COMPUTER ENGINEERING, BS

This program gives students a broad knowledge of the software and hardware components of modern computing and cyber-physical systems, detailed computer-systems design, and the role of computer systems in various engineering disciplines. Students completing the program will be prepared for a computer-oriented engineering career with emphasis on design and applications of embedded computing systems.

Graduates with a Computer Engineering BS degree commonly begin their careers in a variety of functions including: hardware engineers, software engineers, computer systems analysts, computer support specialists, network system & data managers, communication analysts, network & computer systems administrators, computer programmers, database administrators, operations research analysts, and computer & information scientists. These graduates also pursue post-graduate degrees in Computer Engineering, Computer Science, Electrical Engineering, Business & Commerce, and even professional areas such as Law and Medicine.

Program Educational Objectives and Student Outcomes

The mission of the undergraduate Computer Engineering program is to provide high-quality and broad-based education in Computer Engineering that emphasizes critical thinking and communication skills while preparing graduates for professional careers and lifelong learning. The faculty has adopted the educational objectives listed below for the Computer Engineering undergraduate program. The department has included a process to provide continual improvement of the curricula. Graduates will:

- excel in engineering careers and/or postgraduate education utilizing knowledge of Computer Engineering disciplines and underlying fundamental principles of science and mathematics, engineering analysis, problem solving, and design
- expand their knowledge of current and emerging issues in Computer Engineering and continue career-long professional development through engagement in lifelong learning
- grow professionally and advance throughout their engineering careers utilizing skills in effective communication; responsible, multidisciplinary teamwork; and adherence to principles of professional accountability and ethics.

To facilitate attainment of these career-long objectives, the department has defined a set of student outcomes and associated assessments to demonstrate that, by graduation, students have:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to apply engineering design to produce solutions that meet specific needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- An Ability to communicate effectively with a range of audiences
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
- An ability to solve mathematics problems in probability, statistics, differential equations, linear algebra, complex variables, and discrete mathematics as they relate to problems in Computer Engineering.

The information contained here describes the undergraduate curriculum in Computer Engineering. Graduate students and students participating in the Accelerated Masters Program (AMP) should consult the graduate catalog for information on all cross-listed and graduate-only courses. More information about various programs within the department is available in the Electrical and Computer Engineering departmental office located in 3043 HM Comer Hall.

The overall goal of the Computer Engineering program is to prepare students for engineering careers within the discipline. The first year and a half of the Computer Engineering curriculum includes basic courses in mathematics and physical science, broadening courses in humanities and social science, and foundation courses in engineering. The next three semesters provide the core education in Computer Engineering with courses in digital logic, microcomputers, computer programming, electronics, circuits, and systems. The last year of study includes two semesters of Capstone Design as well as required advanced courses in computer architecture and embedded systems (with its associated lab). Technical electives are available during the final year to allow students to concentrate in selected areas of the discipline. The department offers advanced courses in communications, controls, digital system design, and microelectronics.

To complete the senior-level electives, students must select one lecture with its associated lab (lecture/lab combination). This lecture/lab combination must be completed as a pair. Additional materials that describe the curriculum are available in the Electrical and Computer Engineering departmental office and on the Computer Engineering website.

Click here for details on the College of Engineering policy for repeating courses.

Click here for details on the College of Engineering Residency policy.

Freshman

Fall	Hours	Spring	Hours
CH 101	4	PH 105	4
MATH 125	4	MATH 126	4
ECE 121 or ENGR 111 (Or other ENG intro courses)	1	ENGR 103 or 123	3
EN 101	3	EN 102	3
Humanities (HU), Literature (L), or Fine Arts (FA) Elective[1,2]	3		
	15		**14**

Sophomore

Fall	Hours	Spring	Hours
PH 106	4	MATH 301	3
MATH 238	3	ECE 225	4
MATH 227	4	MATH 237	3
CS 100	4	ECE 380	4
		Humanities (HU), Literature (L), or Fine Arts (FA) Elective[1,2]	3
	15		**17**

Junior

Fall	Hours	Spring	Hours
History (HI) or Social Behavioral Sciences (SB) Elective[1,2]	3	History (HI) or Social Behavioral Sciences (SB) Elective[1,2]	3
ECE 370	3	ECE 332	4
MATH 355	3	ECE 326	3
CS 101	4	CS 201	4
ECE 383	4		
	17		**14**

Senior

Fall	Hours	Spring	Hours
Humanities (HU), Literature (L), or Fine Arts (FA) Elective[1,2]	3	History (HI) or Social Behavioral Sciences (SB) Elective[1,2]	3
ECE 333	4	ECE Restricted Area Elective[3]	3
ECE 492	2	ECE 494	2
Select one of the following lecture/lab combinations	4	ECE Restricted Area Elective or Professional Elective[3,4]	3
ECE 408 & ECE 409		ECE 486 & ECE 487	4
ECE 475 & ECE 476			
ECE 480 & ECE 481			
ECE 484	3		
	16		**15**

Total Hours: 123

Footnotes

[1] Students must satisfy the College of Engineering in-depth requirement (minimum of six hours in one discipline).

[2] The College of Engineering core curriculum requires a minimum of: nine hours of HU, L, or FA courses; nine hours of HI or SB courses; six hours of FC courses; six hours of W courses (300- and 400-level ECE courses); 12 hours of N courses (eight hours of calculus-based physics); 12 hours of MA courses (MATH 125 Calculus I or higher); and six hours of C or FL courses.

[3] The ECE Restricted Area Elective must be chosen from the list approved by the Department of Electrical and Computer Engineering and is found on the Computer Engineering website.

[4] The Professional Elective must be chosen from the list approved by the Department of Electrical and Computer Engineering and is found on the Computer Engineering website.

Computer Engineering graduates have career opportunities in a number of industries and fields including, but not limited to, communications, manufacturing, aerospace, automotive, defense/military, medical, robotics and automation, and consumer electronics. The degree also provides an excellent background for graduate study in Electrical Engineering or Computer Engineering as well as Law and Medicine.

Types of Jobs Accepted

Computer Engineering graduates often gain entry-level positions as embedded hardware designers, software developers, or design engineers with engineering and consulting firms across various industries including aerospace, defense, automotive, and robotics.

Jobs of Experienced Alumni

Alumni of the Department of Electrical and Computer Engineering currently hold positions such as distribution manager, Alabama Power; vice president, ADTRAN; senior design engineer, Radiance Technologies; senior engineer, TSC.

Learn more about opportunities in this field at the Career Center