IOWA | Chemical and Biochemical Engineering

CHEMICAL PROCESS ENGINEERING FOCUS AREA

Summary

The chemical process engineering focus area prepares students to design, analyze, and optimize processes that convert raw materials into high-value products. It emphasizes core chemical engineering principles — such as material and energy balances, transport processes, reaction engineering, and process design — to ensure safe, efficient, and scalable manufacturing across industries including food, electronics, polymers, fuels, and pharmaceuticals. This pathway equips students for careers in process development, plant operations, quality and reliability engineering, and continuous improvement roles where chemical engineers drive productivity and innovation.

Focus Area Requirements

In addition to the core chemical engineering requirements, you must choose a focus area and complete 12 s.h. toward that focus area. Below are the lists of possible focus area electives that can fulfill this requirement for the chemical process engineering focus area. If you feel another course would fit within this requirement, you must get approval from the department undergraduate director to have it count.

Focus Area Electives 12 s.h. (pick one from list below)

Offered	Course	s.h.
F	CBE:4460 Process and Design for Satellites and Environmental Sensors	3
F/S	CBE:5199 Contemporary Topics: Chem & Biochem Engr-Petroleum Refining (recommended)	1
S	CBE:5199 Contemporary Topics: Chem & Biochem Engr-Advanced Controls (recommended)	1
S-EVEN	CBE:5310 Polymer Science and Technology	3
F-EVEN	CBE:5315 Polymer Chemistry	3
S-EVEN	CBE:5410 Electrochemical Engineering	3
S-EVEN	CBE:4125 Advanced Chemical Process Safety	3
F	ISE:2360 Design for Manufacturing	3
F	ISE:3600 Quality Control (P: STAT:2020)	3
F	ISE:5350 Logistics Engineering and Management	3
F/S	ME:2200 Introduction to Mechanical Engineering Design (P: ENGR:1100)	2
F/S	ME:2300 Manufacturing Processes (C: ENGR:2720, ME:2200)	3
F/S	MATH:4820 Optimization Techniques	3

Other Electives that Align with this Focus Area

In addition to the focus area electives listed above, you will be required to complete the following electives to complete your degree: the Advanced Chemistry Elective (3 s.h.), the Advanced Chemistry Lab Elective, the Advanced Science Elective (3 s.h.), the Statistics Elective (3 s.h.), a free elective (3 s.h.), the Engineering Be Creative General Education Elective (3 s.h.), the Cultural Perspectives, Values, & Society General Education Elective (3 s.h.), and additional general education requirements (9 s.h.). ***These do not count toward your focus area electives.*** Below are lists of possible courses to fulfill these requirements that align with this focus area.

Statistics Requirement 3 s.h. (possible courses that align with this focus area)

Offered	Course	s.h.
S	CBE:3020 Applied Statistics for Chemical and Natural Resources Engineering	3
ALL	STAT:2020 Probability and Statistics for Engineers	3
ALL	STAT:3510 Biostatistics	3

Advanced Chemistry Elective 3 s.h. (possible courses that align with this focus area)

Offered	Course	s.h.
ALL	CHEM 3000+ level course	3

Advanced Chemistry Lab Elective 3 s.h. (possible courses that align with this focus area)

Offered	Course	s.h.
ALL	CHEM:2210 Fundamentals of Chemical Measurements Lab	3
ALL	CHEM:2220 Organic Chemistry Lab	3
ALL	CHEM:2240 Organic Chemistry for Majors Lab	3

Advanced Science Elective 3 s.h. (possible courses that align with this focus area)

Offered	Course	s.h.
S-EVEN	CBE:5425/CEE:5115 Atmospheric Chemistry and Physics	3
F-EVEN	CBE:5315 Polymer Chemistry (if not taken as focus area)	3
ALL	See Advanced Science List	3

Cultural Perspectives, Values, & Society Gen Education Elective 3 s.h. (possible courses that align with this focus area)

Offered	Course	s.h.
F/S	WRIT:2100 Writing and Community Outreach	3

General Education Elective 9 s.h. (possible courses that align with this focus area)

Offered	Course	s.h.
F/S	PSY:1001 Elementary Psychology	3
F/S	SOC:1040 Energy, Sustainability, and Society	3
S	SEES:3780/HIST:3240/POLI:3431/GHS:3780 U.S. Energy Policy in Global Context	3