

# CHEMICAL ENGINEERING

— ABET ACCREDITATION CRITERIA APPLY —

Chemical Engineering is a discipline influencing numerous areas of technology. In broad terms, chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation and transport of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology to full scale production.

The large number of industries which depend on the synthesis and processing of chemicals and materials place the chemical engineer in great demand. In addition to traditional examples such as the chemical, energy and oil industries, opportunities in biotechnology, pharmaceuticals, electronic device fabrication, and environmental engineering are increasing. The unique training of the chemical engineer becomes essential in these areas whenever processes involve the chemical or physical transformation of matter. For example, chemical engineers working in the chemical industry investigate the creation of new polymeric materials with important electrical, optical or mechanical properties. This requires attention not only to the synthesis of the polymer, but also to the flow and forming processes necessary to create a final product. In biotechnology, chemical engineers have responsibilities in the design of production facilities to use microorganisms and enzymes to synthesize new drugs. Problems in environmental engineering that engage chemical engineers include the development of processes (catalytic converters, effluent treatment facilities) to minimize the release of or deactivate products harmful to the environment.

To carry out these activities, the chemical engineer requires a complete and quantitative understanding of both the engineering and scientific principles underlying these technological processes. This is reflected in the curriculum of the chemical engineering department which includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. These courses are built on a foundation in the sciences of chemistry, physics and biology.

If you have additional questions regarding this major, please contact the Department of Chemical Engineering at 723-4906.

# CHEMICAL ENGINEERING PROGRAM

<b>COURSE</b>	<b>UNITS/ QUARTER</b>	<b>YEAR</b>
<b>CHEMICAL ENGINEERING DEPTH (51-53 UNITS)</b>		
E 20: Introduction to Chemical Engineering	3S	Fr/So
ChE 100: Mathematical Methods in Chemical Engineering	3A	Jr
ChE 110: Equilibrium Thermodynamics	3W	Jr
ChE 120: Separation Processes	3S	Jr
ChE 130: Kinetics and Reactor Design	3W	Sr
ChE 140: Fluid Mechanics	4W	Jr
ChE 150: Energy and Mass Transport	4S	Jr
ChE 160: Chemical Engineering Plant Design	3S	Sr
ChE 170 Polymer Science & Engineering	3W	Sr
ChE 180AB ChE Lab (Satisfies "Writing Within the Major" requirement)	3A 3W	Sr
Restricted Elective*	3-5AWS	So/Jr/Sr
Chem 130: Theory and Practice of Identification	4A	Sr
Chem 171: Physical Chemistry	3A	Jr
Chem 173: Physical Chemistry	3W	Jr
Chem 175: Physical Chemistry	3S	Jr
<b>ENGINEERING FUNDAMENTALS (5 COURSES MINIMUM)**</b>	<b>19-22AWS</b>	
<b>MATHEMATICS AND SCIENCE (52 UNITS)</b>		
Math 41, 42, 43: Calculus	5A 5W 5S	Fr
Math 44: Calculus	3AWS	So
Math 130: Ordinary Differential Equations	3AWS	So
Physics 41: Mechanics	3A	Fr
Physics 42: Electricity	3W	Fr
Physics 43: Magnetism	3S	Fr
Physics 47: Light & Heat	4A	So
Chem 31: Chemical Principles	4A	So
Chem 33: Structure and Reactivity	4W	So
Chem 35: Organic Monofunctional Compounds	4S	So
Chem 36: Chemical Separations	3S	So
Chem 131: Organic Polyfunctional Compounds	3A	Jr
<b>TECHNOLOGY IN SOCIETY (SELECT ONE COURSE FROM THE SCHOOL OF ENGINEERING APPROVED LIST)</b>	<b>3-5AWS</b>	<b>So/Jr/ Sr</b>

**\*STUDENTS MUST CHOOSE ONE COURSE FROM THE FOLLOWING LIST FOR THE CHE RESTRICTED ELECTIVE**

Engineering 104, 105, 120

Aeronautics & Astronautics 135, 192

Civil Engineering 101ABC, 161, 162, 163, 172, 180AB,

Electrical Engineering 101, 102, 103, 111, 112, 113, 121, 122, 133, 141, 142, 182

Materials Science & Engineering 151, 152, 191, 192, 193, 194, 195, 196, 197, 198, 199

Mechanical Engineering 33, 111, 117, 118, 130, 131ABC, 161

Petroleum Engineering 121, 172

Computer Science 107, 108, 109AB, 110, 137, 138AB

**Note:** To be accepted, ME 33 and CE 101B must be completed prior to ChE 140;

Graduate courses in Engineering or Computer Science will be considered only by petition

**\*\*STUDENTS MUST CHOOSE FIVE COURSES FROM THE FOLLOWING LIST:**

E 14: Applied Mechanics: Statics and Deformables - 5 units

or

E15: Dynamics - 5 units

E 30: Engineering Thermodynamics - 3 units

E 40: Basic Electronics - 5 units

E 50: Introductory Science of Materials - 3 units

E 60: Engineering Economy - 3 units

or

E 62: Introduction to Operations Research - 4 units

E 70A: Programming Methodology - 5 units

or

E 70X: Programming Methodology and Abstractions - 5 units

## SUGGESTED FOUR YEAR SCHEDULE FOR CHEMICAL ENGINEERING MAJORS

Freshman Year		
<i>Autumn</i>	<i>Winter</i>	<i>Spring</i>
CIV 5	CIV 5	CIV 5
Math 41 5	Math 42 5	Math 43 5
Physics 41 3	Physics 43 3	Physics 45 3
Writing 3-5	Writing 3-5	
Sophomore Year		
<i>Autumn</i>	<i>Winter</i>	<i>Spring</i>
Chem 31 4	Chem 33 4	Chem 35 4
Math 44 3	Math 130 3	Chem 36 3
Engr. Fund. 3-5	Engr. Fund. 3-5	E 20 3
Physics 47 4	Engr. Fund. 3-5	ChE Restricted Elective 3-5
Junior Year		
<i>Autumn</i>	<i>Winter</i>	<i>Spring</i>
Chem 171 3	Chem 173 3	Chem 175 3
ChE 100 3	ChE 110 3	ChE 120 3
Chem 131 3	ChE 140 4	ChE 150 4
Engr. Fund. 3-5		Tech. in Society 3-5
Senior Year		
<i>Autumn</i>	<i>Winter</i>	<i>Spring</i>
Chem 130 4	ChE 130 3	ChE 160 3
ChE 180A 3	ChE 180B 3	
Engr. Fund. 3-5	ChE 170 3	

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Ch E Flow Chart

