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

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<td>Materials</td>
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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).

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<th>Course Number</th>
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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.