BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

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.

Lower Division Required Courses

APM 205	Calculus I:Science & Engr	4
APM 206	Calculus II:Science & Engr	4
APM 307	Multivariable Calculus	4

APM 485	Diff Equat/Engr&Scientist	3
ECH 132	Orientatn&Intro to Chem Eng I	1
ECH 133	Orientatn&Intro to Chem Eng II	1
ECH 202	Prin Mass/Energy Balance	3
ECH 212	Engr Thermodynamics	3
EFB 103	Gen Bio II:Cell Bio & Genetics	3
EFB 104	General Biology II Laboratory	1
EWP 190	Writing And The Envrnment	3
EWP 290	Research Writing & Humanities	3
FCH 150	General Chemistry I	3
FCH 151	General Chemistry I Lab	1
FCH 152	General Chemistry II	3
FCH 153	General Chemistry II Lab	1
FCH 221	Organic Chemistry 1	3
FCH 222	Organic Chemistry Lab 1	1
FCH 223	Organic Chemistry II	3
AND		
FCH 224	Organic Chemistry Lab II	1
OR		
PSE 223	Intro to Lignocellulosics	4
FOR 207	Introduction To Economics	3
GNE 160	Comp Methods/Engrs&Scientists	3
PHY 211	General Physics I	0 - 8
PHY 221	General Physics I Laboratory	0 - 8
PHY 212	General Physics II	0 - 8
PHY 222	General Physics II Laboratory	0 - 8

General Education Electives

Course	Codes*	Credits
General Education Course in one of the following categories: US History & Civic Engagement, The Arts, World History and Global Awareness, World Languages	G	3
General Education Course in Diversity, Equity, Inclusion and Social Justice	G	3

Upper Division Required Courses

APM 395	Probability & Stats/Engr	3
	Professional Experience: ECH 498	2
	ECH 304 + ECH 306	
ECH 312	Chemical Engrn Thermodynamics	3
ECH 322	Fluid Mechanics	3
ECH 323	Transport Phenomena	3
ECH 324	Unit Operations Laboratory	3
ECH 341	Chem Reaction Engnrng Kinetics	3
ECH 355	Engr Design Economics	3
ECH 371	Process Control	3
ECH 422	Unit Process Operations	3
ECH 442	Chem Reaction Eng&Prcss Safety	3
ECH 454	Product Design in Chem Eng	3
ECH 455	Capstone Chemical Engnrng Lab	3
ECH 457	Chemical Engnrng Plant Design	3
ESF 200	Information Literacy	1

*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 in any semester.

Directed Electives

14 credits out of the following directed electives.

Course	Codes*	Credits
Junior or higher engineering directed electives		5 - 14
Science Electives		3 - 9

Total Minimum Credits For Degree: 127