CIVIL ENGINEERING - BS, TRANSPORTATION AND INFRASTRUCTURE MATERIALS ENGINEERING TRACK

This track is appropriate for those wishing to pursue careers in engineering related to the planning, design, construction, operation and maintenance of various elements of the transportation system, including roads, rail, transit and aviation.

The Transportation and Infrastructure Materials Engineering Track to fulfill the Bachelor of Science in Civil Engineering degree emphasizes specialized coursework in transportation and infrastructure materials engineering. This includes the planning, design and operations of transportation facilities along with the design, construction and maintenance of transportation infrastructure.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, architectural engineering, biological and agricultural engineering, civil engineering, computer engineering, computer science, data engineering, 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. 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. 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 (https://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 (https://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 (https://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 (BS-AREN curriculum take ARCH 249, ARCH 250, or ARCH 350), 3 from social and behavioral sciences (BS-DAEN curriculum take ECON 202 or ECON 203; BS-IDIS curriculum take ECON 202), 3 from language, philosophy and culture (BS-AREN, BS-CVEN, BS-EVEN and BS-PETE curriculum take PHIL 482). In addition, 6 hours are required from American history and 6 hours from government/political science. The required 3 hours of international and cultural diversity and 3 hours of cultural discourse may be satisfied by courses that also meet the creative arts, social and behavioral sciences, language, philosophy and culture or American history requirements if those courses are on the approved list of international and cultural diversity (https://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/) courses and cultural discourse (https://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/) courses.
4. BS-BMEN, BS-CHEN and BS-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 BS-BMEN, BS-CHEN and BS-MSEN can take CHEM 120 second semester freshman year. Students who take CHEM 119 and CHEM 120 can substitute CHEM 120 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 University Core Curriculum elective. For BS-MEEN, allocate 3 hours to core communications course (ENGL 203, ENGL 210, COMM 203 or COMM 205) and/or 3 hours to University Core Curriculum elective. For BS-BAEN, allocate 3 hours to core communications course (ENGL 210)

Second Year

Fall		Semester Credit Hours
CVEN 207	Introduction to the Civil Engineering Profession [1]	2
CVEN 221	Engineering Mechanics: Statics [1]	3

CVEN 250	Introduction to Graphics and Visualization Applications in Civil Engineering Design [1]	2
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
STAT 211	Principles of Statistics I [1]	3
	Semester Credit Hours	**18**
Spring		
CVEN 302	Computer Applications in Engineering and Construction [1]	3
CVEN 303	Civil Engineering Measurement [1]	3
CVEN 305	Mechanics of Materials [1]	3
CVEN 311/ EVEN 311	Fluid Dynamics [1]	3
ENGL 210 or COMM 205	Technical and Professional Writing or Communication for Technical Professions	3
MATH 308	Differential Equations [1]	3
	Semester Credit Hours	**18**
Third Year		
Fall		
CVEN 306	Materials Engineering for Civil Engineers [1]	3
CVEN 322	Civil Engineering Systems [1]	3
CVEN 345	Theory of Structures [1]	3
CVEN 363	Engineering Mechanics: Dynamics [1]	3
Technical coursework [1,6]		3
	Semester Credit Hours	**15**
Spring		
CVEN 399	Mid-Curriculum Professional Development [1]	0
Technical coursework [1,6]		12
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**15**
Fourth Year		
Fall		
CVEN 424	Civil Engineering Professional Practice [1,7]	2
Technical coursework [1,6]		11
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**16**
Spring		
PHIL 482	Ethics and Engineering [1]	3
Technical coursework [1,6]		9
University Core Curriculum (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) [3]		3
	Semester Credit Hours	**15**
	Total Semester Credit Hours	**97**

[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.

[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

Transportation and Infrastructure Materials Engineering Track - Technical Coursework

Technical coursework for the BS in Civil Engineering, Transportation and Infrastructure Materials Engineering Track are composed of breadth courses (12 semester credit hours), design courses (9 semester credit hours), focus courses (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.

Code	Title	Semester Credit Hours
BREADTH		
CVEN 307	Transportation Engineering [1]	3
CVEN 342	Materials of Construction [1,8]	3
or CVEN 343	or Portland Cement Concrete Materials for Civil Engineers	
CVEN 365	Introduction to Geotechnical Engineering [1,8]	3
or CVEN 31	or Sensor Technology for the Built Environment	
Select 3 hours of the following: [1]		3
CVEN 301/ EVEN 301	Environmental Engineering	
CVEN 339/ EVEN 339	Water Resources Engineering	
CVEN 349	Civil Engineering Project Management	
DESIGN		
CVEN 418	Highway Materials and Pavement Design [1]	3
CVEN 444	Structural Concrete Design [1]	3

CVEN 457	Urban Traffic Facilities [1]	3
FOCUS		
CVEN 417	Bituminous Materials [1]	3
CVEN 454	Urban Planning for Engineers [1]	3
Select 2 hours of the following: [1]		2
CVEN 314	Sensor Technology in Civil Engineering [9]	
CVEN 336	Fluid Dynamics Laboratory	
CVEN 403	Applied Civil Engineering Surveying	
CVEN 449	Visualization and Building Information Modeling in Structural Engineering Design	
CVEN 450	AutoCAD in Civil Engineering	
CVEN 485	Directed Studies [10]	
CVEN 491	Research [10]	
SCIENCE		
Select 3 hours of the following: [1]		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	
ENSS 105	Introduction to Environmental Systems Science	
GEOG 203	Planet Earth	
GEOL 104	Physical Geology	
GEOL 320	Geology for Civil Engineers	
OCNG 310	Physical Oceanography	
RWFM 375	Conservation of Natural Resources	
CAPSTONE DESIGN		
CVEN 456	Highway Design [1]	3
Total Semester Credit Hours		**35**

[8] The following courses satisfy the laboratory course requirement, CVEN 342 or CVEN 343, CVEN 315 or CVEN 365.

[9] Only one of the following courses, CVEN 314 or CVEN 315, can be used to meet degree requirements.

[10] Up to 2 hours of CVEN 485 or CVEN 491 may be used.