



## Bachelor of Science in Computer Science

(Requires 120 credits.)

### Admission Requirements

All students must meet the minimum admission requirements of the University. Please refer to the [Admissions section](#) of this catalog.

All students must meet the preprofessional requirements listed [above](#) in order to be accepted into the Computer Science program.

### Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the Intellectual Foundations Program) and requirements for the college and major. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the [Transition Guides](#).

All courses not listed with the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

### Degree

### Requirements

The minimum number of credits required for the Bachelor of Science in Computer Science (B.S.C.S.) degree is 120 credits. All courses that count toward the degree must be completed with a grade of "C" or better. This degree will be awarded to students who satisfy all admission and degree requirements for the department. Items below are referenced in the table following the list. This degree program is available in person and fully online.

1. Students entering FAU with fewer than 30 credits must satisfy the course requirements specified in the catalog section, [Degree Requirements](#). Students entering FAU with more than 30 credits (transfer students) must see the undergraduate advisor for an evaluation of courses taken at another school. The general education requirements are satisfied normally if a student has an Associate in Arts (A.A.) degree from a Florida community or state college.

~~2. See advisor for approved courses.~~

2 ~~3~~. At least one science course must have a laboratory component.

3 ~~4~~. For those students who are also pursuing a math minor, STA 4032, Probability and Statistics for Engineers, can be substituted for [EEE 4541](#) ~~STA 4824~~, Stochastic Models.

**Pass/Fail Grades:** Courses taken as pass/fail will not be accepted for Computer Science students.

### Program Summary

|                          |    |
|--------------------------|----|
| <b>General Education</b> | 24 |
| <b>Mathematics</b>       | 11 |
| <b>Science</b>           | 7  |
| <b>Common Core</b>       | 24 |
| <b>CS-CE Core</b>        | 15 |
| <b>CS Core</b>           | 12 |

|                          |            |
|--------------------------|------------|
| <b>Semi-Core Group 1</b> | 6          |
| <b>Semi-Core Group 2</b> | 6          |
| <b>Electives</b>         | 15         |
| <b>Total</b>             | <b>120</b> |

|   |           |
|---|-----------|
| <b>General Education</b>                  |           |
| Foundations of Written Communication      | 6         |
| Foundations of Society and Human Behavior | 6         |
| Foundations of Global Citizenship         | 6         |
| Foundations of Humanities                 | 6         |
| <b>Subtotal</b>                           | <b>24</b> |

|                                   |          |           |
|-----------------------------------|----------|-----------|
| <b>Mathematics</b>                |          |           |
| Calculus with Analytic Geometry 1 | MAC 2311 | 4         |
| Calculus with Analytic Geometry 2 | MAC 2312 | 4         |
| Matrix Theory                     | MAS 2103 | 3         |
| <b>Subtotal</b>                   |          | <b>11</b> |

|   |           |   |
|---|-----------|---|
| <b>Science (Choose 2 3-credit courses and a lab or a 3-credit course and a 4-credit course)</b> |           |   |
| Biological Principles   | BSC 1010  | 3 |
| Biological Principles Lab   | BSC 1010L | 1 |
| General Chemistry 1   | CHM 2045  | 3 |
| General Chemistry 1 Lab   | CHM 2045L | 1 |
| General Physics for Engineers 1   | PHY 2048  | 3 |
| General Physics Lab 1   | PHY 2048L | 1 |

|   |           |          |
|---|-----------|----------|
| Physics for Engineers 2                 | PHY 2044  | 3        |
| General Physics Lab 2                   | PHY 2049L | 1        |
| Physical Geology/Evolution of the Earth | GLY 2010C | 4        |
| <b>Subtotal</b>                         |           | <b>7</b> |

