TECHNICAL ELECTIVE OPTIONS FOR CHEMICAL ENGINEERING UNDERGRADUATE PROGRAMS

Technical electives must be upper level courses, taken in the junior or senior years. Each semester other potential technical electives are offered at OU. This list is not exhaustive, but 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 the faculty.

**CH E STANDARD OPTION ENGINEERING TECHNICAL ELECTIVES**

*Chemical, Biological & Materials Engineering (Technical Elective I & II)*
- CH E 3990 Undergraduate Research
- CH E 3990 Sustainable Energy for the Future
- CHE 4163 Catalysis (undergrad students)
- CH E 4980 Senior Research
- CH E 3960 Honors Reading
- CH E 3980 Honors Research
- CH E 5163 Catalysis (grad students)
- CH E 5183 Graduate Transport Phenomena
- CH E 5203 Bioengineering Principles
- CH E 5243 Biochemical Engineering
- CH E 5273 Biomedical Engineering
- CH E 5293 Transport in Biological Systems
- CHE 5373 Tissue Engineering
- CH E 5453 Polymer Science
- CH E 5463 Polymer Processing
- CHE 5480 Advanced Numerical Methods
- CH E 5480 Biology for Engineers
- CH E 5480 Biopharmaceutical Engineering
- CHE 5480 Energy & Process Optimization
- CH E 5480 Industrial & Environmental Transport Process
- CH E 5480 Seminar in Selected Topics
- CHE 5513 Surface Characterization
- CH E 5523 Advanced Mathematical Methods
- CH E 5563 Properties & Applications of Porous Materials
- CH E 5643 Natural Gas Utilization
- CH E 5673 Colloids and Surface Science
- CH E 5693 Cellular Aspects in Tissue Regeneration
- CH E 5703 Biology for Engineers
- CH E 5723 Biosensors

**CH E 5843 Advanced CHE Thermodynamics**
- CH E 6723 Advanced Kinetics and Reaction Engineering

**Aerospace and Mechanical Engineering (Technical Elective I & II)**
- 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 Computational Heat and Fluid Flow
- AME 5953 Turbulence I
- AME 5983 Computational Fluid Dynamics

**Bioengineering (Technical Elective I & II)**
- BIOE 5213 Biomechanics I
- BIOE 5223 Biomechanics II
- BIOE 5233 Biomaterials
- BIOE 5243 Biochemical Engineering
- BIOE 5253 Implantable Devices
- BIOE 5203 Bioengineering Principles
- BIOE 5293 Transport in Biological Systems
- BIOE 5373 Tissue Engineering
- BIOE 5393 Introduction to Computer-aided Tissue Engineering
- BIOE 5693 Cellular Aspects in Tissue Regeneration
- BIOE 5703 Biology for Engineers
- BIOE 5723 Biosensors
- BIOE 5990 Independent Study
- BIOE 6970 Advanced Topics in Bioengineering

**Civil Engineering and Environmental Science (Technical Elective I & II)**
- C E 3213 Water Resources Engineering
- C E 3243 Water and Wastewater Treatment Design
- C E 4943 Intro to Air Quality
- C E 4114 Aquatic Chemistry
- C E 4263 Hazardous and Solid Waste Management
- C E 4943 Intro to Air Quality
- C E 5244 Water and Waste Treatment

**Electrical and Computer Engineering (Technical Elective I & II)**
- ECE 3323 Intro-Solid State Elec Devices
- ECE 3813 Introductory Electronics
- ECE 4973 Engineering Principles of the Body
- ECE 4813 Electronics
- ECE 4823 Engineering Principles of the Human Body
- ECE 4990 Res. & Design Experience in Bioengineering
- ECE 5843 Medical Imaging Systems
- ECE 5863 Bioinstrumentation
- ECE 5973 Special Topics: Computational Bioengineering
- ECE 6813 Advanced Topics in Biomedical Engineering

**Industrial and Systems Engineering (Technical Elective I & II)**
- ISE 3293 Applied Engineering Statistics
- ISE 5393 Introduction to Computer-aided Tissue Engineering

