

Bachelor of Science in Bioprocess Engineering
Department of Chemical Engineering

Summary of Changes

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

Proposed Catalog Description

Bachelor of Science in Bioprocess Engineering

The bioprocess engineering program prepares students for careers as engineers in the bioprocess or biotechnology industry filling positions that are typically filled by chemical engineers with additional training. The bioprocess engineering program seeks to educate engineers versed in the chemical engineering fields in biologics / biopharmaceutical, bioprocess, biotechnology, biochemical and bioenergy, with a focus on developing products from sustainable sources in a sustainable manner or through the applications of green chemistry. The bioprocess engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org> following the criteria of Chemical, Biochemical, Biomolecular and Similarly Named Engineering Programs since 2012 (<https://www.aiche.org/abet-accredited-universities>).

Students gain valuable experience through a capstone-design experience in which they work on significant problems in the design and implementation of new technologies. In addition, a summer internship is required of all students during which they gain valuable skills and experience in terms of technical knowledge and professional development. Both of these experiences serve to integrate the knowledge gained in their coursework with real-world work experiences commonly seen in their first positions after graduation.

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, physics, and biology—to provide the background for the courses that prepare students for engineering practice. The engineering courses cover a variety of topics that are traditional for a chemical engineering program, supplemented with courses specific to bioprocess engineering. The moderate requirement of 128 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 bioprocess 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, biological sciences, or general science and mathematics are encouraged to apply as transfer students.

Undergraduate Program Requirements

Lower Division Required Courses (62 credits)

APM 205 Calculus I

G,M 4

APM	206	Calculus II	G,M	4
APM	307	Multivariable Calculus	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
BPE	300	Intro to Bioprocess Engineering	ENG	3
EWP	190	Writing and the Environment	G	3
EWP	290	Writing, Humanities, and the Environment	G	3
EFB	103	General Biology II	G,NS	3
EFB	104	General Biology II lab	G,NS	1
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
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	G,NS	3
PHY	222	General Physics Laboratory II	NS	1
ECH	202	Principles of Mass & Energy Balances	ENG	3
ECH	212	Engineering Thermodynamics	ENG	3
		DEISJ	G	3

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 (47 credits)

APM	395	Probability and Statistics for Engineers	ES	3
		Professional Experience: BPE 498 or BPE 304 + BPE 306	ENG	2*
ECH	312	Chemical Engineering Thermodynamics & Colloids	ES	3
ECH	322	Fluid Mechanics	ENG	3
BPE	321	Biomolecular Kinetics	ENG	3
BPE	420	Bioseparations	ENG	3
BPE	421	Bioprocess Kinetics and Systems Engineering	ENG	3
BPE	440	Bioprocess and Systems Engineering Laboratory	ENG	3
BPE	450	Bioprocess Engineering Product Design	ENG	3
BPE	481	Bioprocess Engineering Design	ENG	3
EWP	444	Writing for Science Professionals		2
ESF	200	Information Literacy		1
ECH	322	Transport Phenomena	ENG	3

ECH	324	Process Operations Laboratory	ENG	3
ECH	355	Engineering Design Economics	ENG	3
ECH	371	Process Control	ENG	3
EFB	325	Cell Biology	NS	3

*Professional experience: BPE 304 must be taken in the summer + BPE 306 in the after right after, while BPE 498 can be taken in any semester.

Directed Electives (13 credits)

Science	3 - 6
Junior or higher Biology, Biochemistry, or Engineering Electives	7 - 10

TOTAL MINIMUM CREDITS FOR THE DEGREE **128**