COLLEGE OF ENGINEERING

COMPUTER SCIENCE B.S.C.S.

TOTAL DEGREE HOURS: 120

The Computer Science program focuses on the design, development, and application of software systems. Additional course work in algorithms, discrete structures, object oriented design, data structures, operating systems, digital logic design, computer architecture, and a wide range of advanced electives extend and supplement the core.

MISSION STATEMENT

In keeping with the mission of the College of Engineering, the Department of Computer Science and Engineering strives for excellence in teaching, research, and public service. Specifically, the Department aspires to:

1. Lead the advancement of computer science, computer engineering, information technology, and cybersecurity through internationally recognized research and education, as well as technology transfer.
2. Prepare students for full and ethical participation in a diverse society and encourage lifelong learning.
3. Educate students in the best practices of the field as well as integrate the latest research into the curriculum.
4. Foster the development of problem solving and communication skills as an integral component of the profession.
5. Provide quality learning experiences through effective classroom practices, active learning styles of teaching, and opportunities for meaningful interactions between students and faculty.

PROGRAM EDUCATIONAL OBJECTIVES AND STUDENT OUTCOMES

The Department has established the following program educational objectives for Computer Science graduates.

Objective 1: Our graduates will apply their knowledge and skills to succeed in their careers and/or obtain advanced degrees.

Objective 2: Our graduates will function ethically and responsibly, and will remain informed and involved as full participants in our profession and society.

Objective 3: Our graduates will creatively solve problems, communicate effectively, and successfully function in multi-disciplinary teams.

Objective 4: Our graduates will apply principles and practices of computing grounded in mathematics and science to successfully complete software-related projects to meet customer business objectives and/or productively engage in research.

The following are the Student Outcomes. Graduates of the program will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]

Student Enrollment Data

Student enrollment data is posted on the Department website.

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UNIVERSITY ADMISSIONS - COLLEGE OF ENGINEERING

Admission to the University is based on the University's Undergraduate Admission Requirements that may be found by clicking on the following urls:

- **Freshman:** https://www.usf.edu/admissions/freshmen/admission-information/requirements-deadlines.aspx
- **Transfer:** https://www.usf.edu/admissions/transfer/admission-information/index.aspx
- **International:** https://www.usf.edu/admissions/international/admission-information/index.aspx

For Admission information specific to the College of Engineering, see the information at College of Engineering.

PROGRESSION REQUIREMENTS IN THE UPPER DIVISION - COMPUTER SCIENCE B.S.C.S.

Computer Science students who have fully met the below requirements and are in good academic standing, may progress into the upper level of the major. Prior to progression into the upper level, a student may take no more than two Departmental courses. The department may have continuation requirements, which specify minimum performance standards in core major courses which must be met before further registration in the department is granted.

1. Completion of:
   - **MAC 2311 - Calculus I Credit(s): 4** OR **MAC 2281 - Engineering Calculus I Credit(s): 4 AND MAC 2312 - Calculus II Credit(s): 4** OR **MAC 2282 - Engineering Calculus II Credit(s): 4**
   - **PHY 2048 - General Physics I - Calculus Based Credit(s): 3 AND PHY 2048L - General Physics I Laboratory Credit(s): 1**
   - All students must complete the equivalent of USF Engineering Calculus I & II, and Calculus-based General Physics I (with lab) with minimum grades of C in each course (grades of C- are insufficient). The minimum overall grade average in these three courses required for progression to the upper level is between 3.0 and 3.8 for any given year. The minimum acceptable grade average will be posted on the Department's website one year prior to the fall semester that the revised grade average is applicable. The computed grade average is based on the best attempts in these courses. These requirements must be met with a maximum of two attempts allowed for each course.
2. Completion of **COP 2510 - Programming Concepts Credit(s): 3** with a minimum grade of B (grade of B- is insufficient) or another introductory programming course covering a modern programming language, with an emphasis on programming concepts and design methodology with a minimum grade of B (grade of B- is insufficient).
3. A minimum overall GPA of 2.0
4. A minimum USF GPA of 2.0

MINIMUM CONTINUATION REQUIREMENTS - COMPUTER SCIENCE B.S.C.S.

Students meeting the above requirements may progress to either of the Computer Science or Computer Engineering degree tracks; however, continuation in the major will be allowed only for students who complete **CDA 3103 - Computer Organization Credit(s): 3** and COP 3514 - Program Design **Credit(s): 3** with minimum grades of B, based on best attempts in each course (grades of B- are insufficient). These requirements must be met with a maximum of two attempts allowed for each course.

