

# ELECTRICAL ENGINEERING - BS

The Department of Electrical and Computer Engineering at Texas A&M University offers a Bachelor of Science degree option to its undergraduate students desiring to major in Electrical Engineering.

Electrical engineers design, develop, test and supervise the manufacture of sophisticated electrical and electronic systems such as: cell phones, iPods, digital TVs, medical imaging, smart appliances, automobiles and advanced satellite systems. Many electrical engineers also work in areas closely related to computers. Areas of specialization include analog and mixed-signal electronics; biomedical imaging, sensing and genomic signal processing; computer engineering and systems; device science and nanotechnology; energy and power; electromagnetics and microwaves; and information science and systems.

The bachelor's degree program in electrical engineering has been accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org/>). With ABET accreditation, students, parents, employers and the society we serve can be confident that a program meets the quality standards that produce graduates prepared to enter a global workforce.

## Program Mission

The mission of the electrical engineering program is threefold:

- To create new knowledge and challenge young minds by participation in the process of discovery and invention;
- To educate electrical engineers with a solid background of fundamentals, stretching their imagination, and preparing them for an exciting future; and
- To serve the society through research, education, and outreach activities.

## Program Educational Objectives

The educational objectives of the electrical engineering program are to produce graduates whose expected accomplishments within a few years of graduation are:

1. Graduates who choose to pursue a career in industry or government will become productive and valuable electrical engineers.
2. Graduates who choose to pursue advanced degrees will be able to gain admission to graduate programs and succeed in top graduate programs.
3. Graduates will lead and work effectively on diverse teams to promote a breadth of perspectives in developing, communicating, and executing solutions across a broad range of electrical engineering application areas.
4. In keeping with the legacy of an Aggie Engineer, graduates will be successful in attaining positions of leadership in their professional careers.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department. The full bachelors program is offered on College Station and Qatar campuses. All electrical engineering undergraduate coursework is offered on both campuses.

## Program Requirements

The freshman year is identical for degrees in aerospace engineering, architectural engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, environmental engineering, industrial distribution, industrial engineering, interdisciplinary engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering (Note: not all programs listed are offered in Qatar). The freshman year is slightly different for chemical engineering, biomedical engineering and materials science and engineering degrees in that students take CHEM 119 or CHEM 107/CHEM 117 and CHEM 120.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year		Semester
Fall		Credit Hours
CHEM 107	General Chemistry for Engineering Students <sup>1,4</sup>	3
CHEM 117	General Chemistry for Engineering Students Laboratory <sup>1,4</sup>	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition <sup>1</sup> or Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation <sup>1</sup>	2
MATH 151	Engineering Mathematics I <sup>1,2</sup>	4
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
<b>Semester Credit Hours</b>		<b>16</b>
Spring		
ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics <sup>1</sup>	2
MATH 152	Engineering Mathematics II <sup>1</sup>	4
PHYS 206	Newtonian Mechanics for Engineering and Science <sup>1</sup>	3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II <sup>1,4</sup>	
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3,5</sup>		
<b>Semester Credit Hours</b>		<b>15-16</b>
<b>Total Semester Credit Hours</b>		<b>31-32</b>

<sup>1</sup> A grade of C or better is required.

<sup>2</sup> Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.

<sup>3</sup> Of the 21 hours shown as University Core Curriculum electives, 3 must be from creative arts (see AREN curriculum for more information), 3

from social and behavioral sciences (see IDIS curriculum for more information), 3 from language, philosophy and culture (see CVEN, EVEN and PETE curriculum for more information), 6 from American history and 6 from government/political science. The required 3 hours of international and cultural diversity and 3 hours of cultural discourse may be met by courses satisfying the creative arts, social and behavioral sciences, language, philosophy and culture, and American history requirements if they are also on the approved list of international and cultural diversity (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/>) courses and cultural discourse (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) courses.

<sup>4</sup> BMEN, CHEN and MSEN require 8 hours of fundamentals of chemistry which are satisfied with CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Students with an interest in BMEN, CHEN and MSEN can take CHEM 120 second semester freshman year. CHEM 120 will substitute for CHEM 107/CHEM 117.

<sup>5</sup> For BS-PETE, allocate 3 hours to core communications course (ENGL 210, COMM 203, COMM 205, or COMM 243) and/or 3 hours to UCC elective. For BS-MEEN, allocate 3 hours to core communications course (ENGL 203, ENGL 210, or COMM 205) and/or 3 hours to UCC elective.

## Second Year

Fall		Semester Credit Hours
CSCE 120	Program Design and Concepts <sup>1</sup>	3
ECEN 248	Introduction to Digital Systems Design <sup>1</sup>	4
MATH 251	Engineering Mathematics III <sup>1</sup>	3
PHYS 207	Electricity and Magnetism for Engineering and Science <sup>1</sup>	3
PHYS 217/ ENGR 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism <sup>1</sup>	2
<b>Semester Credit Hours</b>		<b>15</b>
Spring		Semester Credit Hours
ECEN 214	Electrical Circuit Theory <sup>1</sup>	4
ECEN 250	Machine Learning for Electrical Engineering <sup>1</sup>	3
MATH 308	Differential Equations <sup>1</sup>	3
MATH 311	Topics in Applied Mathematics I <sup>1</sup>	3
PHYS 222	Modern Physics for Engineers <sup>1</sup>	3
<b>Semester Credit Hours</b>		<b>16</b>

## Third Year

Fall		Semester Credit Hours
ECEN 314	Signals and Systems <sup>1</sup>	3
ECEN 322	Electric and Magnetic Fields <sup>1</sup>	3
ECEN 325	Electronics <sup>1</sup>	4
ECEN 340	Electric Energy Conversion <sup>1</sup>	3
Select one of the following: <sup>1</sup>		3
ENGL 210	Technical and Professional Writing	
COMM 205	Communication for Technical Professions	
COMM 243	Argumentation and Debate	
<b>Semester Credit Hours</b>		<b>16</b>

## Spring

ECEN 303	Random Signals and Systems <sup>1</sup>	3
ECEN 350/ CSCE 350	Computer Architecture and Design <sup>1</sup>	4
ECEN 370	Electronic Properties of Materials <sup>1</sup>	3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
Technical elective <sup>1,6</sup>		3
<b>Semester Credit Hours</b>		<b>16</b>

## Fourth Year

Fall		Semester Credit Hours
ECEN 403	Electrical Design Laboratory I <sup>1</sup>	3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		6
ECEN elective <sup>1,7</sup>		9
High Impact Experience <sup>8</sup>		0
ECEN 399	High Impact Professional Development	
<b>Semester Credit Hours</b>		<b>18</b>

## Spring

ECEN 404	Electrical Design Laboratory II <sup>1</sup>	3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
ECEN elective <sup>1,7</sup>		10
<b>Semester Credit Hours</b>		<b>16</b>
<b>Total Semester Credit Hours</b>		<b>97</b>

<sup>6</sup> Select from ASTR 314, CSCE 313, CSCE 314, ESET 352, MATH 407, MATH 412, MATH 414, MATH 417, MATH 470, MATH 471, MEEN 221, MEEN 222/MSEN 222, MEEN 315, MSEN 325, PHYS 221.

<sup>7</sup> Select from ECEN 326, ECEN 333, ECEN 338, ECEN 360, ECEN 410-480 (<http://catalog.tamu.edu/undergraduate/course-descriptions/ecen/>), ECEN 489.

<sup>8</sup> All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the ECEN advising office.

# Total Program Hours 128