COMPUTER ENGINEERING - BS

The curriculum is designed to cover the engineering aspects of both hardware and software—a total computer systems perspective. All computer engineering students take courses in the following areas: electrical circuits, electronics, digital circuits, computer architecture ranging from embedded systems to data centers, interfacing, programming languages ranging from assembler to high level, data structures, analysis of algorithms, operating systems, software engineering and computer systems. A solid foundation in the basic sciences of physics, chemistry and mathematics is used to support these courses.

The curriculum encompasses much of the core material of traditional Computer Science and Electrical Engineering degrees. Students are able to further enhance their knowledge by taking electives in a broad range of topics: computer networks, computer system architecture, artificial intelligence, machine learning, computer graphics, robotics, cybersecurity, computer languages, large-scale hardware and software systems, Very Large Scale Integrated (VLSI) circuits and systems, microprocessor interfacing and system design, hardware-software interaction and embedded systems.

The bachelor's degree program in computer engineering has been accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org (http://www.abet.org/). The program's emphasis on design and engineering fundamentals prepares the student for licensing as a professional engineer as well.

Program Mission

The mission of the computer engineering program is threefold:

- The computer engineering program provides students with an education that ensures an excellent understanding of hardware and software systems and the necessary system design and development skills, and that fosters professional curiosity and imagination that drives them throughout their career.
- The program stimulates and challenges the students with exceptional, highly motivated faculty members who share knowledge and excitement about computer engineering; well-designed undergraduate and graduate curricula; research opportunities at all levels; and a first-class educational infrastructure.
- The program strives to produce graduates who are well prepared to excel in industry, academia and government, and who will take on leadership roles in shaping the technological landscape of the future.

Program Educational Objectives

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

1. Graduates who choose to pursue a career in industry or government will become productive and valuable computer engineers.
2. Graduates who choose to pursue advanced degrees will gain admission 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 computer systems 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.

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		
Fall		**Semester Credit Hours**
CHEM 107	General Chemistry for Engineering Students [1,4]	3
CHEM 117	General Chemistry for Engineering Students Laboratory [1,4]	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition [1] or Composition and Rhetoric	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]	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]		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II [1,4]	

University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3,5]		
	Semester Credit Hours	**15-16**
	Total Semester Credit Hours	**31-32**

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 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.
4. 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.
5. 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 [1]	3
ECEN 248	Introduction to Digital Systems Design [1]	4
MATH 251	Engineering Mathematics III [1]	3
PHYS 207	Electricity and Magnetism for Engineering and Science [1]	3
PHYS 217/ ENGR 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism [1]	2
	Semester Credit Hours	**15**
Spring		
CSCE 221	Data Structures and Algorithms [1]	4
CSCE 222/ ECEN 222	Discrete Structures for Computing [1]	3
ECEN 214	Electrical Circuit Theory [1]	4
ECEN 303 or STAT 211	Random Signals and Systems [1] or Principles of Statistics I	3
MATH 308	Differential Equations [1]	3
	Semester Credit Hours	**17**

Third Year

Fall		
CSCE 313	Introduction to Computer Systems [1]	4
CSCE 350/ ECEN 350	Computer Architecture and Design [1]	4
CSCE 481	Seminar [1]	1
ECEN 314	Signals and Systems [1]	3
MATH 311	Topics in Applied Mathematics I [1]	3
Select one of the following: [1]		3
ENGL 210	Technical and Professional Writing	
COMM 205	Communication for Technical Professions	
COMM 243	Argumentation and Debate	
	Semester Credit Hours	**18**
Spring		
CSCE 331	Foundations of Software Engineering [1]	4
CSCE 462 or ECEN 449	Microcomputer Systems [1] or Microprocessor Systems Design	3
ECEN 325	Electronics [1]	4
ECEN 454	Digital Integrated Circuit Design [1]	3
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**17**

Fourth Year

Fall		
Senior design [1,6]		3
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
Area elective [1,7]		6
Engineering elective [1,8]		3
High Impact Experience [9]		0
CSCE 399 or ECEN 399	High-Impact Experience or High Impact Professional Development	
	Semester Credit Hours	**15**
Spring		
Senior Design [1,6]		3
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		6
Area elective [1,7]		6
	Semester Credit Hours	**15**
	Total Semester Credit Hours	**97**

6. 6 hours chosen from either (ECEN 403 and ECEN 404) or (CSCE 483 and an additional 3 hours of Area electives.)
7. Area electives chosen in consultation with academic advisor.
8. Select from: MATH 407, MATH 412, MATH 414, MATH 431, MATH 471, MEEN 315, MEEN 221, MEEN 222/MSEN 222, PHYS 221, PHYS 222.
9. 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 CSE or ECE advising office.

Total Program Hours 128