DEPARTMENTAL POLICIES

In addition to the College's graduation requirements, the Department has the following policies:

1. Mandatory academic advising and/or mentoring of students.
2. Exit interview and/or survey as a graduation requirement.

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STATE MANDATED COMMON COURSE PREREQUISITES - COMPUTER SCIENCE B.S.C.S.

Following Florida BOG Regulation 8.010, state mandated common course prerequisites are lower-division courses that are required for progression into the upper division of a particular baccalaureate degree program.

Transfer students should complete the State Mandated Common Course Prerequisites at the lower level prior to entering the university. If these courses are not taken at a Florida College System institution, they must be completed before the degree is granted. Successful completion of the common prerequisites alone does not guarantee a student admission into the degree program.

Unless stated otherwise, a grade of C is the minimum acceptable grade in prerequisite courses.

Students qualify for direct entry to the Department if they have completed the following courses at a Florida College System institution or University in the Florida State University System (SUS) and meet all other admissions requirements of the University and College.

- COP XXXX* - 3 credit hours
- MAC X311 **OR** MAC X281 Calculus I - 4 credit hours
- MAC X312 **OR** MAC X282 Calculus II - 4 credit hours
- (PHY X048 and PHY X048L **OR** PHY X048C General Physics I with Lab - 4 credit hours
- (PHY X049 and PHY X049L **OR** PHY X049C General Physics I with Lab - 4 credit hours

- XXX XXXX** - 6 credit hours

*Introductory Programming in C, C++, Java, or equivalent language. Choose programming language required by the university to which the student wishes to transfer.

**Science courses for Science majors.

REQUIRED COURSES: (96 CREDIT HOURS)

MAJOR CORE COURSES: 28 COURSES; 75 CREDIT HOURS

MATH AND SCIENCE COURSES: 7 COURSES; 20 CREDIT HOURS

- MAC 2281 - Engineering Calculus I **Credit(s): 4**
  OR
- MAC 2311 - Calculus I **Credit(s): 4**
- MAC 2282 - Engineering Calculus II **Credit(s): 4**
  OR
- MAC 2312 - Calculus II **Credit(s): 4**
- MAC 2283 - Engineering Calculus III **Credit(s): 4**
  OR
- MAC 2313 - Calculus III **Credit(s): 4**
- PHY 2048 - General Physics I - Calculus Based **Credit(s): 3**
- PHY 2048L - General Physics I Laboratory **Credit(s): 1**
- PHY 2049 - General Physics II - Calculus Based **Credit(s): 3**
- PHY 2049L - General Physics II Laboratory **Credit(s): 1**

BASIC ENGINEERING COURSES: 4 COURSES; 8 CREDIT HOURS

- EGN 3000 - Foundations of Engineering **Credit(s): 0-3**
- EGN 3000L - Foundations of Engineering Lab **Credit(s): 3**
- EGN 3443 - Probability and Statistics for Engineers **Credit(s): 3**
- EGN 4450 - Introduction to Linear Systems **Credit(s): 2**

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SPECIALIZATION COURSES: 14 COURSES; 38 CREDIT HOURS

- COP 2510 - Programming Concepts **Credit(s): 3**
- COP 3514 - Program Design **Credit(s): 3**
- COP 4530 - Data Structures **Credit(s): 3**
- COP 4600 - Operating Systems **Credit(s): 3**
- CDA 3103 - Computer Organization **Credit(s): 3**
- CDA 3201 - Computer Logic and Design **Credit(s): 3**
- CDA 3201L - Computer Logic and Design Lab **Credit(s): 1**
- CDA 4205 - Computer Architecture **Credit(s): 3**
- CDA 4205L - Computer Architecture Lab **Credit(s): 1**
- CEN 4020 - Software Engineering **Credit(s): 3**
- COT 3100 - Introduction to Discrete Structures **Credit(s): 3**
- COT 4400 - Analysis of Algorithms **Credit(s): 3**
- CNT 4419 - Secure Coding **Credit(s): 3**
- CIS 4250 - Ethical Issues and Professional Conduct **Credit(s): 3**

COMPOSITION AND TECHNICAL WRITING COURSES: 3 COURSES; 9 CREDIT HOURS

- ENC 1101 - Composition I **Credit(s): 3**
- ENC 1102 - Composition II **Credit(s): 3**
- ENC 3246 - Communication for Engineers **Credit(s): 3**

MAJOR ELECTIVES: 7 COURSES; 21 CREDIT HOURS

Note: The Department website undergraduate section contains the most up to date list of Departmental upper-level technical electives. Additional electives may be available with a special topics course number (typically, CIS 4930). The prerequisite for Departmental upper-level technical electives is CDA 3201 Computer Logic and Design and COP 4530 Data Structures. Consult with the Department Undergraduate Advisor to learn more about available electives. A maximum of six (6) hours of CIS 4900 and/or any other supervised individual study (including CIS 4915 and CIS 4940) are allowed as Department credit.

