

CIVIL ENGINEERING - BS, STRUCTURAL ENGINEERING TRACK

The Structural Engineering track to fulfill the BS in Civil Engineering degree provides coursework in the areas of structural analysis and structural design that equip the student to analyze and design the frameworks that support buildings, bridges, offshore installations and civil infrastructure projects. This track is appropriate for careers related to the structural design of engineered facilities to safely resist the forces found in their environment, and for those planning on further specialization in graduate studies.

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 II⁴

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, 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 freshman chemistry, which may be satisfied by CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Credit by Examination (CBE) for CHEM 119 plus CHEM 120; or 8 hours of CBE for CHEM 119 and CHEM 120. BMEN, CHEN and MSEN should 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
CVEN 207	Introduction to the Civil Engineering Profession	2
CVEN 221	Engineering Mechanics: Statics	3
CVEN 250	Introduction to Graphics and Visualization Applications in Civil Engineering Design	2
ENGR 217/ PHYS 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism	2
MATH 251	Engineering Mathematics III	3
PHYS 207	Electricity and Magnetism for Engineering and Science	3
STAT 211	Principles of Statistics I	3
Semester Credit Hours		18

Spring

CVEN 302	Computer Applications in Engineering and Construction	3
CVEN 303	Civil Engineering Measurement	3
CVEN 305	Mechanics of Materials	3
CVEN 306	Materials Engineering for Civil Engineers	3
ENGL 210 or COMM 205	Technical and Business Writing or Communication for Technical Professions	3
MATH 308	Differential Equations	3
Semester Credit Hours		18

Third Year**Fall**

CVEN 311/ EVEN 311	Fluid Dynamics	3
CVEN 322	Civil Engineering Systems	3
CVEN 345	Theory of Structures	3
CVEN 363	Engineering Mechanics: Dynamics	3
Technical elective ⁶		3
Semester Credit Hours		15

Spring

CVEN 399	Mid-Curriculum Professional Development	0
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		3
Technical elective ⁶		12
Semester Credit Hours		15

Fourth Year**Fall**

CVEN 424	Civil Engineering Professional Practice ⁷	2
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		3
Technical elective ⁶		11
Semester Credit Hours		16

Spring

PHIL 482/ ENGR 482	Ethics and Engineering	3
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³		3
Technical elective ⁶		9
Semester Credit Hours		15
Total Semester Credit Hours		97

⁶ A total of 35 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student's advisor and/or the Civil Engineering Undergraduate Student Services Office to ensure pre- and co-requisites are satisfied. Capstone design courses must include more than one civil engineering context.

⁷ All students must take at least two courses in their major that are designated as writing intensive (W). CVEN 207 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

Total Program Hours 128

Structural Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, Structural Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (20 semester credit hours), FOCUS courses (9 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 35 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office.

Code	Title	Semester Credit Hours
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SCIENCE Course (3 Semester Credit Hours Required)

Select 3 hours from:

ATMO 201	Weather and Climate	
ATMO 363	Introduction to Atmospheric Chemistry and Air Pollution	
BESC 201	Introduction to Bioenvironmental Sciences	
BIOL 113	Essentials in Biology	
GEOG 203	Planet Earth	
GEOL 320	Geology for Civil Engineers	
GEOL 410	Hydrogeology	
GEOS 105	Introduction to Environmental Geoscience	
OCNG 410	Physical Oceanography	
RENK 205	Fundamentals of Ecology	
RENK 375	Conservation of Natural Resources	

Code	Title	Semester Credit Hours
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BREADTH Courses (20 Semester Credit Hours Required)

CVEN 342	Materials of Construction	3
or CVEN 344	or Portland Cement Concrete Materials for Civil Engineers	
CVEN 349	Civil Engineering Project Management	3
CVEN 365	Introduction to Geotechnical Engineering	3

Select 6-9 hours from:

CVEN 301/ EVEN 301	Environmental Engineering	
CVEN 307	Transportation Engineering	

CVEN 339/ Water Resources Engineering
EVEN 339

Select 2-5 hours from:

CVEN 315 Sensor Technology for the Built Environment

CVEN 336 Fluid Dynamics Laboratory

CVEN 403 Applied Civil Engineering Surveying¹

CVEN 423 Geomatics for Civil Engineering

CVEN 435 Geotechnical Engineering Design

CVEN 436 Case Histories in Geotechnical Engineering

CVEN 450 AutoCAD in Civil Engineering²

CVEN 451 Public Works Engineering

CVEN 473 Engineering Project Estimating and Planning

CVEN 485 Directed Studies³

CVEN 491 Research³

MATH 304 Linear Algebra

MATH 311 Topics in Applied Mathematics I

OCEAN 400 Basic Coastal Engineering

STAT 212 Principles of Statistics II

Code	Title	Semester Credit Hours
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FOCUS Courses (9 Semester Credit Hours Required)

CVEN 444	Structural Concrete Design	3
CVEN 445	Matrix Methods of Structural Analysis	3
CVEN 446	Structural Steel Design	3

Code	Title	Semester Credit Hours
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CAPSTONE DESIGN Course (3 Semester Credit Hours Required)

CVEN 483	Analysis and Design of Structures	3
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¹ CVEN 403 is a 2 semester credit hour course.

² CVEN 450 is a 1 semester credit hour course.

³ Up to 2 hours of CVEN 485 or CVEN 491 may be used.