**Petroleum and Geological Engineering (Technical Elective I & II)**
- PE 5603 Intro. to Natural Gas Engr. & Management
- PE 5613 Natural Gas Engineering
- PE 5623 Natural Gas Processing
CH E STANDARD OPTION
NON-ENGINEERING Technical Electives

Biology (Technical Elective II)
BIOL 3101 Principles of Physiology Lab
(take with 3103)
BIOL 3103 Principles of Physiology
(take with 3101)
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 Transmission Electron Microscopy
BIOL 5374 Scanning Electron Microscopy

Chemistry and Biochemistry (Technical Elective II)
CHEM 3523 Physical Chemistry II
CHEM 3653 Introduction to Biochemistry
CHEM 3753 Introduction 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 Introduction 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

Mathematics (Technical Elective II)
MATH 3333 Linear Algebra I
MATH 4753 Applied Statistical Methods
MATH 3423 Physical Math II
MATH 4163 Intro Partial Differential Equations

Meteorology (Technical Elective II)
METR 5103 Boundary Layer Meteorology
METR 5344 Computational Fluid Dynamics I

Microbiology (Technical Elective II)
MBIO 3113 Cell Biology
MBIO 3813 Fundamentals of Microbiology
MBIO 3812 Fundamentals of Microbiology Laboratory
MBIO 4833 Basic Immunology
MBIO 4843 Introduction of Molecular Biology
MBIO 5620 Investigations in Microbiology
MBIO 5833 Industrial & Applied Microbiology
MBIO 5843 Introduction to Molecular Biology

Physics (Technical Elective II)
PHYS 3223 Modern Physics for Engineers

CH E PRE-MEDICAL/BIOMEDICAL OPTION
(Technical Electives I & II)

Biomedical students must take CHE 5203 as one technical elective selection.
Offered alternate Fall semesters.

Pre-medical students must take (1) of the (3) BIOL courses listed below as one technical elective selection.

CH E 5203 Bioengineering Principles
CH E 5243 Biochemical Engineering
CH E 5293 Transport in Biological Systems
CH E 5373 Tissue Engineering
CHE 5693 Cellular Aspects in Tissue Regeneration
CHE 5703 Biology for Engineers
CH E 5723 Biosensors

Aerospace and Mechanical Engineering (Technical Elective I & II)
AME 5203 Bioengineering Principles
AME 5213 Biomechanics I
AME 5223 Biomechanics II
AME 5233 Biomaterials
AME 5253 Implantable Devices
AME 5293 Transport in Biological Systems

Bioengineering (Technical Elective I & II)
BIOE 5213 Biomechanics I
BIOE 5223 Biomechanics II
BIOE 5233 Biomaterials
BIOE 5253 Implantable Devices
BIOE 5203 Bioengineering Principles
BIOE 5293 Transport in Biological Systems
BIOE 5990 Independent Study
BIOE 6970 Advanced Topics in Bioengineering
BIOE 5243 Biochemical Engineering
BIOE 5373 Tissue Engineering
BIOE 5693 Cellular Aspects in Tissue Regeneration
BIOE 5703 Biology for Engineers
BIOE 5723 Biosensors
BIOE 5393 Introduction to Computer-aided Tissue Engineering

Electrical and Computer Engineering (Technical Elective I & II)
ECE 4823 Engineering Principles of the Human Body
ECE 4990 Special Studies: Research & Design Experience in Bioengineering
ECE 5823 Bioinstrumentation
ECE 5843 Medical Imaging Systems
ECE 5973 Computational Bioeng.
ECE 6813 Advanced Topics in Biomedical Engineering

Industrial and Systems Engineering (Technical Elective I & II)
ISE 5393 Introduction to Computer-aided Tissue Engineering

CH E PRE-MEDICAL/BIOMEDICAL OPTION
NON-ENGINEERING Technical Electives

BIOL 3113 Cell Biology
BIOL 3333 Genetics
BIOL 4843 Intro. to Molecular Biology

AMES 5710 Neural Engineering