required major elective coursework. Students must earn minimum grades of C in coursework for the major. An exit interview is required in the student's last semester.

A student can request to transfer in a maximum of four courses toward required core Computer Science or required Computer Science elective coursework, dependent upon courses being deemed equivalent by the Department. Course equivalency requests should begin with the department advising office, followed by the undergraduate coordinator.

Students must earn minimum grades of C in coursework for the major. An exit interview is required in the student's last semester.

**Code** | **Title** | **Credits**
--- | --- | ---
**Required Foundation Coursework**
ENC 3246 | Professional Communication for Engineers | 3
or ENC 2210 | Technical Writing | 1
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 4105 | Linear Algebra 1 | 3-4
or MAS 3114 | Computational Linear Algebra | 1

Select one:

- PHY 2048 | Physics with Calculus 1 & Laboratory for Physics with Calculus 1 | 4-5
- PHY 2053 | Physics 1 & Laboratory for Physics 1 | 4-5
- PHY 2049 | Physics with Calculus 2 & Laboratory for Physics with Calculus 2 | 4-5
- PHY 2054 | Physics 2 & Laboratory for Physics 2 | 4-5
- STA 3032 | Engineering Statistics | 3

**Required Core Coursework**

CDA 3101 | Introduction to Computer Organization | 3
CEN 3031 | Introduction to Software Engineering | 3
COP 3502 | Programming Fundamentals 1 | 3
COP 3503 | Programming Fundamentals 2 | 3
CIS 4301 | Information and Database Systems 1 | 3
CIS 4914 | Senior Project | 3
or CIS 4913C | Integrated Product and Process Design 2 | 3
COP 3530 | Data Structures and Algorithm | 3
COP 4600 | Operating Systems | 3
COT 3100 | Applications of Discrete Structures | 3
COT 4501 | Numerical Analysis: a Computational Approach | 3
or MAD 4401 | Introduction to Numerical Analysis | 3
EEL 3701C | Digital Logic and Computer Systems | 3
EEL 4345C | Digital Design | 3
EEL 4541 | Computer Architecture | 3
ESE 3020C | Engineering Mechanics I | 3
ESE 4101 | Engineering Mechanics II | 3

**Required Major Electives**

Any 4000-level or higher CISE course, beyond the Core Requirements

- CIS 4940 | Practical Work (Internship, 1 credit, repeatable up to 3 credits) | 3
- EGN 4912 | Engineering Directed Independent Research (0-3 credits) | 3
- EEL 3744C | Microprocessor Applications | 3
- EEL 4712C | Digital Design | 3
- EEL 4713C | Digital Computer Architecture | 3

**Total Credits** | **70-73**

1. Students may substitute EGN 4641 and EGS 4034. Please see department advisor to request the substitution.
2. 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.
**Combination Degree Program**

The computer science combination-degree program is a joint program between the colleges of Engineering and Liberal Arts and Sciences, and is coordinated by the Department of Computer and Information Science and Engineering.

**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 3503. Students will need to see an advisor in the major to adjust their degree audit.

**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.

For degree requirements outside of the major, refer to CLAS Degree Requirements: Structure of a CLAS Degree.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (http://www.flvc.org/cpp/displayRecord.jsp?cip=110101&track=01) may be used for transfer students.

<table>
<thead>
<tr>
<th>Semester 1</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete MAC 1147 or MAC 2311</td>
<td></td>
<td>2.0 UF GPA required</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete MAC 2311</td>
<td></td>
<td>2.0 UF GPA required</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 3</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete MAC 2312</td>
<td></td>
<td>2.0 UF GPA required</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 4</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete MAC 2313; and PHY 2053/PHY 2053L or PHY 2048/PHY 2048L</td>
<td></td>
<td>2.5 GPA required for all critical-tracking courses</td>
<td>2.0 UF GPA required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 5</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete COP 3502; and PHY 2054/PHY 2054L or PHY 2049/PHY 2049L</td>
<td></td>
<td>2.5 GPA required for all critical-tracking courses</td>
<td>2.0 UF GPA required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 6</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete COP 3503 and COT 3100</td>
<td></td>
<td>2.0 UF GPA required</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 7</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete COP 3530</td>
<td></td>
<td>2.0 UF GPA required</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 8</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete COP 4600</td>
<td></td>
<td>2.0 UF GPA required</td>
<td></td>
</tr>
</tbody>
</table>

**Model Semester Plan**

Students are expected to complete the writing requirement while in the process of taking the courses below. Students are also expected to complete the general education international (GE-N) and diversity (GE-D) requirements concurrently with another general education requirement (typically, GE-C, H, or S).

