

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 ^{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 |
|---------------------|--|-----------------------|
| CHEM 227 & CHEM 237 | Organic Chemistry I and Organic Chemistry Laboratory ¹ | 4 |
| CHEN 201 | Elementary Chemical Engineering Lab | 1 |
| 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 ¹ | 3 |

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|------------------------------|--|-----------|
| PHYS 207 | Electricity and Magnetism for Engineering and Science ¹ | 3 |
| Semester Credit Hours | | 16 |

Spring

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|---|--|-----------|
| CHEM 228 & CHEM 238 | Organic Chemistry II and Organic Chemistry Laboratory ¹ | 4 |
| CHEN 205 | Chemical Engineering Thermodynamics I | 3 |
| ENGL 210 | Technical and Professional Writing | 3 |
| MATH 308 | Differential Equations ¹ | 3 |
| University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³ | | 3 |
| Semester Credit Hours | | 16 |

Third Year**Fall**

| | | |
|---|---|-----------|
| CHEN 304 | Chemical Engineering Fluid Operations | 3 |
| CHEN 320 | Numerical Analysis for Chemical Engineers | 3 |
| CHEN 322 | Chemical Engineering Materials | 3 |
| CHEN 354 | Chemical Engineering Thermodynamics II | 3 |
| CHEN 481 | Seminar | 1 |
| University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³ | | 3 |
| Semester Credit Hours | | 16 |

Spring

| | | |
|---|---|-----------|
| CHEM 322 | Physical Chemistry for Engineers ¹ | 3 |
| CHEN 323 | Chemical Engineering Heat Transfer Operations | 3 |
| CHEN 324 | Chemical Engineering Mass Transfer Operations | 3 |
| CHEN 364 | Kinetics and Reactor Design | 3 |
| CHEN 374 | Chemical Engineering Process Industries | 2 |
| University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³ | | 3 |
| High Impact Experience ⁷ | | 0 |
| CHEN 399 | Mid-Curriculum Professional Development | |
| Semester Credit Hours | | 17 |

Fourth Year**Fall**

| | | |
|---|---|-----------|
| CHEN 425 | Process Integration, Simulation and Economics | 3 |
| CHEN 432 | Chemical Engineering Laboratory I | 2 |
| CHEN 461 | Process Dynamics and Control | 3 |
| CHEN 482 | Bioprocess Engineering | 3 |
| University Core Curriculum ³ | | 3 |
| CHEN specialty options ⁶ | | 3 |
| Semester Credit Hours | | 17 |

Spring

| | | |
|-------------------|------------------------------------|---|
| CHEN 426 | Chemical Engineering Plant Design | 3 |
| CHEN 433 | Chemical Engineering Laboratory II | 2 |
| CHEN 455/SENG 455 | Process Safety Engineering | 3 |

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|---|-----------|
| University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³ | 3 |
| CHEN specialty options ⁶ | 3 |
| Semester Credit Hours | 14 |
| Total Semester Credit Hours | 96 |

⁶ For a list of approved specialty options, please see a chemical engineering advisor.

⁷ 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