### Core Courses

All students must take the following core courses, which total 51 credits:

| <b>Common Core</b>                         |           |           |
|--|-----------|-----------|
| Programming I                              | COP 2220  | 3         |
| Foundations of Computing                   | COT 2000  | 3         |
| Computer Logic Design                      | CDA 3203  | 3         |
| Computer Architecture                      | CDA 4102  | 3         |
| Stochastic Models                          | EEE 4541  | 3         |
| Introduction to Data Science and Analytics | CAP 4773  | 3         |
| RI: Engineering Design 1                   | EGN 4950C | 3         |
| RI: Engineering Design 2                   | EGN 4952C | 3         |
| <b>Subtotal</b>                            |           | <b>24</b> |

| <b>CS-CE Core</b>                      |          |           |
|--|----------|-----------|
| Programming II                         | COP 3014 | 3         |
| Data Structures and Algorithm Analysis | COP 3530 | 3         |
| Communication Networks                 | CNT 4005 | 3         |
| Principles of Software Engineering     | CEN 4010 | 3         |
| Computer Operating Systems             | COP 4610 | 3         |
| <b>Subtotal</b>                        |          | <b>15</b> |

| <b>CS Core</b>                      |          |           |
|-------------------------------------|----------|-----------|
| Introduction to Database Structures | COP 3540 | 3         |
| Theory of Computation               | COT 4420 | 3         |
| Design and Analysis of Algorithms   | COT 4400 | 3         |
| Princ Programming Languages         | COP 4020 | 3         |
| <b>Subtotal</b>                     |          | <b>12</b> |

### Semi-Core Courses

All students must take 6 credits from each of the two semi-core groups for a total of 12 semi-core credits.

| <b>CS Semi-Core Group 1 (choose 2 courses)</b>   |          |          |
|--|----------|----------|
| Foundations of Cybersecurity                     | CNT 4403 | 3        |
| Applied Cryptography and Security                | CIS 4634 | 3        |
| Introduction to Deep Learning                    | CAP 4613 | 3        |
| Introduction to Artificial Intelligence          | CAP 4630 | 3        |
| Introduction to Data Mining and Machine Learning | CAP 4770 | 3        |
| <b>Subtotal</b>                                  |          | <b>6</b> |

| <b>CS Semi-Core Group 2 (choose 2 courses)</b> |          |          |
|--|----------|----------|
| Mobile App Projects                            | COP 4655 | 3        |
| Advanced Database Systems                      | COP 4703 | 3        |
| Python Programming                             | COP 4045 | 3        |
| Object-Oriented Design and Programming         | COP 4331 | 3        |
| Introduction to Internet Computing             | COP 3813 | 3        |
| Full Stack Web Development                     | COP 4808 | 3        |
| Cloud Computing                                | COP 4804 | 3        |
| <b>Subtotal</b>                                |          | <b>6</b> |

## Electives

All students must take 15 credits of elective courses. Any 4000-level course offered by the EECS Department can be used as Computer Science electives. Certain 5000-level or 6000-level courses may be taken as Computer Science electives. Students must see an advisor for a current list of approved elective courses.

|                                   |           |
|-----------------------------------|-----------|
| <b>Computer Science Electives</b> | <b>15</b> |
|-----------------------------------|-----------|

|   |           |                 |
|---|-----------|-----------------|
| <b>Computer Science Core (2)</b>                |           |                 |
| Introduction to Programming in C                | COP-2220  | 3               |
| Foundations of Computer Science                 | COP-3044  | 3               |
| Introduction to Logic Design                    | CDA-3201C | 4               |
| Data Structures and Algorithm Analysis          | COP-3530  | 3               |
| Introduction to Internet Computing              | COP-3843  | 3               |
| Computer Operating Systems                      | COP-4640  | 3               |
| Stochastic Models for Computer Science (4)      | STA-4824  | 3 or            |
| Stochastic Processes and Random Signals         | EEE-4544  | 3               |
| Introduction to Database Structures             | COP-3540  | 3               |
| Introduction to Microprocessor Systems          | CDA-3334C | 3               |
| Formal Languages and Automata Theory            | COT-4420  | 3               |
| Design and Analysis of Algorithms               | COT-4400  | 3               |
| Principles of Software Engineering              | GEN-4010  | 3               |
| Programming Languages                           | COP-4020  | 3               |
| RI: Engineering Design 1                        | EGN-4950G | 3               |
| RI: Engineering Design 2                        | EGN-4952G | 3               |
| <b>Subtotal</b>                                 |           | <b>46</b>       |
| <b>Computer Science Technical Electives (2)</b> |           |                 |
|   |           | <b>18</b>       |
| <b>Free Electives (2)</b>                       |           |                 |
|   |           | <b>10 or 11</b> |
| <b>Total</b>                                    |           | <b>120</b>      |

