IOWA | Chemical and Biochemical Engineering

OIL AND GAS ENGINEERING FOCUS AREA

Summary

The oil and gas engineering focus area prepares students to apply chemical engineering principles to the exploration, production, processing, and refining of oil and natural gas resources. It emphasizes core concepts such as thermodynamics, fluid flow, transport phenomena, separations, reaction engineering, and process design to support safe, efficient, and sustainable energy operations. Students gain an understanding of upstream, midstream, and downstream processes, including resource extraction, transportation, refining, and petrochemical production. This pathway equips students for careers in oil and gas production, process engineering, refining operations, petrochemical manufacturing, energy systems, and emerging energy technologies, where chemical engineers play a critical role in optimizing performance, ensuring safety, and advancing innovation across the energy sector.

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 oil and gas 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 from list below)

Offered	Course	s.h.
S	CBE:2040 Environment, Energy and Climate Change	3
F/S	CBE:5999 Contemporary Topics: Chem & Biochem Engr-Petroleum Refining (recommended)	1
S-EVEN	CBE:4125 Advanced Process Safety	3
F	CBE:4460 Process and Design for Satellites and Environmental Sensors	3
S	CBE:5199 Contemporary Topics: Chem & Biochem Engr-Advanced Controls (recommended)	1
S-ODD	CBE:5310 Polymer Science and Technology	3
F-EVEN	CBE:5315 Polymer Chemistry	3
S-EVEN	CBE:5410 Electrochemical Engineering	3
F/S	ENGR:3110 Intro to Artificial Intelligence and Machine Learning	3
S	ISE:2500 Engineering Economy	3
F	ISE:2360 Design for Manufacturing	3
F	ISE:3600 Quality Control (P: STAT:2020)	3
F	ISE:5520 Renewable Energy	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
S	SEES:1115 The History of Oil	3
F	SEES:3500 Intro to Environmental Remote Sensing	3
S	SEES:3510 Igneous and Metamorphic Petrology (P: SEES:1050, SEES:2410)	3
S	SEES:3840 Structural Geology (P: SEES:1030 or SEES:1050)	3
S	SEES:4750 Environmental Impact Analysis (P: SEES:4750)	3
S	SEES:3780/HIST3240/POLI3431/GHS3780 U.S. Energy Policy in Global Context (if not taken as a general elective)	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 Engineering Be Creative General Education Elective (3 s.h.), and the Cultural Perspectives, Values, & Society General Education Elective (3 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 (recommended)	3
ALL	STAT:2020 Probability and Statistics for Engineers	3
ALL	STAT:3510 Biostatistics	3

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

Offered	Course	s.h.
F/S	SEES:1030 Introduction to Earth Science (often a pre-req)	3
F	SEES:1050 Introduction to Geology (often a pre-req)	3
ALL	Any other course	3

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

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

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

Offered	Course	s.h.
ALL	CHEM:2210 Fundamental 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.
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	SOC:1040 Energy, Sustainability, and Society	3
S	SEES:3780/HIST:3240/POLI:3431/GHS:3780 U.S. Energy Policy in Global Context	3