

# ELECTRICAL AND COMPUTER ENGINEERING (B.S.E.C.E.)

The Electrical and Computer Engineering curriculum consists of two main course stems. In the electrical stem, students study signals and systems, electromagnetics, electronic circuit design and control systems design. In the computer stem, students study digital logic design, computer organization, embedded computer systems, hardware/software design and digital signal processing. With these two required stems, students gain a foundation in the major areas of electrical and computer engineering and are prepared for careers in a broad spectrum of industries. Elective courses allow a student to study a specialized field of interest, including areas like communication and networking, signal and image processing, optics and photonics, control and robotics, digital and embedded systems, wireless and microwave systems, and power and energy systems.

## Electrical and Computer Engineering Mission Statement

The mission of the Electrical and Computer Engineering program is to educate students within a caring Christian environment, in the discipline of electrical and computer engineering. We want our graduates to be motivated by Christian ideals and to view their career as a lifelong commitment to serving others. We strive to provide our students with a strong technical foundation with an emphasis on professional, moral, ethical and leadership development.

## BSECE Program Educational Objectives

Within a few years after graduation, Baylor BSECE graduates will:

- Be productive and valuable engineers.
- Be successful in high-quality MS, PhD, JD, MBA, and MD programs.
- Be mindful of the moral and ethical relationships that their engineering decisions have with society and the world.
- Make positive contributions to their communities, churches, and society at large.

## BSECE Expected Graduate Outcomes

In support of the program objectives, graduates of the program must demonstrate that they have:

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

## B.S.E.C.E. Degree Requirements

Code	Title	Hours
<b>Required Courses</b>		
Minimum 124 hours including the following:		
<i>Literature and Writing</i>		
ENG 1310	Writing and Academic Inquiry Seminars	3
GTX 2301	Intellectual Traditions of the Ancient World : Literature and Thought	3
or GTX 2302	Medieval Intellectual Traditions: Literature and Thought in Context	
PWR 3300	Technical Writing	3
<i>Religion</i>		
REL 1310	The Christian Scriptures	3
REL 1350	The Christian Heritage	3
<i>Foreign Language and Culture</i>		
Select 3 hours from the Foreign Language and Culture Distribution List for ECS Majors. Second-level proficiency must be reached if a foreign language is chosen.		3
<i>Other Requirements</i>		
PSC 1387	The U.S. Constitution, Its Interpretation, and the American Political Experience	3
or ENG 2301	British Literature	
EGR 2108	Engineering Economics	1
EGR 3305	Social and Ethical Issues in Engineering	3
or EGR 3315	Ethics of International Service	
EGR 1101	Engineering New Student Experience	1
Chapel: Two Semesters		0
Lifetime Fitness: Any LF 11XX course		1
<i>Mathematics and Basic Sciences</i>		
CHE 1301	Basic Principles of Modern Chemistry I	3
MTH 1321	Calculus I	3
MTH 1322	Calculus II	3
MTH 2311	Linear Algebra	3
MTH 2321	Calculus III	3
MTH 3325	Ordinary Differential Equations	3
STA 3381	Probability and Statistics	3
PHY 1420	General Physics I	4
PHY 1430	General Physics II	4
<i>Mathematics Elective</i>		
Select one course from the following:		3
MTH 3324	Numerical Methods	
MTH 3326	Partial Differential Equations	
MTH 3370	Mathematical Methods of Operations Research	
MTH 4322	Numerical Analysis	
MTH 4324	Systems of Ordinary Differential Equations	
MTH 4329	Theory of Functions of a Complex Variable	
STA 4374	Statistical Process Control	

ME 4327	Numerical Methods for Engineers	
<i>Electrical and Computer Engineering Major</i>		
EGR 1301	Introduction to Engineering	3
EGR 1302	Introduction to Engineering Analysis	3
CSI 1430	Introduction to Computer Science I with Laboratory	4
ELC 2337	Digital Logic Design	3
ELC 2137	Digital Logic Design Laboratory	1
ELC 2330	Electrical Circuit Theory	3
ELC 2130	Electrical Circuit Laboratory	1
ELC 3114	Electronic Design Laboratory	1
ELC 3314	Electronic Design	3
ELC 3335	Signals and Systems	3
ELC 3336	Microprocessor Systems	3
ELC 3337	Applied Electromagnetic Fields	3
ELC 3338	Computer Organization	3
ELC 4332	Automatic Control Systems	3
ELC 4351	Digital Signal Processing	3
ELC 4438	Embedded Systems Design	4
EGR 3380	Engineering Design I	3
EGR 4390	Engineering Design II	3
Select four courses from the following:		12
EGR 3V95	Internship Experience	
EGR 4375	Elements of Nuclear Engineering	
ELC 4311	Advanced Logic Design	
ELC 4318	Avionics System Design	
ELC 4320	Introduction to Optics	
ELC 4321	Computational Photonics	
ELC 4322	Integrated Photonics	
ELC 4323	Solid-State Materials	
ELC 4324	Semiconductor Devices	
ELC 4325	Fundamentals of Lasers	
ELC 4329	Introduction to Microfabrication	
ELC 4330	Introduction to Robotics	
ELC 4331	Electric Machines and Drives	
ELC 4340	Power Systems	
ELC 4345	Power Electronics	
ELC 4350	Principles of Communication	
ELC 4353	Image Formation and Processing	
ELC 4357	Cardiovascular Engineering and Instrumentation	
ELC 4366	Quantum Mechanics for Engineers	
ELC 4367	Introduction to Quantum Computing	
ELC 4372	Bioinstrumentation	
ELC 4377	Solar Energy	
ELC 4378	Introduction to Biosensors	
ELC 4381	Antennas and Wireless Propagation I	
ELC 4383	RF/Microwave Circuits I	
ELC 4384	RF/Microwave Circuits II	
ELC 4396	Special Topics in Electrical or Computer Engineering	
ELC 4V97	Special Projects in Electrical or Computer Engineering	

A grade of "C" or better in all of the Electrical and Computer Engineering hours counted towards major.

**Total Hours****121**