

Example Uses of Chemical Engineering Technical Elective Requirements

Note: The new chemical engineering elective requirements have been defined such that you may pursue a more in-depth program of study in an area of interest. When you find elective courses that you would like to take, it is important to note the pre-requisite requirements for those courses. The following “focus areas” may be helpful identifying impactful courses in different common areas of interest for chemical engineering students. These are not formal tracks, nor is it required that you take all of the courses listed below for a focus area you may want to pursue. The courses prescribed are meant to give you an idea of courses you could select, keeping in mind pre-requisites needed for pertinent upper division courses (unless the pre-requisites are already a part of the chemical engineering curriculum). Each focus area defined below abides by the chemical engineering elective requirements.

Focus Area in Chemistry/Catalysis – Recommended Courses

- CHE 110A, Physical Chemistry: Introduction to Quantum Mechanics, 4 units
- CHE 105, Analytical & Physical Chemical Methods, 4 units
- CHE 110B, Physical Chemistry: Properties of Atoms & Molecules, 4 units
- CHE 115, Instrumental Analysis, 4 units
- Remaining: 3 upper division engineering units + 1 science/engineering/business unit either upper or lower division
 - Recommend ECH 166 (Catalysis) when offered

Focus Area in Process Engineering – Recommended Courses

- ENG 17, Circuits, as required lower division engineering course
- ENG 100, Electronic Circuits & Systems, 3 units
- ECH 198, Chemical Process Safety Fundamentals, 4 units
- MAT 168, Optimization, 4 units
- ECH 267, Advanced Process Control, 3 units
- Remaining: 6 science/engineering/business units either upper or lower division
 - Recommend ECH 166 (Catalysis) when offered

Focus Area in Food Engineering – Recommended Courses

- BIS 2A, Introduction to Biology, 5 units
- FST 100A, Food Chemistry, 4 units
- ECH 168, Chemical & Engineering Principles in Whisky & Fuel Alcohol Production, 3 units
- ECH 198, Chemical Engineering Principles in Food Processing, 4 units
 - Soon to be ECH 171
- Remaining: 4 science/engineering/business units, 3 of which could be taken in lower division courses

Focus Area in Economics – Recommended Courses

- ECN 001A, Principles of Microeconomics, 4 units
- ECN 001B, Principles of Macroeconomics, 4 units
- ECN 110A, World Economics History Before the Industrial Revolution, 4 units

- ECN 101, Intermediate Macro Theory, 4 units
- Remaining: 3 upper division engineering units + 1 science/engineering/business unit either upper or lower division
- If pursuing an economics minor (<https://catalog.ucdavis.edu/departments-programs-degrees/economics/economics-minor/#requirementstext>) only one course can count towards major requirements (including the elective requirements).

Focus Area in Environmental Engineering – Recommended Courses

- General Focus
 - ECI 040, Introduction to Environmental Engineering, 4 units
 - ECI 140B, Chemical Principles for Environmental Engineers, 4 units
 - ECI 148A, Water Quality Management, 4 units
 - ECI 149, Air Pollution, 4 units
 - ECI 163, Energy & Environmental Aspects of Transportation, 4 units
- Water Treatment Focus
 - ECI 040, Introduction to Environmental Engineering, 4 units
 - ECI 140A, Environmental Analysis of Aqueous Systems, 4 units
 - ECI 140B, Chemical Principles for Environmental Engineers, 4 units
 - ECI 140CN, Water & Wastewater Treatment System Design, 4 units
 - ECI 148A, Water Quality Management, 4 units

Focus Area in Sustainable Energy/Battery Technology – Recommended Courses

- ENG 45, Properties of Materials, as required lower division engineering course
- EMS 170, Sustainable Energy Technology: Batteries, Fuel Cells, & Photovoltaic Cells, 4 units
- EMS 172, Smart Materials, 4 units
- EMS 170L, Sustainable Energy Technologies Laboratory, 3 units
- Remaining: 9 science/engineering/business units, 8 of which could be taken in lower division courses

Focus Area in Semiconductors – Recommended Courses

- ENG 17, Circuits, as required lower division engineering course
- PHY 9D, Modern Physics, 4 units
- EEC 140A, Principles of Device Physics 1, 4 units
- EEC 146A, Integrated Circuits Fabrication, 4 units
- Remaining: 8 science/engineering/business units, 4 of which could be taken in lower division courses...could include
 - EEC 145, Electronic Materials, 4 units
 - EEC 146B, Advanced Integrated Circuits Fabrication, 3 units