

Electrical Engineering (BS) - Premed Track

Degree Requirements

General Education Requirements (74 Hours)

Area I - Written Composition (2 Courses, 6 Hours)

- A. 3 hours: EH 101
- B. 3 hours: EH 102 or EH 105

Area II - Humanities & Fine Arts (3 Courses, 9 Hours)

- A. 3 hours from: EH 215, EH 216, EH 225, EH 226, EH 235, EH 236
- B. 3 hours from: ARH 100, ARH 103, ARH 123, ARS 101, DRA 110, MUL 101
- C. 3 hours: CA 110

Area III – Natural Sciences & Mathematics (13 Courses & Labs, 28 Hours)

- A. 4 hours from: MA 125
- B. 24 hours from: BLY 121 & BLY 121L, BLY 122 & BLY 122L, CH 131 & CH 131L, CH 132 & CH 132L, PH 201 & PH 201L, PH 202 & PH 202L

Area IV – History, Social & Behavioral Sciences (3 Courses, 9 Hours)

- A. 3-6 hours from: HY 101, HY 102, HY 135, HY 136
- B. 3-6 hours from: AN 100, AN 101, CA 100, CA 211, ECO 215, ECO 216, GEO 114, GEO 115, GS 101, IS 100, IST 201, PSC 130, PSY 120, PSY 250, SY 109, SY 112

Area V (8 Courses, 22 Hours)

- A. 22 hours: MA 126, MA 227, MA 237, MA 238, CH 201 & CH 201L, CH 202 & CH 202L

Major Requirements (65 Hours)

Electrical Engineering Major Core (24 Courses & Labs, 58 Hours)

- A. 2 hours: EG 101 or EG 201
- B. 6 hours: BMD 321, BMD 322
- C. 3 hours: *BLY 350 (not required)
- D. 3 hours: CIS 210
- E. 3 hours: EG 231
- F. 14 hours: EE 220, EE 223, EE 227, EE 263, EE 264, EE 268
- G. 19 hours: EE 321, EE 322, EE 328, EE 331, EE 334, EE 368, EE 372
- H. 11 hours: EE 401, EE 404, EE 431, EE 437, EE 465

Technical Electives (2 Courses, 6 Hours)

Must include a two-course concentration *Credit for both EE 440 & EE 443 not allowed

- A. 6 hours: Control Systems: EE 442, EE 423, EE 424, EE 427, EE 438, EE 468
- B. 6 hours: Communications and Networks: EE 441, EE 444, EE 453, EE 471, EE 473
- C. 6 hours: Digital Systems: EE 438, EE 440*, EE 441, EE 443*, EE 454, EE 457, EE 468, EE 469
- D. 6 hours: Electromagnetics and Optics: EE 450, EE 452, EE 453, EE 455, EE 456, EE 458, EE 488
- E. 6 hours: Electronics: EE 430, EE 432, EE 438, EE 439, EE 455, EE 470, EE 482, EE 486
- F. 6 hours: Power Systems: EE 430, EE 481, EE 482, EE 483, EE 484, EE 485, EE 486, EE 488, EE 489

Senior Lab Elective (1 Course, 1 Hour)

A. 1 hour: EE 446 or EE 447

Minor Requirements (0 Hours)

A minor is not required for this degree program

Notes:

* Recommended Course

1. C-grade or higher required in all prerequisite courses.
2. Appropriate software tools will be utilized in almost all EE courses.
3. BLY 350 is recommended but not required for the Pre-Med Track.
4. **PSY 120 and **SY 109 are recommended for the MCAT.
5. Accelerated Bachelor's to Master's (ABM) students will take up to six hours of approved graduate coursework.
6. All Electrical and Computer Engineering undergraduates must complete two designated writing credit (W) courses, at least one of which must be in the student's major.

Additional Information**Professional Component Standing (PCS)**

PCS is required to be eligible to take EE 300-level and EE 400-level courses. PCS is awarded when the students meet the following requirements.

- Courses: MA 125, MA 126, CH 131, CH 131L, PH 201, CIS 210, EE 220, EE 263, EH 101, EH 102,
- C-grade or higher required in PCS courses
- Minimum Grade Point Average: 2.00 USA GPA

Students who fail to maintain at least a 2.00 GPA overall at the University of South Alabama will lose PCS and may be required to take or repeat appropriate courses as specified by the department chair to correct their deficiencies and may not be permitted to continue in 300- and 400-level engineering courses.