### Computer Science Technical Electives

To satisfy the Computer Science technical elective requirement, all students must take 18 credits chosen from Computer Science and Computer Engineering upper-division courses that are not in the Computer Science core. Certain 5000-level or 6000-level courses may be taken as Computer Science technical electives. Students must see an advisor for a current list of approved courses. Students seeking a specialty may consider taking electives in an area of study. A few suggested areas of concentration follow.

| <b>Internet Technology</b>          |          |   |
|-------------------------------------|----------|---|
| Introduction to Data Communications | CNT 4104 | 3 |
| Foundations of Cybersecurity        | CNT 4403 | 3 |
| Mobile App Projects                 | COP 4655 | 3 |
| Applied Database Systems            | COP 4703 | 3 |

| <b>Software Engineering</b>            |          |   |
|--|----------|---|
| Software Engineering Project           | CEN 4910 | 3 |
| Python Programming                     | COP 4045 | 3 |
| Object-Oriented Design and Programming | COP 4331 | 3 |

| <b>Cybersecurity</b>           |          |   |
|--------------------------------|----------|---|
| Cyber Physical System Security | CIS 4213 | 3 |
| Operating Systems Security     | CIS 4367 | 3 |
| Foundations of Cybersecurity   | CNT 4403 | 3 |
| Network and Data Security      | CNT 4411 | 3 |

| <b>Data Science</b>                                   |                     |              |
|---|---------------------|--------------|
| Introduction to Deep Learning                         | CAP 4613            | 3            |
| Introduction to Artificial Intelligence Learning      | CAP 4630            | 3            |
| Introduction to Data Mining and Machine Learning      | CAP 4770            | 3            |
| <del>Introduction to Data Science and Analytics</del> | <del>CAP 4773</del> | <del>3</del> |

| <b>Computer Architecture</b>     |          |   |
|----------------------------------|----------|---|
| Structured Computer Architecture | CDA 4102 | 3 |
| Introduction to VLSI             | CDA 4210 | 3 |
| CAD-Based Computer Design        | CDA 4204 | 3 |

The following courses may be taken as Computer Science electives. ~~The group classification will be designated when offered:~~

|                            |          |     |
|----------------------------|----------|-----|
| Directed Independent Study | COT 4900 | 1-3 |
|----------------------------|----------|-----|

### Directed Independent Study

Students must have completed COP 3530 Data Structures and Algorithm Analysis with a C or better before being eligible to register for directed independent study. Students are allowed to take no more than the equivalent of one course (3 credits) to satisfy degree requirements. ~~Special permission is required to count more than 3 credits of directed independent study.~~

### Additional Math Elective

~~One of the following mathematics courses must be taken and must be passed with a grade of "C" or better:~~

|  |                     |                 |
|--|---------------------|-----------------|
| <del>Calculus with Analytic Geometry 3</del> | <del>MAC-2313</del> | <del>4</del>    |
| <del>Numerical Methods</del>                 | <del>MAD-3400</del> | <del>3</del>    |
| <del>Differential Equations 1</del>          | <del>MAP-2302</del> | <del>3 or</del> |
| <del>Engineering Math 1</del>                | <del>MAP-3305</del> | <del>3</del>    |
| <del>Introduction to Queueing Theory*</del>  | <del>MAP-4260</del> | <del>3</del>    |
| <del>Matrix Theory</del>                     | <del>MAS-2103</del> | <del>3</del>    |
| <del>Modern Algebra</del>                    | <del>MAS-4301</del> | <del>3</del>    |

~~\* Cannot be used as a Computer Science elective if used to satisfy the mathematics requirement.~~

~~Elective courses cannot include COP-2220, COP-2510 or STA-4032. Also,~~ Students must make sure that they have the necessary minimum of 120 credits for graduation.

### Sample Four-Year Program of Study

For the sample four-year program of study for the Bachelor of Science with Major in Computer Engineering, refer to the [Curriculum Sheets and Flight Plans](#) by major.

