

Concentrations for Chemical Engineering Majors

Chemical engineering majors may choose to focus their studies by obtaining one of the following Concentrations: Biological, Energy, Environmental, or Materials. A Concentration is not mandatory and some students will benefit from exploring a variety of areas rather than choosing to focus on one. The Concentrations require 3 units of study (potentially all of which may be double-counted towards the Chemical Engineering degree) comprised of the following: an MQP (that satisfies the Chemical Engineering degree requirement and covers a topic in the Concentration field) and 2 units from the appropriate list below. Students should consult their academic advisor for advice and the Chemical Engineering Department Undergraduate Committee for approval of an appropriate course of study. Appropriate experimental courses, ISPs, and other appropriate courses or projects, not on the current lists, may be applied towards a Concentration with approval from the Chemical Engineering Undergraduate Committee.

Chemical Engineering with Biological Concentration

Science:

BB 1035 Biotechnology⁺

BB 1025 Human Biology⁺

BB 2002 Microbiology

BB 2550 Cell Biology

BB 3102 Human Anatomy & Physiology: Transport and Maintenance

BB 4008 Cell Culture Theory and Applications

BB 4065 Virology

BB 4910 Advanced Molecular Biology

BB 560 Separation of Biological Molecules

CH 4110 Biochemistry I

CH 4120 Biochemistry II

CH 4130 Biochemistry III

Engineering Science and Design:

CHE 3301 Introduction to Biological Engineering

CHE 3201 Kinetics and Reactor Design

CHE 4402 Unit Operations Laboratory II

ME/CHE 2301 Nanobiotechnology Laboratory Experience

BME 1001 Introduction to Biomedical Engineering⁺

BME 2511 Introduction to Biomechanics and Biotransport

BME/ME 4504 Biomechanics

BME/ME 4606 Biofluids

BME/ME 4814 Biomaterials

CHE 521 Biochemical Engineering

BB 509 Scale-Up of Bioprocessing

⁺No more than one 1000-level course may be counted.

Chemical Engineering with Energy Concentration

Science:

CH 3510 Chemical Thermodynamics*

CH 3550 Chemical Dynamics

PH 2101 Principles of Thermodynamics*

Engineering Science and Design:

CHE 3702 Energy Challenges in the 21st Century

CHE 3201 Kinetics and Reactor Design

CHE 3301 Introduction to Biological Engineering

CHE 4402 Unit Operations of Chemical Engineering II

ES 3001 Introduction to Thermodynamics*

ES 3003 Heat Transfer

ES 3005 Radiation Heat Transfer Applications

ME 4710 Gas Turbines for Propulsion and Power Generation

CHE 506 Kinetics and Catalysis

CHE 507 Chemical Reactor Design

CHE 531 Fuel Cell Technology

CHE 561 Advanced Thermodynamics

FPE 520 Fire Modeling

FPE 521 Fire Dynamics

* Only one of the following courses may be counted: ES 3001, CH 3510, or PH 2101.

Chemical Engineering with Environmental Concentration

Science:

GE 2341 Geology

BB 1002 Environmental Biology

BB 2040 Principles of Ecology

Engineering Science and Design:

CHE/CEE 4063 Transport and Transformations in the Environment

CHE 3301 Introduction to Biological Engineering

CHE 3201 Kinetics and Reactor Design

CHE 4402 Unit Operations Laboratory II

ES 3002 Mass Transfer

ES 2800 Environmental Impacts of Engineering Decisions

CE 3060 Water Treatment

CE 3061 Waste Water Treatment

CE 4060 Environmental Engineering Lab

CE 4061 Hydrology

CE 3059 Environmental Engineering*

CE 3070 Introduction to Urban and Environmental Planning*

CE 3074 Environmental Analysis*

* Only one of the following courses may be counted: CE 3059, CE 3070, or CE 3074.

Chemical Engineering with Materials Concentration

Science:

CH 2320 Organic Chemistry II

CH 3410 Principles of Inorganic Chemistry

CH 4330 Organic Synthesis

Engineering Science and Design:

ES 2001 Introduction to Material Science

CHE 3201 Kinetics and Reactor Design

CHE 508 Catalysis and Surface Science of Materials
ME/CHE 2301 Nanobiotechnology Laboratory Experience
ME 2820 Materials Processing
ME 3801 Experimental Methods in Material Science and Engineering
ME 4813 Ceramics and Glasses for Engineering Applications
ME 4814 Biomaterials
ME 4821 Plastics
ME 4832 Corrosion and Corrosion Control
ME 4840 Physical Metallurgy
ME 4860 Food Engineering
ME 4875/MFE 575 Introduction to Nanomaterials and Nanotechnology

Application for Chemical Engineering with (check one) Concentration

Biological	
Energy	
Environmental	
Materials	

Last Name: _____ First Name: _____

Student ID: _____ Major: _____

Anticipated Graduation Date: _____ Email: _____ @ wpi.edu

1. List your MQP Title _____

Have your MQP advisor sign to certify that this topic falls within the Concentration field.

MQP advisor _____ Signature _____

2. In the table below, list two units of courses from the approved list for the specified Concentration that you have completed (or anticipate completing in your final two terms before graduation).

Course Number	Course Title	Term Completed

3. Obtain approval from the CHE Department Undergraduate Committee Chair:

Concentration Approval: _____ Date: _____

Chemical Engineering Undergraduate Committee Chair

4. Submit the completed form to the registrar no later than two terms before your anticipated graduation date, typically by the end of B term of your senior year. Note that courses you have registered for, but not yet completed, may be included in the course list of item 2 above.