

TECHNICAL ELECTIVE OPTIONS FOR CHEMICAL ENGINEERING UNDERGRADUATE PROGRAMS

Technical electives must be upper level courses taken in the junior or senior year. Students should obtain adviser approval before enrolling in any course NOT on this list for technical elective credit. Courses on this list are pre-approved by faculty.

3 Electives REQUIRED: Of the three, one Technical Elective or Advanced Chemistry Elective must be a CHE course.

Standard Option Technical Elective List (Choose 2)

ENGINEERING Technical Electives

Chemical, Biological & Materials Engr

CH E 3990 Undergraduate Research
 CH E 4980 Senior Research
 CH E 3960 Honors Reading
 CH E 3980 Honors Research
 CH E 5163 Catalysis (grad students)
 CH E 5183 Grad Transport Phenomena
 CH E 5203 Bioengineering Principles
 CH E 5143 Multi-Scale Modeling of Matter (Dr. Huang)
 CH E 5243 Biochemical Engineering
 CH E 5273 Biomedical Engineering
 CH E 5293 Transport in Biological Systems
 CHE 5373 Tissue Engineering (BME 5373)
 CH E 5453 Polymer Science
 CH E 5463 Polymer Processing
 CH E 5480 Industrial & Environmental Transport Process
 CH E 5480 Seminar in Selected Topics
 CHE 5513 Surface Characterization
 CH E 5523 Advanced Mathematical Methods
 CHE 5533 Material Design for Energy Application (Dr. Wang)
 CH E 5643 Natural Gas Utilization
 CH E 5673 Colloids and Surface Science
 CH E 5693 Cellular Aspects in Tissue Regeneration
 CHE 5823 Advanced Numerical Methods (Dr. Harwell)
 CH E 5843 Adv CHE Thermodynamics
 CH E 6723 Adv Kinetics and Reaction Engr

Aerospace and Mechanical Engineering

AME 3363 Design of Thermal Fluid Systems
 AME 5203 Bioengineering Principles
 AME 5213 Biomechanics I (Biosolids)
 AME 5223 Biomechanics II
 AME 5233 Biomaterials
 AME 5253 Implantable Devices
 AME 5293 Transport in Biological Systems
 AME 5710 Topics in Solid Mechanics-Neural Engr
 AME 5720 Topics in Fluid Mechanics
 AME 5973 Comp Heat & Fluid Flow
 AME 5953 Turbulence I
 AME 5983 Computational Fluid Dynamics

Biomedical Engineering

BME 5243 Biochemical Engineering
 BME3153 Molecular, Cellular & Tissue Engr
 BME 3163 Biomedical Micro/Nano Tech
 BME 5990 Independent study

Civil Engineering & Environ. Science

CEES 3213 Water Resources Engineering
 CEES 3243 Water and Wastewater Treatment Design
 CEES 4943 Intro to Air Quality
 CEES 4114 Aquatic Chemistry
 CEES 4263 Hazardous and Solid Waste Management
 CEES 4943 Intro to Air Quality
 CEES 5244 Water and Waste Treatment

Electrical and Computer Engineering

ECE 3323 Intro-Solid State Elec Devices
 ECE 3813 Introductory Electronics
 ECE 4973 Engr Principles of the Body
 ECE 4813 Electronics
 ECE 4823 Engineering Principles of the Human Body
 ECE 4990 Res. & Design Exp in Bioengr
 ECE 5843 Medical Imaging Systems
 ECE 5863 Bioinstrumentation
 ECE 5973 Special Topics: Comp Bioengr
 ECE 6813 AdvTopics in Biomedical Engr

Industrial and Systems Engineering

ISE 3293 Applied Engineering Statistics

Petroleum and Geological Engineering

PE 5603 Intro Natural Gas Engr. & Mgmt
 PE 5613 Natural Gas Engineering
 PE 5623 Natural Gas Processing

ENGR 4013 Leadership & Management

NON-ENGINEERING Technical Electives Mathematics

MATH 3333 Linear Algebra I
 MATH 4753 Applied Statistical Methods
 MATH 3423 Physical Math II
 MATH 4163 Intro Partial Diff. Equations

Meteorology

METR 5103 Boundary Layer Meteorology
 METR 5344 Comp Fluid Dynamics I

Biology

BIOL 3101 Princ of Physiology Lab (take w/ 3103-Princ of Physiology lecture)
 BIOL 3103 Princ of Physiology
 BIOL 3113 Cell Biology
 BIOL 3201 Animal Development Lab
 BIOL 3203 Animal Development
 BIOL 3333 Genetics
 BIOL 4244 Animal Histology
 BIOL 4843 Intro. to Molecular Biology
 BIOL 4853 Neurobiology of Memory
 BIOL 4913 Quantitative Biology
 BIOL 5153 Endocrine Physiology
 BIOL 5293 Cytology Ultrastructure
 BIOL 5343 Developmental Genetics
 BIOL 5364 Trans Electron Microscopy
 BIOL 5374 Scanning Electron Microscopy