**"The following Professional Bachelors description was previously submitted as a part of BACS program change"**



## Professional Bachelor of Science in Computer Science

The Bachelor of Science Arts in Computer Science (B.A.C.S.) (B.S.C.S.) Professional Program is designed specifically for working professionals who may advance their careers with an accelerated undergraduate program and obtain a bachelor's degree in Computer Science while continuing to work in their professional careers. The Professional Program includes evenings, weekends and online materials using Canvas. This degree program requires 36 core computer science credits and 6 credits of computer science electives. The duration of each course may be four, eight or sixteen weeks depending on the course format. Students are normally expected to complete the program in two years.

### Admission/Degree Requirements

Applicants are required to meet the same admission and degree requirements as for the Second Bachelor's Degree in B.A.C.S. Computer Science noted below.

### Program Fees

The B.S.C.S.-B.A.C.S. Professional Program is a full-service, all-inclusive program. The fees cover all program costs including tuition, course materials and graduation activities.

### Application Process and More Information

To apply or receive more information about this program, visit the Computer & Electrical Engineering and Computer Science [website](#) or call 561-297-3855.

## Second Bachelor's Degree

This program is for those individuals with a degree in another discipline who are seeking a Bachelor of Science with major in Computer Science degree at FAU.

### Admission Requirements

Students seeking a bachelor's degree or graduate degree in another discipline must satisfy all admission requirements of the first bachelor's degree in Computer Science at FAU.

### Degree Requirements

The minimum number of FAU credits needed to earn a second bachelor's degree in Computer Science is 30 credits at the 3000 level or higher.

1. Earn a minimum of 30 credits in residence at FAU, at the 3000 level or higher, beyond those required for the first degree. Students earning two degrees simultaneously (a "dual degree") must earn at least 150 credits.
2. Earn at least 75 percent of all upper-division credits required for the major from FAU.
3. Students must have completed at least 15 credits in mathematics including discrete mathematics with mathematical rigor at least equivalent to introductory calculus. Each course must be completed with a minimum grade of "C."
4. Students must have completed at least 6 credits (or equivalent) in natural science coursework intended for science and engineering majors. At least one course must have a laboratory component. Each course must be completed with a minimum grade of "C."
5. Students must complete 51 credits of core courses listed in the Computer Science degree program and 12 credits of semi-core courses 36 credits in computer science core and 6 credits in computer science electives. Each course must be completed with a minimum grade of "C."

|                                   |          |   |
|-----------------------------------|----------|---|
| <b>Mathematics (15 Credits)**</b> |          |   |
| Discrete Mathematics (required)   | MAD-2104 | 3 |

| <b>12 credits from the following courses or equivalent</b> |          |           |
|--|----------|-----------|
| Methods of Calculus  | MAC-2233 | 3         |
| Calculus with Analytic Geometry 1                          | MAC-2311 | 4         |
| Calculus with Analytic Geometry 2                          | MAC-2312 | 4         |
| Discrete Mathematics (3)                                   | MAD-2104 | 3         |
| Numerical Methods  | MAD-3400 | 3         |
| Differential Equations 1                                   | MAP-2302 | 3         |
| Engineering Math 1   | MAP-3305 | 3         |
| Introduction to Queueing Theory                            | MAP-4260 | 3         |
| Matrix Theory  | MAS-2103 | 3         |
| Modern Algebra   | MAS-4301 | 3         |
| Experimental Design and Statistical Inference              | PSY-3234 | 3         |
| Introductory Statistics                                    | STA-2023 | 3         |
| Probability and Statistics for Engineers                   | STA-4032 | 3         |
| Probability and Statistics 1                               | STA-4442 | 3         |
| Stochastic Models for Computer Science                     | STA-4821 | 3         |
| <b>Subtotal</b>  |          | <b>12</b> |

\*\*Courses may be replaced with equivalent courses.

| <b>Science (6 credits)**</b>            |           |          |
|---|-----------|----------|
| Biological Principles                   | BSC-1010  | 3        |
| Biological Principles Lab               | BSC-1010L | 1        |
| General Chemistry 1                     | CHM-2045  | 3        |
| General Chemistry 1 Lab                 | CHM-2045L | 1        |
| General Physics for Engineers 1 (3)     | PHY-2048  | 3        |
| General Physics Lab 1 (3)               | PHY-2048L | 1        |
| Physics for Engineers 2 (3)             | PHY-2044  | 3        |
| General Physics Lab 2 (3)               | PHY-2049L | 1        |
| Physical Geology/Evolution of the Earth | GLY-2010C | 4        |
| <b>Subtotal</b>                         |           | <b>6</b> |

\*\*\*At least one science course must include a lab component. Courses may be replaced with equivalent courses.

