

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE - DISTRIBUTED SYSTEM & SOFTWARE DESIGN AND COMPUTING HARDWARE & EMERGING ARCHITECTURES

| Code  | Title  | Credit Hours |
|---|--|--------------|
| <b>Wellness</b>   |  |              |
| APPH 1040   | Scientific Foundations of Health   | 2            |
|   | or APPH 10 The Science of Physical Activity and Health                     |              |
|   | or APPH 10 Flourishing: Strategies for Well-being and Resilience           |              |
| <b>Core A - Essential Skills</b>  |  |              |
| ENGL 1101   | English Composition I  | 3            |
| ENGL 1102   | English Composition II   | 3            |
| MATH 1552   | Integral Calculus <sup>2</sup>   | 4            |
| <b>Core B - Institutional Options</b>   |  |              |
| CS 1301   | Introduction to Computing <sup>2</sup>                                     | 3            |
| <b>Core C - Humanities</b>  |  |              |
| Any HUM <sup>1</sup>  |  | 6            |
| <b>Core D - Science, Math, &amp; Technology</b>   |  |              |
| PHYS 2211   | Introductory Physics I <sup>2</sup>  | 4            |
| PHYS 2212   | Introductory Physics II <sup>2</sup>                                       | 4            |
| MATH 1551   | Differential Calculus <sup>2</sup>   | 2            |
| MATH 1554   | Linear Algebra <sup>2</sup>  | 4            |
| <b>Core E - Social Sciences</b>   |  |              |
| Choose one of the following:  |  | 3            |
| HIST 2111   | The United States to 1877  |              |
| HIST 2112   | The United States since 1877   |              |
| INTA 1200   | American Government in Comparative Perspective                             |              |
| POL 1101  | Government of the United States  |              |
| PUBP 3000   | American Constitutional Issues   |              |
| Choose one of the following:  |  | 3            |
| ECON 2100   | Economic Analysis and Policy Problems                                      |              |
| ECON 2101   | The Global Economy   |              |
| ECON 2105   | Principles of Macroeconomics   |              |
| ECON 2106   | Principles of Microeconomics   |              |
| Any SS  |  | 6            |
| <b>Core F - Courses Related to Major</b>  |  |              |
| ECE 1100  | ECE Discovery Studio   | 1            |
| ECE 2020  | Digital System Design <sup>2</sup>   | 3            |
| ECE 3005  | Professional and Technical Communications for ECE                          | 1            |
| CS 1331   | Introduction to Object Oriented Programming <sup>2</sup>                   | 3            |
| CS 1332   | Data Structures and Algorithms for Applications <sup>2</sup>               | 3            |
| CS 2050   | Introduction to Discrete Mathematics for Computer Science <sup>2</sup>     | 3            |
|   | or CS 2051 Honors - Induction to Discrete Mathematics for Computer Science |              |
| MATH 2550   | Introduction to Multivariable Calculus <sup>2</sup>                        | 2            |
| MATH 2552   | Differential Equations <sup>2</sup>  | 4            |
| CHEM 1310   | Principles of General Chemistry for Engineers                              | 4            |
|   | or CHEM 12 Chemical Principles I   |              |
| Ethics <sup>1</sup>   |  |              |
| Probability/Statistics <sup>4,9</sup>   |  | 3            |
| <b>Major Requirements</b>   |  |              |
| ECE 2031  | Digital Design Laboratory <sup>2</sup>                                     | 2            |
| ECE 2035  | Programming for Hardware/Software Systems <sup>2</sup>                     | 4            |
| ECE 2040  | Circuit Analysis <sup>2</sup>  | 3            |
| ECE 3058  | Architecture, Systems, Concurrency, and Energy in Computation <sup>2</sup> | 4            |
| <b>Distributed System &amp; Software Design<sup>2,6,9</sup></b>   |  |              |
| CS 3251   | Computer Networking I  | 3            |
| Select three of the following (Advanced Software): <sup>2,6</sup>   |  | 9            |
| CS 4220   | Programming Embedded Systems   |              |
| ECE 4122  | Advanced Programming Techniques for Engineering Applications               |              |
| ECE 4795  | GPU Programming for Video Games  |              |
| ECE 4150  | Cloud Computing  |              |
| ECE 4180  | Embedded Systems Design  |              |
| CS 4605   | Mobile and Ubiquitous Computing  |              |
| CS 3651   | Prototyping Intelligent Devices  |              |
| <b>Computing Hardware &amp; Emerging Architectures<sup>2,6,9</sup></b>  |  |              |
| ECE 3150  | VLSI and Advanced Digital Design   | 4            |
| ECE 3030  | Physical Foundations of Computer Engineering                               | 3            |
| Select three of the following: <sup>2,6</sup>   |  | 9            |
| CS 4220   | Programming Embedded Systems   |              |
| ECE 4180  | Embedded Systems Design  |              |
| ECE 4181  | Embedded Computing Systems   |              |
| ECE 4130  | Advanced VLSI Systems  |              |
| ECE 4420  | Digital Integrated Circuits  |              |
| ECE 4452  | IC Fabrication   |              |
| ECE 4460  | Introduction to Electronic Systems Packaging                               |              |
| ECE 4100  | Advanced Computer Architecture   |              |
| ECE 4150  | Cloud Computing  |              |
| <b>Culminating Senior Design Options (Capstone)</b>   |  |              |
| Culminating Senior Design <sup>5</sup>  |  | 3            |
| <b>Free Electives<sup>3,7</sup></b>   |  | <b>11</b>    |
| <b>Total Credit Hours</b>   |  | <b>129</b>   |
| Pass-fail only allowed for Humanities Electives, Social Sciences Electives, Free Electives, ECE 1100, and ECE 3005                                    |  |              |
| Courses that are cross-listed with ECE must be taken under the ECE number.  |  |              |
| <sup>1</sup> Student must complete one Ethics course during their program. For a complete list of Ethics courses, please see the Ethics Catalog page. |  |              |
| <sup>2</sup> Minimum grade of C required  |  |              |