SOFTWARE ELECTIVES

- CAP 4034 - Computer Animation Fundamentals **Credit(s): 3**
- CAP 4063 - Web Application Design **Credit(s): 3**
- CAP 4111 - Introduction to Augmented and Virtual Reality **Credit(s): 3**
- CAP 4401 - Image Processing Fundamentals **Credit(s): 3**
- CAP 4410 - Computer Vision **Credit(s): 3**
- CAP 4662 - Introduction to Robotics **Credit(s): 3**
- CAP 4773 - Social Media Mining **Credit(s): 3**
- CEN 4072 - Software Testing **Credit(s): 3**
- CIS 4364 - Cryptology and Information Security **Credit(s): 3**
- CNT 4004 - Computer Networks I **Credit(s): 3**
- CNT 4411 - Computing and Network Security **Credit(s): 3**
- CNT 4800 - Network Science **Credit(s): 3**
- COP 4020 - Programming Languages **Credit(s): 3**
- COP 4365 - Software System Development **Credit(s): 3**
- COP 4520 - Computing in Massively Parallel Systems **Credit(s): 3**
- COP 4620 - Compilers **Credit(s): 3**
- COP 4656 - Software Development for Mobile Devices **Credit(s): 3**
- COP 4710 - Database Design **Credit(s): 3**

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HARDWARE ELECTIVES

- CDA 4203 - Computer System Design **Credit(s): 3**
- CDA 4203L - Computer System Design Lab **Credit(s): 1**
- CDA 4213 - CMOS-VLSI Design **Credit(s): 3**
- CDA 4213L - CMOS-VLSI Design Lab **Credit(s): 1**
- CDA 4253 - Field Programmable Gate Array System Design and Analysis **Credit(s): 3**
- CDA 4322 - Principles of Secure Hardware Design **Credit(s): 3**
- CDA 4621 - Control of Mobile Robots **Credit(s): 3**

THEORY ELECTIVES

- COT 4210 - Automata Theory and Formal Languages **Credit(s): 3**
- COT 4521 - Computational Geometry **Credit(s): 3**

OTHER COURSES

- CIS 4212 - Privacy-Preserving and Trustworthy Cyber-Infrastructures **Credit(s): 3**
- CIS 4345 - Big Data Storage and Analysis with Hadoop **Credit(s): 3**
- CIS 4623 - Practical Cybersecurity **Credit(s): 3**
- CIS 4900 - Independent Study in Computer Science **Credit(s): 1-5**
- CIS 4910 - Computer Science and Engineering Project **Credit(s): 3**
- CIS 4915 - Supervised Research in Computer Science **Credit(s): 1-5**
- CIS 4940 - Industry Internship **Credit(s): 0-6**

COMPUTER SCIENCE B.S.C.S. - ADDITIONAL INFORMATION

GPA REQUIREMENTS

Students must have and maintain a minimum 2.0 semester GPA, 2.0 Math and Science GPA, 2.0 Engineering GPA, 2.0 Specialization GPA, 2.0 USF GPA, and 2.0 overall GPA.

GRADING REQUIREMENTS

Unless otherwise stated, the minimum acceptable grade in all BSCS required math, science, and engineering courses is a C or higher (C- is insufficient). The minimum acceptable grade in specialization courses is a C-, except as stated in the major progression and continuation requirements.

RESIDENCY REQUIREMENTS

Transfer students must complete a minimum number of approved specialization courses in the major at USF. The minimum number of USF specialization credit hours required is established by the respective academic department. In no case will this be less than 18 hours. Basic engineering courses are not considered specialization courses. The University residency requirement must also be met.

A dual degree student must meet the requirements of each major and have a minimum of 18 approved specialization hours taken in the degree granting department beyond those specialization hours required for the first degree.

