

ELECTRICAL ENGINEERING - BS

Electrical engineering is a challenging but exciting and rewarding field of study. It is a rich and rapidly advancing field that plays a significant role in shaping all facets of modern society. This includes generating, transmitting and storing electrical energy; developing and utilizing wired and wireless technologies for broadband communications; controlling complex systems; and developing hardware and software systems that are at the core of most devices we interact with on a daily basis. The rapid industrialization and computerization of Qatar's economy create a need for highly skilled electrical and computer engineers capable to plan, design, implement and manage this transformation. Studying electrical and computer engineering prepares students for assuming key roles with high ethical responsibility in developing and managing the information, communication, and electrical energy infrastructures of Qatar and the world economy.

The program curriculum is designed to prepare graduates for work in the highly diverse electrical engineering profession. A solid foundation in physics, chemistry, and mathematics is used to support courses in the fundamentals of electrical engineering.

The program facilitates the integrated use of computers throughout the curriculum, while laboratory work allows students hands-on experience and to apply basic concepts to a wide range of engineering problems. After their exposure to the most recent analytical techniques and technological developments, students will implement engineering concepts using state-of-the-art computers and laboratory equipment. After foundation studies in analog and digital circuits, signals and systems, electronics, electromagnetic fields, and computer architecture during the sophomore and junior years, students have access to two main elective tracks in the senior year, namely, electric power systems and communications.

The electric power systems track is designed to train students in the theory and techniques related to electromechanical energy conversion systems, electric power, renewable energy, and power electronic systems. The communication track is designed to prepare students to address challenges in the area of digital and wireless communication systems. Both tracks present similar requirements and provide a broad and rigorous educational experience. The program offers additional electives from computer engineering, control, and biomedical engineering areas.

For more information, please visit the Electrical Engineering Program's website at www.qatar.tamu.edu/programs/ecen (<https://www.qatar.tamu.edu/programs/ecen/>).

Program Requirements

The freshman year is identical for degrees in electrical engineering, mechanical engineering, petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 119 or CHEM 107/CHEM 117 and CHEM 120. 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 Credit Hours
Fall		
CHEM 107 & CHEM 117	General Chemistry for Engineering Students and General Chemistry for Engineering Students Laboratory ^{1,4}	4
ENGL 104	Composition and Rhetoric ¹	3
ENGR 102	Engineering Lab I - Computation ¹	2
MATH 151	Engineering Mathematics I ^{1,2}	4
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		3
Semester Credit Hours		16
Spring		
ENGR 216/PHYS 216	Experimental Physics and Engineering Lab II - Mechanics ¹	2
MATH 152	Engineering Mathematics II ^{1,2}	4
PHYS 206	Newtonian Mechanics for Engineering and Science ¹	3
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		6
Semester Credit Hours		15
Total Semester Credit Hours		31

¹ A grade of C or better is required.

² 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.

³ Of the 21 hours shown as University Core Curriculum electives, 3 must be from language, philosophy and culture, 3 must be from creative arts, 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 3 hours from international and cultural diversity and 3 hours from cultural discourse may be met by courses satisfying the language, philosophy and culture, creative arts, social and behavioral sciences, and American history requirements if they are also on the approved list of international and cultural diversity or cultural discourse courses.

⁴ CHEN requires 8 hours of freshman chemistry, which may be satisfied by CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Credit by Examination (CBE) for CHEM 119 or CHEM 107/CHEM 117 plus CHEM 120.

Second Year		Semester Credit Hours
Fall		
ECEN 210	Computer Programming and Algorithms ¹	4
ECEN 248	Introduction to Digital Systems Design ¹	4
ENGR 217/PHYS 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism ¹	2
MATH 251	Engineering Mathematics III ¹	3
PHYS 207	Electricity and Magnetism for Engineering and Science ¹	3
Semester Credit Hours		16

Spring

ECEN 214	Electrical Circuit Theory ¹	4
MATH 308	Differential Equations ¹	3
MATH 311	Topics in Applied Mathematics I ¹	3
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		6
Semester Credit Hours		16

Third Year**Fall**

ECEN 314	Signals and Systems ¹	3
ECEN 322	Electric and Magnetic Fields ¹	3
ECEN 325	Electronics ¹	4
ENGL 210	Technical and Professional Writing ¹	3
PHYS 222	Modern Physics for Engineers ¹	3
Semester Credit Hours		16

Spring

ECEN 303	Random Signals and Systems ¹	3
ECEN 340	Electric Energy Conversion ¹	3
ECEN 350/ CSCE 350	Computer Architecture and Design ¹	4
ECEN 370	Electronic Properties of Materials ¹	3
Technical electives ⁶		3
Semester Credit Hours		16

Fourth Year**Fall**

ECEN 403	Electrical Design Laboratory I ¹	3
ECEN elective (http://catalog.tamu.edu/undergraduate/course-descriptions/ecen/) ⁶		12
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		3
High Impact Experience ⁵		
ECEN 399	High Impact Professional Development	
Semester Credit Hours		18

Spring

ECEN 404	Electrical Design Laboratory II ¹	3
ECEN elective (http://catalog.tamu.edu/undergraduate/course-descriptions/ecen/) ⁶		9
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		3
Semester Credit Hours		15
Total Semester Credit Hours		97

⁵ 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 advising office.

⁶ See an academic advisor for a list of approved courses.