Graduation Plan**Electrical Engineering (BS): PreMed Track (139 Total Hours)****First Year - Fall Semester**

Course ID	Course Description	Hours
MA 125	Calculus I	4
CH 131/CH 131L	General Chemistry I and Lab	4
EH 101	English Composition I	3
EG 101	Intro to Engineering and Design	2
General Education	Area II or IV	3
CA 110	Public Speaking	3

Total Hours 19

First Year - Spring Semester

Course ID	Course Description	Hours
MA 126	Calculus II	4
CH 132/CH 132L	General Chemistry II and Lab	4
PH 201/PH 201L	Calculus-Based physics I and Lab	4
CIS 210	Intro to C++ Programming	3
EH 102	English Composition II	3

Total Hours 18

Second Year - Fall Semester

Course ID	Course Description	Hours
MA 227	Calculus III	4
PH 202/PH 202L	Calculus-Based Physics II and Lab	4
EE 263	Digital Logic Design	3
EE 220	Circuit Analysis	3
CH 201/CH 201L	Organic Chemistry I and Lab	4

Total Hours 18

Second Year - Spring Semester

Course ID	Course Description	Hours
EE 223	Network Analysis	3
EE 268	Digital Logic Lab	1
CH 202/CH 202L	Organic Chemistry II and Lab	4
BLY 121/BLY 121L	General Biology I and Lab	4
MA 237	Linear Algebra I	3
MA 238	App Diff Equations	3

Total Hours 18

Third Year - Fall Semester

Course ID	Course Description	Hours
EE 227	Circuits/Devices Lab	1
EE 264	Microprocessor Sys-Interfacing	3

EE 321	Signals, Systems & Transforms	3
EE 331	Physical Electronics	3
BMD 321	Biochemistry I - Molecular Bio	3
BLY 122/BLY 122L	General Biology II and Lab	4
Total Hours		17

Third Year - Spring Semester

Course ID	Course Description	Hours
EE 322	Prob Rand Signals	3
EE 334	Digital Electronics	3
BMD 322	Biochemistry II-Metabolism	3
EE 328	Feedback Control Systems	3
EE 368	Microprocessor Sys Interface Lab	1
General Education	**Area II or IV	3
General Education	**Area II or IV	3
Total Hours		19

Fourth Year - Fall Semester

Course ID	Course Description	Hours
EE 372	Intro to Communication	3
EE 401	Intro to Electrical and Computer Design	1
EG 231	Intro to Ethics & Processing	3
EE 465	Digital Signal Processing	3
EE 431	Analog Electronics	3
EE 4XX	Technical Senior Lab	1
BLY 350*	Animal Behavior	4
Total Hours		18

Fourth Year - Spring Semester

Course ID	Course Description	Hours
EE 404	Electrical and Computer Engineering Design	3
EE 437	Electronics Lab	1
Technical Elective	**Electrical Engineering Electives	3
Technical Elective	**Electrical Engineering Electives	3
General Education	**Area II or IV	3
General Education	**Area II or IV	3
Total Hours		16

Notes

**See Degree Requirements

Students with an adequate ACT/SAT score in English Composition will not be required to take EH 101 as a prerequisite to EH 102

BOLD courses required for Professional Component Standing (PCS). "C" grade or better in each course to obtain PCS in the Electrical Engineering Program

*** EE technical electives must be selected from Electrical Engineering courses carrying a 400 number and must include a two- course concentration from the following concentration areas with permission of the student's advisor:**

Control Systems: EE 422, EE 423, EE 424, EE427, EE 438, and EE 468.

Communications and Networks: EE 441, EE 444, EE 453, EE 456, EE 471, and EE 473.

Digital Systems: EE 438, EE 440*, EE 441, EE 443*, EE 454, EE 457, EE 465, EE 468 and EE 469.

Electromagnetics and Optics: EE 450, EE 452, EE 453, EE 455, EE 456, EE 458, and EE 488.

Electronics: EE 430, EE 432, EE 438, EE 439, EE 455, EE 470, EE 482, and EE 486.

Power Systems: EE 430, EE 445, EE 481, EE 482, EE 483, EE 484, EE 485, EE 486, EE 488, and EE 489.

Appropriate software tools will be utilized in almost all EE courses.

Department Information

Department of Electrical and Computer Engineering Administrative Staff

(251) 460-6117

Chair

Hulya Kirkici

Professors

Kirkici, Steadman, Woods

Associate Professors

El-Sharkh, Gong, Khan, Russ, Spencer, Thomas, Wang

Assistant Professors

Latif, Lazarou, Shaban, Touma

Emeritus Professors

Bosarge, Gungor, Sakla

Part-time Instructor

Gholson, Sakla

Department of Electrical and Computer Engineering website
<https://www.southalabama.edu/colleges/engineering/ece/index.html>

The Department of Electrical and Computer Engineering offers the degrees of Bachelor of Science in Electrical Engineering (BSEE) and Bachelor of Science in Computer Engineering (BSCpE), both granted by the College of Engineering. The BSCpE program is administered by the ECE Department in consultation with the School of Computing. The ECE Department also offers the degree of Master of Science in Electrical Engineering.

