

TECHNICAL ELECTIVE OPTIONS FOR CHEMICAL ENGINEERING UNDERGRADUATE PROGRAMS

Technical electives must be upper-level courses taken JR or SR year, courses on this list are pre-approved by faculty. Undergraduates: email instructor for permission to enroll in 5000+ courses. 3 Electives/9 hours REQUIRED of which 1 technical or advanced chemistry elective must be CHE. Students are responsible for pre-requisites/instructor permission for non-CHE courses, check classnav.ou.edu or banner for class availability.

Standard Option Technical Elective List (Choose 2)

Chemical Engineering

CH E 3960 Honors Reading
 CH E 3983/4983 Honors Research I & II
 CH E 3953/4953 Undergrad Research I & II
 CH E 4203/5203 Bioengineering Principles
 CH E 4243/5243 Biochemical Engineering
 CH E 4281 Engineering CO-OP*
 CH E 4323 Chemical Process Sustainability
 CH E 4373/5373 Tissue Engineering
 CH E 4423/5423 Genetic Eng & Biotec
 CH E 4583/5583 Adv Techniques in Biomfg
 CH E 4990 Independent Study
 CH E 5063 Sustainable Energy Applications
 CH E 5123 Sustainable Separations
 CH E 5133 Water Sustainability
 CH E 5143 Multi-Scale Modeling Matter
 CH E 5163 Catalysis
 CH E 5183 Grad Transport Phenomena
 CH E 5213 Exp. Methods Materials Res
 CH E 5223 Refining Principles
 CH E 5233 Colloidal Assembly
 CH E 5263 Ind & Env Transport Processes
 CH E 5293 Transport in Biological Systems
 CH E 5353 Emerging Tech Water Sust
 CH E 5393 Rheology of Complex Fluids
 CH E 5433 Data Science for Engineers
 CH E 5453 Polymer Science & Eng.
 CH E 5463 Polymer Processing
 CH E 5480 Seminar in Selected Topics
 CH E 5523 Adv Math Methods in S&E
 CH E 5533 Materials Design Energy App
 CH E 5673 Colloids and Surface Science
 CH E 5843 Adv CHE Thermodynamics
 CH E 5970 Seminar in Selected Topics
 CH E 6723 Adv Kinetics and Reaction Eng
 *CHE4281 must be taken 3 times to fulfill a technical elective.

Aerospace and Mechanical Engineering

AME 3363 Design Thermal Fluid Syst
 AME 4013 Medical Device Design
 AME 4043 Analysis-Heat Pumping Sys
 AME 5213 Biomechanics I (Biosolids)
 AME 5333 Thermo & Combustion
 AME 5710 Topics in Solid Mechanics
 AME 5720 Topics in Fluid Mechanics
 AME 5983 Computational Fluid Dynamics

Biomedical Engineering

BME 3143 Biomechanics
 BME 3153 Molecular Cell Tissue Eng
 BME 3163 Biomed Micro/Nano Tech
 BME 3233 Biomaterials
 BME 4013 Biomedical Device Design
 BME 4813 Quantitative Physiology
 BME 5143 Biosensor: Fund & Apps

Civil Engineering & Env Science

CEES 3213 Water Resources Engineering
 CEES 3243 Water and Wastewater Treatment Design
 CEES 4114 Aquatic Chemistry
 CEES 4263 Hazard & Solid Waste Management
 CEES 4943 Air Quality Management
 CEES 5244 Physicochemical Water Treatment Processes

Electrical and Computer Engineering

ECE 3323 Intro-Solid State Elec Devices
 ECE 3813 Introductory Electronics
 ECE 4813 Electronics
 ECE 5843 Medical Imaging Systems
 ECE 5863 Bioinstrumentation

Industrial and Systems Engineering

ISE 3293 Applied Eng Statistics

Petroleum and Geological Engineering

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

Engineering

ENGR 4013 Leadership & Management

NON-ENGINEERING Technical Electives

Geography

GEOG 4523 Life Cycle Analysis
 GEOG 4583/5583 Energy Sys Sustainability
 GEOG 5253 The Economics of Sustainability
 GEOG 5433 Sustainability: Theory and Practice

Mathematics

MATH 3333 Linear Algebra I
 MATH 4753 Applied Statistical Methods
 MATH 4733 Theory of Probability
 MATH 3423 Physical Math II
 MATH 4163 Intro Partial Diff. Equations

Meteorology

METR 5103 Boundary Layer Meteorology
 METR 4344 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 3463 Water Eco Sus.
 BIOL 4244 Animal Histology
 BIOL 4843 Molecular Biology
 BIOL 4913 Quantitative Biology
 BIOL 5113 Cellular Pathology
 BIOL 5153 Endocrine Physiology
 BIOL 5364 Transmission Electron Micro
 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 Instr Methods CHE Analysis
 CHEM 4333 Advanced Inorganic Chemistry-Periodic System
 CHEM 4444 Adv. Synthesis Spectral Characterization
 CHEM 5100 Instrument. Methods-Analysis
 CHEM 5110 Spectroscopic CHE Analysis
 CHEM 5453 Polymer Science
 CHEM 4753 Principles of Biochem I
 CHEM 6813 Intro to Biochemical Methods