Chemistry and Biochemistry

CHEM 3523 Physical Chemistry II
 CHEM 3653 Intro to Biochemistry
 CHEM 3753 Intro to Biochemical Methods
 CHEM 4023 Instrumental Methods in Chemical Analysis
 CHEM 4333 Advanced Inorganic Chemistry
 CHEM 5453 Polymer Science
 CHEM 5753 Principles of Biochem I
 CHEM 5853 Principles of Biochem II
 CHEM 6813 Intro to Biochemical Methods
 CHEM 6823 Protein, Nucleic Acids, & Gene Expression
 CHEM 6833 Structure & Function of Membranes & Hormones
 CHEM 6843 Enzyme Mechanisms & Metabolic Regulation
 CHEM 6853 Protein Structure & Function

Microbiology

MBIO 3113 Cell Biology
 MBIO 3813 Fundamentals of MBIO
 MBIO 3812 Fundamentals of MBIO Lab
 MBIO 4833 Basic Immunology
 MBIO 4843 Intro of Molecular Biology
 MBIO 5620 Investigations in Microbiology
 MBIO 5833 Industrial & Applied MBIO
 MBIO 5843 Intro to Molecular Biology

Physics

PHYS 3223 Modern Physics for Engineers

Advanced Chemistry Elective List (for STANDARD option)

CHEM 3523 Physical Chemistry II	CH E 4163 and 5163 Heterogeneous Catalysis (irreg.)
CHEM 3653 Intro to Biochemistry	CH E 5243 Biochemical Engineering (spring)
CHEM 4333 Adv Inorganic-Periodic System (fall)	CH E 5273 Biomedical Engineering (irreg.)
CHEM 4444 Adv Synthesis/Spectral Character (fall)	CH E 5453 Polymer Science (irreg. Spring)
	CH E 5673 Colloids and Surface Science (irreg. spring)
	CH E 5533 Mat. Design for Energy Application (irreg.)

Pre-Medical and Biomedical Technical Elective List	
Students must choose one of the Technical Elective options below to follow.	
Pre-Medical Option	Biomedical Option
Take CHEM3653 Intro to Biochemistry	Take CHEM3653 Intro to Biochemistry
<p>Take one of the following: BIOL3113 Cell Biology OR BIOL3333 Genetics OR BIOL4843 Molecular Biology</p>	<p>Take CH E 5203 Bioengineering Principles (alt. even fall)</p>
<p>Take one of the following CH E Pre-Medical Option Technical Elective II</p> <p><u>Bioengineering Content Options:</u></p> <p>CH E 5203 Bioengineering Principles (alt. even fall) CH E 5243 Biochemical Engineering CH E 5293 Transport in Biological Systems CH E 5373 Tissue Engineering (BME 5373)</p> <p>Aerospace and Mechanical Engineering AME 5203 Bioengineering Principles AME 5213 Biomechanics I AME 5223 Biomechanics II AME 5233 Biomaterials AME 5293 Transport in Biological Systems AME 5710 Neural Engineering</p> <p>Electrical and Computer Engineering ECE 4823 Engineering Principles of the Human Body ECE 4990 Special Studies: Research & Design Experience in Bioengineering ECE 5843 Medical Imaging Systems ECE 5973 Computational Bioeng. ECE 6813 Advanced Topics in Biomedical Engineering</p> <p>Biomedical Engineering BME 5243 Biochemical Engineering BME 3153 Molecular, Cellular & Tissue Engineering BME 3163 Biomedical Micro/Nano Technology BME 5990 Independent study</p>	<p>Take one of the following CH E Biomedical Option Technical Elective II</p> <p><u>Biological Content Options:</u> BIOL 3113 Cell Biology BIOL 3333 Genetics BIOL 4843 Intro. to Molecular Biology</p> <p><u>Chemical Engineering</u> CH E 5243 Biochemical Engineering CH E 5293 Transport in Biological Systems CH E 5373 Tissue Engineering (BME 5373)</p> <p>Aerospace and Mechanical Engineering AME 5203 Bioengineering Principles AME 5213 Biomechanics I AME 5223 Biomechanics II AME 5233 Biomaterials AME 5293 Transport in Biological Systems AME 5710 Neural Engineering</p> <p>Electrical and Computer Engineering ECE 4823 Engineering Principles of the Human Body ECE 4990 Special Studies: Research & Design Experience in Bioengineering ECE 5843 Medical Imaging Systems ECE 5973 Computational Bioeng. ECE 6813 Advanced Topics in Biomedical Engineering</p> <p>Biomedical Engineering BME 5243 Biochemical Engineering BME 3153 Molecular, Cellular & Tissue Engineering BME 3163 Biomedical Micro/Nano Technology BME 5990 Independent study</p>