

# CHEMICAL ENGINEERING - BS

The chemical engineering curriculum provides a balanced education in virtually all aspects of chemical engineering principles and practice and includes education in economics, language, philosophy and culture and communication. Chemical engineering courses emphasize fundamentals and methods that are applicable to the analysis, development, design and operation of a wide variety of chemical engineering systems and processes, thereby providing the necessary background for entry into the wide array of activities described above. At the same time, specific example applications provide the student with insight into the ability of chemical engineers to work in such a variety of areas. The curriculum is structured to offer students an opportunity to extend and apply the fundamentals developed in the basic courses toward more focused areas of specialization. The sequence of courses converges in the senior year into a comprehensive capstone design course that includes elements of economics, safety and environmental issues. The course provides an experience much like that of an industry design project. It is this philosophy of fundamentals, applications and design that has enabled our chemical engineering graduates to adapt readily to a dynamic and rapidly changing world and to solve problems they have not previously experienced.

## 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 <sup>1,4</sup>	3
CHEM 117	General Chemistry for Engineering Students Laboratory <sup>1,4</sup>	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition <sup>1</sup> or Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation <sup>1</sup>	2
MATH 151	Engineering Mathematics I <sup>1,2</sup>	4
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
Semester Credit Hours		16

### Spring

ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics <sup>1</sup>	2
MATH 152	Engineering Mathematics II <sup>1</sup>	4
PHYS 206	Newtonian Mechanics for Engineering and Science <sup>1</sup>	3
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II <sup>4</sup>	
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3,5</sup>		
Semester Credit Hours		15-16
Total Semester Credit Hours		31-32

- A grade of C or better is required.
- 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.
- 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.
- 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.
- 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
CHEM 227 & CHEM 237	Organic Chemistry I and Organic Chemistry Laboratory <sup>1</sup>	4
CHEN 204	Elementary Chemical Engineering	3
ENGR 217/ PHYS 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism	2
MATH 251	Engineering Mathematics III <sup>1</sup>	3

PHYS 207	Electricity and Magnetism for Engineering and Science <sup>1</sup>	3	University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>	6
Semester Credit Hours		15	CHEN specialty options <sup>6</sup>	3
<b>Spring</b>			Semester Credit Hours	
CHEM 228 & CHEM 238	Organic Chemistry II and Organic Chemistry Laboratory <sup>1</sup>	4	Total Semester Credit Hours	
CHEM 205	Chemical Engineering Thermodynamics I	3	96	
ENGL 210	Technical and Business Writing	3		
MATH 308	Differential Equations <sup>1</sup>	3		
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3		
Semester Credit Hours		16		
<b>Third Year</b>				
<b>Fall</b>				
CHEM 304	Chemical Engineering Fluid Operations	3		
CHEM 320	Numerical Analysis for Chemical Engineers	3		
CHEM 322	Chemical Engineering Materials	3		
CHEM 354	Chemical Engineering Thermodynamics II	3		
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3		
Science Elective <sup>6</sup>		3		
Semester Credit Hours		18		
<b>Spring</b>				
CHEM 322	Physical Chemistry for Engineers <sup>1</sup>	3		
CHEM 323	Chemical Engineering Heat Transfer Operations	3		
CHEM 324	Chemical Engineering Mass Transfer Operations	3		
CHEM 364	Kinetics and Reactor Design	3		
University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3		
High Impact Experience <sup>7</sup>		0		
CHEM 399	Mid-Curriculum Professional Development			
Semester Credit Hours		15		
<b>Fourth Year</b>				
<b>Fall</b>				
CHEM 425	Process Integration, Simulation and Economics	3		
CHEM 432	Chemical Engineering Laboratory I	2		
CHEM 461	Process Dynamics and Control	3		
CHEM 481	Seminar	1		
CHEM 482	Bioprocess Engineering	3		
CHEN specialty options <sup>6</sup>		3		
Semester Credit Hours		15		
<b>Spring</b>				
CHEM 426	Chemical Engineering Plant Design	3		
CHEM 433	Chemical Engineering Laboratory II	2		
CHEM 455/ SENG 455	Process Safety Engineering	3		

<sup>6</sup> For a list of approved specialty options, please see a chemical engineering advisor.

<sup>7</sup> 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 CHEN advising office.

A grade of C or better is required in all CHEN courses.

## Total Program Hours 128