### Core Courses

All students must take the following core courses, which total 39 credits.

| <b>Computer Science Core (39 credits)</b> |           |   |
|---|-----------|---|
| Introduction to Programming in C          | COP-2220  | 3 |
| Foundations of Computer Science           | COP-3014  | 3 |
| Data Structures and Algorithm Analysis    | COP-3530  | 3 |
| Introduction to Internet Computing        | COP-3813  | 3 |
| Computer Operating Systems                | COP-4610  | 3 |
| Introduction to Database Structures       | COP-3540  | 3 |
| Introduction to Microprocessor Systems    | GDA-3331C | 3 |

|                                      |           |           |
|--------------------------------------|-----------|-----------|
| Formal Languages and Automata Theory | COT 4420  | 3         |
| Design and Analysis of Algorithms    | COT 4400  | 3         |
| Principles of Software Engineering   | CEN 4010  | 3         |
| RI: Engineering Design 1             | EGN 4950C | 3         |
| RI: Engineering Design 2             | EGN 4952C | 3         |
| <b>Subtotal</b>                      |           | <b>39</b> |

### Computer Science Electives (6 credits)

To satisfy the Computer Science elective requirement, all students must take 6 credits chosen from Computer Science and Computer Engineering upper-division courses that are not in the Computer Science core.

### Directed Independent Study

Students in the Computer Science, Computer Engineering and Information Engineering Technology programs must earn a minimum of 9 credits in core courses for their major before being eligible to register for directed independent study. Students are allowed to take no more than the equivalent of one course (3 credits) to satisfy degree requirements. If a student needs more than 3 credits of independent study, written approval must be obtained from the chair of the department prior to enrolling in the additional credits.

### Computer Science Minor

The minor in Computer Science is available to all FAU undergraduates who are not majoring in Computer Science or Computer Engineering. This minor requires completion of five courses (15 credits) with a minimum grade of "C." Students must ensure that they have completed the prerequisites for the selected courses.

|   |          |           |
|---|----------|-----------|
| <b>C/C++ Track</b>  |          |           |
| Programming II Foundations of Computer Science (a)            | COP 3014 | 3         |
| Data Structures and Algorithm Analysis                        | COP 3530 | 3         |
| Select three upper-division courses from the Electives table. |          | 9         |
| <b>Total*</b>   |          | <b>15</b> |

(a) Requires prerequisite: COP 2220, with minimum grade of "C"

|   |          |           |
|---|----------|-----------|
| <b>Python Track</b>   |          |           |
| Introduction to Programming in Python                         | COP 2034 | 3         |
| Data Structures and Algorithm Analysis with Python            | COP 3410 | 3         |
| Select three upper-division courses from the Electives table. |          | 9         |
| <b>Total*</b>   |          | <b>15</b> |

|  |          |   |
|--|----------|---|
| <b>Elective Courses**</b>                        |          |   |
| Applied Machine Learning and Data Mining         | CAP 4612 | 3 |
| Introduction to Deep Learning                    | CAP 4613 | 3 |
| Introduction to Artificial Intelligence          | CAP 4630 | 3 |
| Introduction to Data Mining and Machine Learning | CAP 4770 | 3 |
| Introduction to Data Science and Analytics       | CAP 4773 | 3 |
| Principles of Software Engineering               | CEN 4010 | 3 |
| Introduction to Database Structures              | COP 3540 | 3 |

|  |          |   |
|--|----------|---|
| Introduction to Internet Computing           | COP 3813 | 3 |
| Python Programming                           | COP 4045 | 3 |
| Object-Oriented Design and Programming       | COP 4331 | 3 |
| Computer Operating Systems                   | COP 4610 | 3 |
| Advanced <del>Applied</del> Database Systems | COP 4703 | 3 |
| Design and Analysis of Algorithms            | COT 4400 | 3 |

\* At least 75 percent of credits earned must be from FAU.

Acknowledgment of a minor in Computer Science is official upon successful completion of an FAU degree program.

\*\* See program advisor for a complete list of elective courses.