Microbiology

MBIO 3113 Cell Biology
 MBIO 3813 Fundamentals of MBIO
 MBIO 3812 Fundamentals of MBIO Lab
 MBIO 4723 Biocatalysis Bioremediation
 MBIO 4833 Basic Immunology
 MBIO 4843 Molecular Biology
 MBIO 5620 Investigations in Microbiology
 MBIO 5843 Molecular Biology

Physics

PHYS 3223 Modern Physics for Engineers

Advanced Chemistry Elective List (For Standard Option)

CHEM 3523 Physical Chemistry II	CH E 5163 Heterogeneous Catalysis
CHEM 3653 Intro to Biochemistry	CH E 5213 Experimental Methods in Materials Research
CHEM 4333 Adv Inorganic-Periodic System	CH E 5223 Refining Principles
CHEM 4444 Adv Synthesis/Spectral Character	CH E 5233 Colloidal Assembly
	CH E 5243 Biochemical Engineering
CH E 4423/5423 Genetic Engineering and Biotechnology	CH E 5453 Polymer Science & Engineering
CH E 5063 Sustainable Energy Applications	CH E 5533 Mat. Design for Energy Application
CH E 5123 Sustainable Separations	CH E 5673 Colloids and Surface Science
CH E 5133 Water Sustainability	

Pre-Medical and Biomedical Technical Elective List

Students must choose one of the Technical Elective options below to follow.

Pre-Medical Option	Bioengineering Option
<p><i>Take</i> CHEM3653 Intro to Biochemistry</p>	<p><i>Take</i> CHEM3653 Intro to Biochemistry</p>
<p><i>Take one of the following:</i> BIOL3113 Cell Biology OR BIOL3333 Genetics OR BIOL4843 Molecular Biology OR BIOL 3101 Principles of Physiology*</p>	
<p><i>Take one of the following CH E Pre-Medical Option Technical Elective II</i></p> <p><u>Bioengineering Content Options:</u> CH E 4423/5423 Genetic Engineering and Biotechnology CH E 4243/5243 Biochemical Engineering CH E 5293 Transport in Biological Systems CH E 4373/5373 Tissue Engineering</p> <p><u>Aerospace and Mechanical Engineering</u> AME 2213 Biomechanics I **</p> <p><u>Electrical and Computer Engineering</u> ECE 5843 Medical Imaging Systems</p> <p><u>Biomedical Engineering</u> BME 3143 Biomechanics** BME 3153 Molecular, Cellular & Tissue Engineering BME 3163 Biomedical Micro/Nano Technology BME 3233 Biomaterials BME 4013 Biomedical Device Design BME 4813 Quantitative Physiology*</p>	<p><i>Take one of the following CH E Biomedical Option Technical Elective II</i></p> <p><u>Biological Content Options:</u> BIOL 3113 Cell Biology BIOL 3333 Genetics BIOL 4843 Molecular Biology</p> <p><u>Chemical Engineering</u> CH E 4423/5423 Genetic Engineering and Biotechnology CH E 4243/5243 Biochemical Engineering CH E 4583/5583 Adv Techniques Biomfg CH E 5293 Transport in Biological Systems CH E 4373/5373 Tissue Engineering</p> <p><u>Aerospace and Mechanical Engineering</u> AME 4213 Biomechanics I **</p> <p><u>Electrical and Computer Engineering</u> ECE 5863 Bioinstrumentation</p> <p><u>Biomedical Engineering</u> BME 3143 Biomechanics** BME 3153 Molecular, Cellular & Tissue Engineering BME 3163 Biomedical Micro/Nano Technology BME 3233 Biomaterials BME 4813 Quantitative Physiology BME 5143. Biosensor: Fundamentals and Applications</p>

(updated 3/2024) **Students on B163 and B164 plans 2020 and later have their elective options listed on their check sheets and flowchart.**

*Credit cannot be received for both BIOL 3101 and BME 4813; **credit cannot be received for both BME 3143 and AME 4213

Sustainability Elective List

<p><u>Sustainability Content Options</u> CH E 5063 Sustainable Energy Applications CH E 5123 Sustainable Separations CH E 5133 Water Sustainability CH E 5323 Sustainable Eng. Principles CH E 5353 Energy Technology toward Water Sustainability</p> <p><u>Aerospace and Mechanical Engineering</u> AME 4043 Analysis of Heat Pumping</p> <p><u>Biology</u> BIOL 3463 Water & Ecol. Sustainability</p>	<p><u>Geography</u> GEOG 3233 Principles of Sustainability GEOG 4523 Life Cycle Analysis GEOG 4583/5583 Enrgy Sys &Sustainability GEOG 5253 The Economics of Sustainability GEOG 5433 Sustainability: Theory and Practice</p> <p><u>Meteorology</u> METR 4553 Climate and Renewable Energy</p> <p><u>Microbiology</u> MBIO 4723 Biocatalysis and Bioremediation</p>
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Standard Option: For students on the standard option any 4000 or 5000 level CHE course not listed on their degree checksheet may be used as a technical elective, however students should obtain adviser approval before enrolling in any course NOT on this list for technical elective credit.