INTERNSHIP OPPORTUNITIES

The College of Engineering and USF's Career Services Cooperative Education (Co-Op) program provides services for students interested in experiential educational experiences. A wide variety of industries and government agencies offer internships and cooperative education employment opportunities for engineering students. Participants gain valuable expertise in practical applications and other aspects of operations and development in a professional engineering environment. Students normally apply for participation in this program during their first year in the

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College of Engineering and pursue actual internships during their sophomore, junior and senior years. **See the Department Undergraduate Advisor for more information on earning academic credit for internships.**

BACHELOR'S/MASTER'S PATHWAYS

Students majoring in Computer Science have the option to pursue one of the following Bachelor's/Master's Pathways:

- B.S.C.S. in Computer Science and M.S.C.S. in Computer Science

For more information, see the Graduate Catalog.

ACCREDITATION INFORMATION - COLLEGE OF ENGINEERING

This Engineering degree program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

RESEARCH OPPORTUNITIES - COLLEGE OF ENGINEERING

Undergraduate students in any degree program are able to participate in undergraduate research. Several options exist to show mentored undergraduate research activity on a student's official transcript. Those who wish to enroll in an undergraduate research course should consult with their academic advisor to understand how the credit will apply towards the degree requirements. If no credit is needed, students may be eligible to enroll in the 0-credit IDS 4914 - Advanced Undergraduate Research Experience course. This course will not impact degree credits or GPA but will show on an official transcript and document the experience. The Office of High Impact Practices and Undergraduate Research (HIPUR) is able to assist with further inquiries.

ADVISING INFORMATION - COMPUTER SCIENCE B.S.C.S.

Department Undergraduate Advisor: http://www.usf.edu/engineering/cse/undergraduate/contacts.aspx

4 YEAR PLAN OF STUDY - COMPUTER SCIENCE B.S.C.S.

NOTES:

- SCIV - Civics Literacy needs to be completed prior to graduation. For more information, see https://www.usf.edu/undergrad/students/civics-literacy.aspx or talk with your academic advisor.
- Items that are critical are marked with a ✳ and are included in the plan for a student to stay on track.

Potential Entry Level Job Titles:

- Software Developer
- Software Tester
- Software Engineer
- Device Application Developer
- Cloud Software Developer

Potential Entry Level Salary Range:

$55,000 - $85,000

YEAR 1

SEMESTER 1 (FALL)

- MAC 2281 - Engineering Calculus I **Credit(s): 4**
  or MAC 2311 - Calculus I **Credit(s): 4**
- ENC 1101 - Composition I **Credit(s): 3**
- EGN 3000L - Foundations of Engineering Lab **Credit(s): 3** (Meets TGEC - Creative Thinking requirement)
- ✳ EGN 3000 - Foundations of Engineering **Credit(s): 0-3**
- Natural Science Elective (Life or Physical) **Credit(s): 3**

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- NOTE: SCIV - Civics Literacy requirement needs to be fulfilled prior to graduation. See advisor.

Total Credit Hours: 13

SEMESTER 2 (SPRING)

- MAC 2282 - Engineering Calculus II **Credit(s): 4**
  or MAC 2312 - Calculus II **Credit(s): 4**
- ENC 1102 - Composition II **Credit(s): 3**
- PHY 2048 - General Physics I - Calculus Based **Credit(s): 3**
- COP 2510 - Programming Concepts **Credit(s): 3**
- PHY 2048L - General Physics I Laboratory **Credit(s): 1**

Total Credit Hours: 14

SEMESTER 3 (SUMMER)

Please consider pursing High Impact Practice opportunities this semester such as Education Abroad, Internship Opportunities, Community Engagement, or Research Opportunities.

Questions about opportunities? Schedule an appointment with your academic advisor.

YEAR 2

SEMESTER 4 (FALL)

- MAC 2283 - Engineering Calculus III **Credit(s): 4**
  or MAC 2313 - Calculus III **Credit(s): 4**
- PHY 2049 - General Physics II - Calculus Based **Credit(s): 3**
- PHY 2049L - General Physics II Laboratory **Credit(s): 1**
- CDA 3103 - Computer Organization **Credit(s): 3**
- COP 3514 - Program Design **Credit(s): 3**

Total Credit Hours: 14

SEMESTER 5 (SPRING)

- CDA 3201 - Computer Logic and Design **Credit(s): 3**
- CDA 3201L - Computer Logic and Design Lab **Credit(s): 1**
- SGEH - General Education Core Humanities **Credit(s): 3**
- COT 3100 - Introduction to Discrete Structures **Credit(s): 3**
- COP 4530 - Data Structures **Credit(s): 3**

Total Credit Hours: 13

SEMESTER 6 (SUMMER)

- SGES - General Education Core Social Sciences **Credit(s): 3**
- Natural Science Elective (Life or Physical) **Credit(s): 3**
- EGN 3443 - Probability and Statistics for Engineers **Credit(s): 3** (meets TGEI - Information and Data Literacy requirement)