ENC 3246, MAC 2312, MAC 2313, PHY 2049, PHY 2049L, PHY 2054, PHY 2054L, STA 3032, MAS 3114, and MAS 4105 may count towards 3000 level or above electives outside of the major.

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP 3502</td>
<td>Programming Fundamentals 1 (Critical Tracking)</td>
<td>3</td>
</tr>
<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 1 (Critical Tracking; Gen Ed Mathematics)</td>
<td>4</td>
</tr>
<tr>
<td>Quest 1 (Gen Ed Humanities)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>State Core Gen Ed Composition (<a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a>); Writing Requirement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>COP 3503</td>
<td>Programming Fundamentals 2 (Critical Tracking)</td>
<td>3</td>
</tr>
<tr>
<td>COT 3100</td>
<td>Applications of Discrete Structures (Critical Tracking; Gen Ed Mathematics )</td>
<td>3</td>
</tr>
<tr>
<td>MAC 2312</td>
<td>Analytic Geometry and Calculus 2 (Critical Tracking; Gen Ed Mathematics)</td>
<td>4</td>
</tr>
<tr>
<td>Select one:</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>PHY 2053</td>
<td>Physics 1 (Critical Tracking; State Core Gen Ed Physical Sciences)</td>
<td></td>
</tr>
<tr>
<td>PHY 2048</td>
<td>Physics with Calculus 1 (Critical Tracking; State Core Gen Ed Physical Sciences)</td>
<td></td>
</tr>
<tr>
<td>Select one:</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>PHY 2053L</td>
<td>Laboratory for Physics 1 (Critical Tracking; Gen Ed Physical Sciences)</td>
<td></td>
</tr>
<tr>
<td>PHY 2048L</td>
<td>Laboratory for Physics with Calculus 1 (Critical Tracking; Gen Ed Physical Sciences)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-15</td>
</tr>
<tr>
<td>COP 3530</td>
<td>Data Structures and Algorithm (Critical Tracking)</td>
<td>4</td>
</tr>
</tbody>
</table>
MAC 2313  Analytic Geometry and Calculus 3 (Critical Tracking; Gen Ed Mathematics)  4

Select one:

PHY 2054  Physics 2 (Critical Tracking; Gen Ed Physical Sciences)  3

PHY 2049  Physics with Calculus 2 (Critical Tracking; Gen Ed Physical Sciences)  4

Select one:

PHY 2054L  Laboratory for Physics 2 (Critical Tracking; Gen Ed Physical Sciences)  1

PHY 2049L  Laboratory for Physics with Calculus 2 (Critical Tracking; Gen Ed Physical Sciences)  1

State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)  3

Credits  15-16

Semester Four

CDA 3101  Introduction to Computer Organization  3

State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)  3

Gen Ed Social and Behavioral Sciences  6

Elective  3

Credits  15

Semester Five

CEN 3031  Introduction to Software Engineering  3

ENC 3246  Professional Communication for Engineers (Gen Ed Composition)  3

Gen Ed Biological Sciences  3

Foreign language  4-5

Elective  3

Credits  16-17

Semester Six

EEL 3701C  Digital Logic and Computer Systems  4

MAS 3114  Computational Linear Algebra  3

or MAS 4105  Linear Algebra 1  3

Gen Ed Biological Sciences  3

Foreign language  3-5

Credits  13-16

Semester Seven

CIS 4301  Information and Database Systems 1  3

CISE elective  3

COT 4501  Numerical Analysis: a Computational Approach  3

Elective  3

Foreign language course (or elective if 4-3-3 option)  3

Gen Ed Humanities  3

Credits  18

Semester Eight

CIS 4914  Senior Project  3

COP 4600  Operating Systems (Critical Tracking)  3

STA 3032  Engineering Statistics (Gen Ed Mathematics)  3

CISE elective  3

Elective  4

Credits  16

Total Credits  120

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 or 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 a computing system, component or process, analyzing and interpreting the data.
3. Use the techniques, skills and tools necessary for computer science practice.

Critical Thinking

4. Design a computing system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, and health and safety constraints.
5. Identify, formulate and solve computer science problems.

Communication

6. Communicate technical data and design information effectively in writing, in speech and in multidisciplinary teams to other computer scientists.

Curriculum Map

I = Introduced; R = Reinforced; A = Assessed

<table>
<thead>
<tr>
<th>Courses</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
<th>SLO 4</th>
<th>SLO 5</th>
<th>SLO 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDA 3101</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEN 3031</td>
<td>I, A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 4914</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>COP 3504</td>
<td>I</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COP 3530</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COP 4600</td>
<td>R</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COT 3100</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COT 4501</td>
<td>I, A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Types

- Written assignments
- Exams
- Oral reports/presentations
- Exit survey