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, petroleum engineering (Note: not all programs listed are offered in Qatar). The freshman year is identical for degrees in aerospace engineering, astronautical 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, petroleum engineering (Note: not all programs listed are offered in Qatar).

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 102</td>
<td>Engineering Lab I - Computation</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 216/</td>
<td>Experimental Physics and Engineering Lab</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 216</td>
<td>II - Mechanics</td>
<td>1</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 206</td>
<td>Newtonian Mechanics for Engineering and Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 16

Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 207</td>
<td>Introduction to the Civil Engineering Profession</td>
<td>2</td>
</tr>
<tr>
<td>CVEN 221</td>
<td>Engineering Mechanics: Statics</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 250</td>
<td>Introduction to Graphics and Visualization</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 217/</td>
<td>Experimental Physics and Engineering Lab II</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 217</td>
<td>III - Electricity and Magnetism</td>
<td>2</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 207</td>
<td>Electricity and Magnetism for Engineering</td>
<td>3</td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 18

Select one of the following:

- CHEM 120  Fundamentals of Chemistry II
- University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)

Semester Credit Hours: 3-4

Total Semester Credit Hours: 15-16

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 107/117 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.
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.
Civil Engineering - BS, Structural Engineering Track

Spring
CVEN 302 Computer Applications in Engineering and Construction 3
CVEN 303 Civil Engineering Measurement 3
CVEN 305 Mechanics of Materials 3
CVEN 311/ EVEN 311 Fluid Dynamics 3
ENGL 210 or COMM 205 Technical and Professional Writing or Communication for Technical Professions 3
MATH 308 Differential Equations 3

Semester Credit Hours 18

Third Year
Fall
CVEN 306 Materials Engineering for Civil Engineers 3
CVEN 322 Civil Engineering Systems 3
CVEN 345 Theory of Structures 3
CVEN 363 Engineering Mechanics: Dynamics 3
Technical coursework 6

Semester Credit Hours 15

Spring
CVEN 399 Mid-Curriculum Professional Development 0
Technical coursework 6
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) 3

Semester Credit Hours 15

Fourth Year
Fall
CVEN 424 Civil Engineering Professional Practice 7
Technical coursework 6
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) 3

Semester Credit Hours 16

Spring
PHIL 482/ ENGR 482 Ethics and Engineering 3
Technical coursework 6
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) 3

Semester Credit Hours 15

Total Semester Credit Hours 97

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 Coursework

Technical coursework for the BS in Civil Engineering, Structural Engineering Track are composed of breadth courses (12-15 semester credit hours), design courses (9-12 semester credit hours), focus courses (5-8 semester credit hours), a science course (3 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 and Environmental Engineering Undergraduate Student Services Office.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 349</td>
<td>Civil Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 342</td>
<td>Materials of Construction</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 365</td>
<td>Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 301/ EVEN 301</td>
<td>Environmental Engineering</td>
<td>3-6</td>
</tr>
<tr>
<td>CVEN 307</td>
<td>Transportation Engineering</td>
<td></td>
</tr>
<tr>
<td>CVEN 339/ EVEN 339</td>
<td>Water Resources Engineering</td>
<td></td>
</tr>
</tbody>
</table>

BREADTH

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<tr>
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<tbody>
<tr>
<td>CVEN 349</td>
<td>Civil Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 342</td>
<td>Materials of Construction</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 365</td>
<td>Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

DESIGN

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 444</td>
<td>Structural Concrete Design</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 446</td>
<td>Structural Steel Design</td>
<td>3</td>
</tr>
</tbody>
</table>

FOCUS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 445</td>
<td>Matrix Methods of Structural Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 2 hours from the following:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 314</td>
<td>Sensor Technology in Civil Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CVEN 336</td>
<td>Fluid Dynamics Laboratory</td>
<td></td>
</tr>
<tr>
<td>CVEN 403</td>
<td>Applied Civil Engineering Surveying</td>
<td></td>
</tr>
</tbody>
</table>

6 A total of 35 hours of technical coursework is required. Technical coursework is divided into five categories: breadth courses, design courses, focus courses, a science course, and a capstone design course. The total number of hours between breadth, design, and focus courses must add up to 29 hours. The choice of courses to be taken in each of the five categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil and Environmental Engineering Undergraduate Student Services Office to ensure pre- and co-requisites are satisfied. Capstone design courses must include more than one civil engineering context.
CVEN 449  Visualization and Building  
            Information Modeling in Structural  
            Engineering Design
CVEN 450  AutoCAD in Civil Engineering
CVEN 485  Directed Studies  
            3
CVEN 491  Research  
            3

Select 0-3 hours from the following:  
            0-3
CVEN 315  Sensor Technology for the Built  
            Environment  
            2
CVEN 405  Construction Management of Field  
            Operations
CVEN 423  Geomatics for Civil Engineering
CVEN 436  Case Histories in Geotechnical  
            Engineering
CVEN 451  Public Works Engineering
MATH 304  Linear Algebra
MATH 311  Topics in Applied Mathematics I
STAT 212  Principles of Statistics II

SCIENCE
Select 3 hours from the following:  
            3
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
ECCB 205  Fundamentals of Ecology
GEOG 203  Planet Earth
GEOL 104  Physical Geology
GEOL 320  Geology for Civil Engineers
GEOS 105  Introduction to Environmental  
            Geoscience
OCNG 310  Physical Oceanography
RWFM 375  Conservation of Natural Resources

CAPSTONE DESIGN
CVEN 483  Analysis and Design of Structures  
            3

Total Semester Credit Hours  
            35

1 The following courses satisfy the laboratory course requirement,  
   CVEN 342 or CVEN 343, CVEN 365.
2 Only one of the following courses, CVEN 314 or CVEN 315, can be used  
   to meet the focus elective.
3 Up to 2 hours of CVEN 485 or CVEN 491 may be used. A proposal must  
   be submitted to the undergraduate office and approved before credit  
   can be awarded towards the degree.