

**Bachelor of Science in Chemical Engineering**  
**Department of Chemical Engineering**

**Summary of Changes**

**Inserting DEISJ as the required general education requirement, replacing the one General Education elective in the program.**

**Proposed Catalog Description**

**Bachelor of Science in Chemical Engineering**

Chemical engineering is a versatile program and one of the most broadly-based engineering disciplines. Its field of practice covers the development, design, and control of processes and products that involve molecular change, both chemical and biological, and the operation of such processes. Because many of the products that sustain and improve life are produced by carefully designed and controlled molecular changes, the chemical engineer serves in a wide variety of industries. These industries range from chemical and energy companies to producers of all types of consumer and specialty products including pharmaceuticals, textiles, pulp and paper, polymers, advanced materials, and solid-state and biomedical devices.

Careers are available in industry, government, consulting, and education. Areas of professional work include research and development, operations, technical service, product development, process and plant design, market analysis and development, process control, and pollution abatement.

The chemical engineering degree program prepares students for professional practice in chemically related careers. Chemical engineering graduates are expected to attain the following capabilities at or within a few years of graduation: apply the fundamentals of science and engineering to solve important chemical engineering problems in industry, government or academic settings; communicate effectively and demonstrate the interpersonal skills required to lead and/or participate in interdisciplinary projects; apply life-long learning to meet professional and personal goals of their chosen profession, including graduate study; articulate and practice professional, ethical, environmental and societal responsibilities, and value different global and cultural perspectives.

The curriculum consists of a number of categories of courses. The general education component, which is required of all ESF students, broadens the students' perspectives on global and societal issues, an important component of any education. Students also take a number of courses in math and the basic sciences—chemistry and physics, (and biology)—to provide the background for the courses that prepare students for engineering practice. The engineering courses cover a variety of topics in chemical engineering. Some selective courses have been placed in the curriculum as elective for students wishing to enter into the pulp and paper industry. The moderate requirement of 127 credits hour allows room for students to supplement more courses at their own desire (no limitation on free electives).

Students may be admitted to the chemical engineering program as first-year students with appropriate science backgrounds from their high school or as transfer students at any level with

accommodations for coursework requirements. Students who have the associate degree in engineering science, chemical technology, or general science and mathematics are encouraged to apply as transfer students.

## Undergraduate Program Requirements

### Lower Division Required Courses (66 credits)

APM	205	Calculus I	G,M	4
APM	296	Calculus II	G,M	4
APM	307	Calculus III	M	4
APM	485	Differential Equations for Engineers and Scientists	M	3
ECH	132	Orientation and Introduction to Chemical Engineering I	ES	1
ECH	133	Introduction to Chemical Engineering II	ES	1
ECH	202	Principles of Mass & Energy Balances	ENG	3
ECH	212	Engineering Thermodynamics	ENG	3
EFB	103	General Biology II	NS	3
EFB	104	General Biology II lab	NS	1
EWP	190	Writing and the Environment	G	3
EWP	290	Writing, Humanities, and the Environment	G	3
FCH	150	General Chemistry I	G,NS	3
FCH	151	General Chemistry Laboratory I	G,NS	1
FCH	152	General Chemistry II	G,NS	3
FCH	153	General Chemistry Laboratory II	G,NS	1
FCH	221	Organic Chemistry I	NS	3
FCH	222	Organic Chemistry Laboratory I	NS	1
FCH	223	Organic Chemistry II	NS	3*
FCH	224	Organic Chemistry Laboratory II	NS	1*
		*Or Introduction to Lignocellulosics, 4 credits	ES	
FOR	207	Introduction to Economics	G	3
GNE	160	Computing Methods	PE	3
PHY	211	General Physics I	G,NS	3
PHY	221	General Physics Laboratory I	NS	1
PHY	212	General Physics II	NS	3
PHY	222	General Physics Laboratory II	NS	1
		<b>DEISJ</b>	<b>G</b>	<b>3</b>

### Electives (3 credits, choose **one** from below)

	United States History and Civic Engagement	G	3
	World History and Global Awareness	G	3
	The Arts	G	3
	World Languages	G	3-4

### Upper Division Required Courses (42 credits)

APM	395	Probability and Statistics for Engineers	ES	3
		Professional Experience: ECH 498 or ECH 304 + ECH 306	ENG	2*
ECH	312	Chemical Engineering Thermodynamics & Colloids	ES	3
ECH	322	Fluid Mechanics	ENG	3

ECH	323	Transport Phenomena	ENG	3
ECH	341	Chemical Reaction Engineering Kinetics	ENG	3
ECH	324	Process Operations Laboratory	ENG	3
ECH	442	Chemical Reaction Engineering & Process Safety	ENG	3
ECH	422	Unit Operations	ENG	3
ECH	455	Capstone Chemical Engineering Laboratory	ENG	3
ECH	454	Chemical Engineering Product Design	ENG	3
ECH	457	Chemical Engineering Design	ENG	3
EWP	444	Writing for Science Professionals		2
ESF	200	Information Literacy		1
ECH	355	Engineering Design Economics	ENG	3
ECH	371	Process Control	ENG	3

\*Professional experience: ECH 304 must be taken in the summer and ECH 306 in the Fall semester immediately after, while ECH 498 can be taken any semester.

**Directed Electives (14 credits)**

Science	3 – 9
Junior or higher Biology, Chemistry, or Engineering Electives	5 – 14

**TOTAL MINIMUM CREDITS FOR THE DEGREE 127**