BSEE Program Educational Objectives

The program educational objectives (PEOs) of the Electrical Engineering Degree Program are to produce graduates who, during their first few years after graduation, will:

1. Achieve professional advancement with increasing responsibility, leadership, and mentorship.
2. Function effectively on multidisciplinary teams, and individually, to develop and apply electrical engineering solutions within a global, societal, and environmental context.
3. Communicate effectively and manage resources skillfully as members and leaders of their profession.

4. Advance professional competence through continuous learning such as studying for advanced degrees, professional registration, and leadership through ethical standards and professionalism.

BSEE Student Outcomes

By the time of graduation from the Electrical Engineering Program, students should attain the following outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. 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
5. 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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. The BSEE curriculum is designed to ensure the attainment of the student outcomes.

The Bachelor of Science in Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>

Electrical Engineering is among the fastest evolving disciplines in our technological society. Engineering developments in electrical technology have provided, in a substantial way, improvement in the standard of Living of humanity. The domain of the electrical engineer reaches from massive electrical energy systems to microscopic integrated circuits; from Life studies in bioengineering to satellite communications systems; and from the control of electromagnetic radiation to the control of information flow in a computer. The Computer Engineering program is geared to students who are interested in the design of digital computing systems, integrating both hardware and software design components.

The highly diverse and rapidly evolving characteristics of these fields require a thorough understanding of fundamentals as well as flexibility in the design of individualized programs of study. Therefore, emphasis is placed on mathematics, physics, humanities, social sciences, basic sciences and engineering sciences during the first two years while sufficient flexibility is provided at the senior level to allow a student, in consultation with an advisor, to prepare a specialized course of study in two areas from the broad field of electrical and computer engineering.

BSCpE Program Educational Objectives

The program educational objectives (PEOs) of the Computer Engineering Degree Program are to produce graduates who, during their first few years after graduation, will:

1. Achieve professional advancement with increasing responsibility, leadership and mentorship.
2. Function effectively on multidisciplinary teams, and individually, to develop and apply computer engineering solutions within a global, societal, and environmental context.
3. Communicate effectively and manage resources skillfully as members and leaders of their profession.
4. Advance professional competence through continuous learning such studying for advanced degrees, professional registration, and leadership through ethical standards and professionalism.

BSCpE Student Outcomes

By the time of graduation from the BSCpE program, a student will have demonstrated attainment of the following outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. 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

5. 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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

The BSCpE curriculum is designed to ensure the attainment of the student outcomes.

The Bachelor of Science in Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>

In the Computer Engineering Degree Program, sequences of courses are chosen from Electrical and Computer Engineering and from Computer Science that produce an in-depth treatment of digital logic and systems theory. In addition, means are provided in both degree programs, through the Electrical and Computer Engineering Design Laboratory, for a student to pursue a design topic outside of, but related to, the formal course work.

Students are required to take general education (GenEd) elective courses in two broad areas: (i) Literature, Humanities and Fine Arts, and (ii) History, Social, and Behavioral Sciences. These courses provide breadth to the educational experience of Electrical Engineering and Computer Engineering students. They must be planned, in consultation with an academic advisor, to reflect a rationale appropriate to the educational objectives of the Departmental Programs, while conforming strictly to the requirements of the Articulation and General Studies Committee of the State of Alabama.

A minimum of 18 semester hours from areas (i) and (ii) above must be successfully completed. In area (i), Public Speaking (CA 110) is required for all Electrical and Computer Engineering students. Of the two remaining courses, one course must be in literature and one course must be in the fine arts; in area (ii), at least one course must be in history and at least one course must be from disciplines in the social and behavioral sciences.

Students in Electrical and Computing Engineering are required to become Student Members of the Institute of Electrical and Electronics Engineers (IEEE) when they enroll in EE 401 and EE 404. Students in Computer Engineering are required to become members of either the Institute of Electrical and Electronics Engineers (IEEE) or the Association for Computing Machinery (ACM) when they enroll in EE 401 and EE 404. Through participation in the activities of such technical organizations the student becomes aware of the activities of electrical and computer engineers in society. An excellent opportunity is provided to students for contact with practicing professionals as well as fellow students.

Any Electrical and Computer Engineering student interested in pursuing a career in medicine or bioengineering should consult with an advisor for an appropriate sequence of courses which will meet the minimum requirements for entry into a medical school or the necessary life sciences background to enter a graduate program in bioengineering.

The attainment of the BSEE or the BSCpE degree will allow the graduate to enter the professions of electrical engineering or computer engineering directly, or to continue his/her education at the graduate level.

BSEE Accelerated Bachelor's – Master's (ABM) Degree Option

The Department of Electrical and Computer Engineering allows well-qualified EE and CpE undergraduates to follow an "Accelerated Bachelor's to Master's" study plan. This plan permits up to six credit hours of graduate coursework to count towards both the bachelor's (as Technical Electives) and the master's degrees, so that the master's degree is earned faster than usual. (The coursework concerned must individually satisfy the requirements of both degrees.) See a departmental advisor for specific details.