<sup>3</sup> The following courses are not allowed: HPS 1XXX, PHYS 2XXX (AP Credit), ECE 3710, ECE 3741, LMC 2661, LMC 2662, LMC 3661, LMC 3662, MATH 1113. Maximum of six credit hours of Special Problems or research may be applied toward the degree

<sup>4</sup> CEE 3770 or ISYE 3770 or MATH 3670 or ECE 3077 (Must be taken on Letter/Grade basis)

<sup>5</sup> Senior Design requirements may be satisfied in the following ways:

1. ECE two semester 4000 level ECE Culminating Design I + ECE Culminating Design II
2. Approved single-semester capstone (requires completion of the prerequisite ECE Design Fundamentals junior course, which counts as a free elective)

NOTE: Students may be able to use a VIP project in one of the above options to satisfy Senior Design provided they meet the requirements as outlined at the following VIP page. (see <https://vip.gatech.edu/how-vip-credits-count>)

<sup>6</sup> No single course may be used to satisfy requirements in both selected threads.

1. If a course is **required** in both threads, it must be satisfactorily completed once and the second occurrence shall be replaced by an equivalent number of ECE/CS 3000/4000 elective hours (excluding courses used to satisfy senior design or probability & statistics requirements).
2. If a course is **required** in one thread and **optional** (elective or pick list) in the second thread, it must be completed as required and may not be used to satisfy any element of the second thread.
3. If a course is **optional** (elective or pick list) in both threads, it may be counted once toward either thread, but not toward both.

<sup>7</sup> The total number of available free elective hours will depend on choices made in the thread as well as the choice to fulfill Senior Design requirements according to note (5)

<sup>8</sup> ECE electives are subject to School approval and must satisfy the following constraints:

1. All ECE courses at the 3000-level or higher, including approved special topics course. Exclusions: Junior Design Fundamentals Course (prerequisite for single-semester capstone) and ECE 3077 (used to satisfy Probability and Statistics requirement).
2. Special problems, undergraduate research, and similar courses may not be included, except for three credit hours for one ECE Undergraduate Research sequence, either ECE 3951+ ECE 3952 or ECE 4951+ ECE 4952. For students completing the Research Option but not an ECE UROP sequence, three credit hours for ECE 4699 may be included.

<sup>9</sup> Hours satisfying Probability & Statistics requirement and threads requirements may share with minor requirements.