Total Credit Hours: 9

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YEAR 3

SEMESTER 7 (FALL)

- TGED - Human & Cultural Diversity **Credit(s): 3**
- CDA 4205 - Computer Architecture **Credit(s): 3**
- CDA 4205L - Computer Architecture Lab **Credit(s): 1**
- EGN 4450 - Introduction to Linear Systems **Credit(s): 2**
  (meets TGEI - Information and Data Literacy requirement)
- CSE Elective **Credit(s): 3**
- CSE Software Elective **Credit(s): 3**

Total Credit Hours: 15

SEMESTER 8 (SPRING)

- ENC 3246 - Communication for Engineers **Credit(s): 3**
- COT 4400 - Analysis of Algorithms **Credit(s): 3**
- CSE Elective **Credit(s): 3**
- CSE Software Elective **Credit(s): 3**
- General Elective **Credit(s): 3**

Total Credit Hours: 15

SEMESTER 9 (SUMMER)

- Internship/Co-op Participation (see advisor for credit options - CIS 4940 - Industry Internship)

Total Credit Hours: 0

YEAR 4

SEMESTER 10 (FALL)

- CNT 4419 - Secure Coding **Credit(s): 3**
- COP 4600 - Operating Systems **Credit(s): 3**
- CSE Elective **Credit(s): 3**
- CSE Theory Elective **Credit(s): 3**
- General Elective **Credit(s): 3**

Total Credit Hours: 15

SEMESTER 11 (SPRING)

- CIS 4250 - Ethical Issues and Professional Conduct **Credit(s): 3** (Note: TGEE - Ethical Reasoning & Civic Engagement is met with CIS 4250)
- CSE Elective **Credit(s): 3**
- General Elective **Credit(s): 3**
- CEN 4020 - Software Engineering **Credit(s): 3** (Note: TGEH - High Impact Practice is met with CEN 4020

Total Credit Hours: 12

4 YEAR PLAN OF STUDY - COMPUTER SCIENCE B.S.C.S.

NOTES:

- SCIV - Civics Literacy needs to be completed prior to graduation. For more information, see https://www.usf.edu/undergrad/students/civics-literacy.aspx or talk with your academic advisor.
- Items that are critical are marked with a and are included in the plan for a student to stay on track.

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YEAR 1

SEMESTER 1 (FALL)

- EGN 3000 - Foundations of Engineering **Credit(s): 0-3**
- COP 3514 - Program Design **Credit(s): 3**
- CDA 3103 - Computer Organization **Credit(s): 3**
- COT 3100 - Introduction to Discrete Structures **Credit(s): 3**
- ENC 3246 - Communication for Engineers **Credit(s): 3**
- NOTE: SCIV (Civics Literacy requirement) needs to be fulfilled prior to graduation. See advisor.

Total Credit Hours: 12

SEMESTER 2 (SPRING)

- CDA 3201 - Computer Logic and Design **Credit(s): 3**
- CDA 3201L - Computer Logic and Design Lab **Credit(s): 1**
- COP 4530 - Data Structures **Credit(s): 3**
- CSE Elective **Credit(s): 3**
- CSE Elective **Credit(s): 3**
- CSE Elective **Credit(s): 3**

Total Credit Hours: 16

SEMESTER 3 (SUMMER)

- **Internship/Co-op Participation (see advisor for credit options - CIS 4940 - Industry Internship)**

Total Credit Hours: 0

YEAR 2

SEMESTER 4 (FALL)

- COT 4400 - Analysis of Algorithms **Credit(s): 3**
- CDA 4205 - Computer Architecture **Credit(s): 3**
- CDA 4205L - Computer Architecture Lab **Credit(s): 1**
- CNT 4419 - Secure Coding **Credit(s): 3**
- COP 4600 - Operating Systems **Credit(s): 3**
- CSE Elective **Credit(s): 3**

Total Credit Hours: 16

SEMESTER 5 (SPRING)

- CEN 4020 - Software Engineering **Credit(s): 3** NOTE: TGEH - High Impact Practice is met with CEN 4020
- CIS 4250 - Ethical Issues and Professional Conduct **Credit(s): 3** NOTE: TGEE - Ethical Reasoning & Civic Engagement is met with CIS 4250
- CSE Elective **Credit(s): 3**
- CSE Software Elective **Credit(s): 3**
- CSE Theory Elective **Credit(s): 3**

Total Credit Hours: 15