BACHELOR OF SCIENCE IN COMPUTER ENGINEERING- CYBERSECURITY AND COMPUTING HARDWARE & EMERGING ARCHITECTURES

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		9
Field of Study		
ECE 2020	Digital System Design [2]	3
CS 1331	Introduction to Object Oriented Programming [2]	3
CS 1332	Data Structures and Algorithms for Applications [2]	3
CS 2050	Introduction to Discrete Mathematics for Computer Science [2]	3
or CS 2051	Honors - Induction to Discrete Mathematics for Computer Science	
MATH 2550	Introduction to Multivariable Calculus [2]	2
MATH 2552	Differential Equations [2]	4
Major Requirements		
Economics Requirement [10]		
Ethics [1]		
Probability/Statistics [4,9]		3
CHEM 1310	Principles of General Chemistry for Engineers	4
or CHEM 1211K	Chemical Principles I	
ECE 1100	ECE Discovery Studio	1
ECE 2031	Digital Design Laboratory [2]	2
ECE 2035	Programming for Hardware/Software Systems [2]	4
ECE 2040	Circuit Analysis [2]	3
ECE 3005	Professional and Technical Communications for ECE	1
ECE 3058	Architecture, Systems, Concurrency, and Energy in Computation [2]	4
Cybersecurity [2,6,9]		
ECE 4115	Introduction to Computer Security	4
Select one of the following: [2]		3
CS 3251	Computer Networking I	
ECE 3600	Computer Communications	
Select two of the following (Cybersecurity Topics): [2,6]		6
ECE 3170	Cryptographic Hardware for Embedded Systems	
ECE 4112	Internetwork Security	
ECE 4117	Introduction to Malware Reverse Engineering	
ECE 4147	Adv Malware Analysis	
ECE 4156	Hardware-Oriented Security and Trust	
Computing Hardware & Emerging Architectures [2,6,9]		
ECE 3150	VLSI and Advanced Digital Design	4
ECE 3030	Physical Foundations of Computer Engineering	3
Select three of the following: [2,6]		9
CS 4220	Programming Embedded Systems	
ECE 4180	Embedded Systems Design	
ECE 4181	Embedded Computing Systems	
ECE 4130	Advanced VLSI Systems	
ECE 4452	IC Fabrication	
ECE 4420	Digital Integrated Circuits	
ECE 4460	Introduction to Electronic Systems Packaging	
ECE 4100	Advanced Computer Architecture	
ECE 4150	Cloud Computing	
Culminating Senior Design Options (Capstone)		
Culminating Senior Design [5]		3
Free Electives [3,7]		**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. Student must complete one Ethics course during their program. For a complete list of Ethics courses, please see the Ethics Catalog page.
2. Minimum grade of C required
3. 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

[4] CEE 3770 or ISYE 3770 or MATH 3670 or ECE 3077 (Must be taken on Letter/Grade basis)

[5] 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)

[6] 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.

[7] 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)

[8] 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.

[9] Hours satisfying Probability & Statistics requirement and threads requirements may share with minor requirements.

[10] 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.