# BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - ROBOTICS & AUTONOMOUS SYSTEMS AND ELECTRONIC DEVICES

| Code | Title | Credit Hours |
|---|---|---|
| **Wellness Requirement** | | |
| 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 | |
| **Core IMPACTS** | | |
| **Institutional Priority** | | |
| CS 1301 | Introduction to Computing [2] | 3 |
| **Mathematics and Quantitative Skills** | | |
| MATH 1552 | Integral Calculus [2] | 4 |
| **Political Science and U.S. History** | | |
| HIST 2111 | The United States to 1877 | 3 |
| or HIST 2112 | The United States since 1877 | |
| or INTA 1200 | American Government in Comparative Perspective | |
| or POL 1101 | Government of the United States | |
| or PUBP 3000 | American Constitutional Issues | |
| **Arts, Humanities, and Ethics** | | |
| Any HUM [1] | | 6 |
| **Communicating in Writing** | | |
| ENGL 1101 | English Composition I | 3 |
| ENGL 1102 | English Composition II | 3 |
| **Technology, Mathematics, and Sciences** | | |
| PHYS 2211 | Principles of Physics I [2] | 4 |
| PHYS 2212 | Principles of Physics II [2] | 4 |
| MATH 1551 | Differential Calculus [2] | 2 |
| MATH 1554 | Linear Algebra [2] | 4 |
| **Social Sciences** | | |
| Any SS [1] | | 9 |
| **Field of Study** | | |
| ECE 2020 | Digital System Design [2] | 3 |
| CHEM 1310 | Principles of General Chemistry for Engineers | 4 |
| or CHEM 12 | Chemical Principles I | |
| MATH 2551 | Multivariable Calculus [2] | 4 |
| MATH 2552 | Differential Equations [2] | 4 |
| Science Elective [3] | | 3 |
| **Major Requirements** | | |
| Economics Requirement [11] | | |
| Ethics Requirement [1] | | |
| Probability/Statistics [6, 10] | | 3 |
| ECE 1100 | ECE Discovery Studio | 1 |
| ECE 2026 | Introduction to Signal Processing [2] | 3 |
| ECE 2031 | Digital Design Laboratory [2] | 2 |
| ECE 2035 | Programming for Hardware/Software Systems [2] | 4 |
| or ECE 2036 | Engineering Software Design | |
| ECE 2040 | Circuit Analysis [2] | 3 |
| ECE 3005 | Professional and Technical Communications for ECE | 1 |
| ECE 3025 | Electromagnetics [2] | 3 |
| ECE 3040 | Microelectronic Circuits [2] | 4 |
| ECE 3043 | Measurements, Circuits, and Microelectronics Laboratory [2] | 2 |
| **Electronic Devices [2,10]** | | |
| ECE 3450 | Semiconductor Devices | 3 |
| ECE 4452 | IC Fabrication | 3 |
| Select one of the following: [2,8] | | 3 |
| ECE 4350 | Electromagnetic and Microwave Applications | |
| ECE 4460 | Introduction to Electronic Systems Packaging | |
| ECE 4470 | Devices for Renewable Energy | |
| ECE 4500 | Optical Engineering | |
| ECE 4751 | Laser Theory and Applications | |
| ECE 4754 | Electronics Packaging Assembly, Reliability, Thermal Management, and Test | |
| ECE 4755 | Electronic Packaging Substrate Fabrication | |
| **Electronic Devices Electives** | | |
| ECE 3000/4000-level Elective [4] | | 3 |
| **Robotics & Autonomous Systems [10]** | | |
| ECE 3550 | Feedback Control Systems | 3 |
| ECE 4550 | Control System Design | 4 |
| Select one of the following: [2,8] | | 3 |
| ECE 3084 | Signals and Systems | |
| ECE 3251 | Optimization for Information Systems | |
| ECE 4560 | Introduction to Automation and Robotics | |
| ECE 4570 | System Theory for Communication and Control | |
| ECE 4580 | Computational Computer Vision | |
| **Robotics & Autonomous Systems Electives** | | |
| ECE 3000/4000-level Elective [4] | | 3 |
| **Culminating Senior Design Options (Capstone)** | | |
| Culminating Senior Design [7] | | 3 |
| **Free Electives [5,9]** | | **10** |
| **Total Credit Hours** | | **129** |

Pass-fail only allowed for Free Electives, ECE 1100, and ECE 3005.

Courses that are cross-listed with ECE must be taken under the ECE number.

[1] Students must complete one Ethics course during their program. For a complete list of Ethics courses, please click here.

[2] Minimum grade of C required.

[3] Please select any academic course from the Schools of Biological Sciences, Chemistry, Earth and Atmospheric Sciences, or Physics. Research credits may not apply to this requirement.

[4] 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.

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

6   CEE 3770 or ISYE 3770 or MATH 3670 or ECE 3077 (must be taken for Letter Grade basis)

7   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)

8   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 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.

9   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 (7)

10  Hours satisfying Probability & Statistics requirement and threads requirements may share with minor requirements.

11  Engineering students must complete one of the following economics classes: ECON 2100, ECON 2101, ECON 2105, ECON 2106. The course will also satisfy 3 hours of Core IMPACTS Social Science courses