

Senior Year Advising Guide

During your Senior year you will complete the following courses

- Four Major Electives
- One Math/Science Elective
- One Technical Elective
- Emerging Topics (Spring)
- System Dynamics and Controls (Fall)
- Two General Education courses
- Senior Engineering Clinic I and II

Of the four Major electives at least one must be from the Thermal Sciences track and at least one must be from the Mechanical Sciences track. See the section “Mechanical Engineering Major Electives” for more information.

A Math/Science Elective is a 200-level or higher science course or 300-level or above math course.

Mechanical Engineering Major Electives

You must take a total of four major elective courses. At least one of these must be from the Thermal/Fluids list and at least one must be from the Mechanical Systems list. All of the courses listed below are worth three credits each.

Thermal Sciences List

ME 10411	Introduction to Combustion
ME 10412	Introduction to Rocket Propulsion
ME 10413	Advanced Heat/Mass Transfer
ME 10414	Introduction to Energy Conversion Systems
ME 10421	Introduction to Gas Dynamics
ME 10422	Introduction to Computational Fluid Dynamics
ME 10444	Introduction to Automotive Engineering
ME 10471	Introduction to Biofluids
ENGR 01410	Introduction to Finite Element Analysis
ENGR 01411	Introduction to Engineering Optimization

Mechanical Sciences List

ME 10401	Introduction to Computer Integrated Manufacturing
ME 10406	Introduction to Computational Materials Science
ME 10441	Advanced Mechanism Design for Undergraduates
ME 10442	Mechatronics
ME 10443	Design for X
ME 10444	Introduction to Automotive Engineering
ME 10450	Introduction to Advanced Solid Mechanics
ME 10451	Introduction to the Mechanics of Continuous Media
ME 10452	Introduction to Structural Acoustics
ME 10454	Introduction to the Elastic Stability of Structures
ME 10470	Introduction to Biomechanics
ME 10472	Introduction to Biomaterials
ENGR 01410	Introduction to Finite Element Analysis
ENGR 01411	Introduction to Engineering Optimization
ENGR 01453	Introduction to Analytical Dynamics

Acceptable Math / Science Electives

Astronomy

ASTR 11.241	Astronomy and Astrophysics
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Biology

BIOL 01.203	Biology 3: Intro to Cell Biology	BIOL 07.301	Comparative Vertebrate Anatomy
BIOL 01.204	Biology 4: Global Ecology	BIOL 10.210	Human Anatomy and Physiology I*
BIOL 01.210	Biological Systems and Applications	BIOL 10.212	Human Anatomy and Physiology II*
BIOL 01.300	Phycology	BIOL 10.345	Human Physiology
BIOL 01.310	Evolution	BIOL 10.350	Work Physiology
BIOL 01.320	Introduction to Virology	BIOL 11.330	Microbiology
BIOL 01.325	Introduction to Mycology	BIOL 11.338	Immunology
BIOL 01.352	Ornithology	BIOL 11.405	Environmental Microbiology
BIOL 01.356	Parasitology	BIOL 14.440	Introduction to Biochemistry
BIOL 01.405	Conservation Biology	BIOL 18.360	Marine Biology
BIOL 01.428	Developmental Biology	BIOL 18.400	Limnology
BIOL 01.430	Cell Biology 4	BIOL 20.310	Ecology
BIOL 01.435	Cell Culture Technology	BIOL 20.311	Ecology (WI)
BIOL 01.454	Herpetology	BIOL 20.321	Physiological Ecology
BIOL 01.458	Mammalogy	BIOL 20.330	Environmental Science
BIOL 01.460	Animal Ethology	BIOL 20.401	Principles of Ecology
BIOL 01.465	Animal Histology	BIOL 20.425	Environmental Toxicology
BIOL 01.470	Ichthyology	BIOL 21.401	Entomology
BIOL 02.200	Introductory Botany	BIOL 22.335	Genetics
BIOL 02.201	Plant Diversity	BIOL 22.410	Concepts in Human Genetics
BIOL 02.405	Plant Physiology*	BIOL 22.450	Molecular Genetics
BIOL 02.410	Stream Ecology*	BIOL 27.403	Comparative Embryology
BIOL 07.200	Invertebrate Zoology		

Special note for Biology: only the classes marked with * do not require Biology I or Biology II as prerequisites.

Chemistry

CHEM 06.300	Advanced Inorganic Chemistry	CHEM 07.464	Adv Organic Chemistry I - WI
CHEM 07.200	Organic Chemistry I	CHEM 07.466	Adv Organic Chemistry II
CHEM 07.201	Organic Chemistry II	CHEM 07.470	Organic Spectroscopic Analysis
CHEM 07.202	Industrial Organic Chemistry	CHEM 07.475	Polymer Synthesis
CHEM 07.348	Biochemistry	CHEM 07.478	Polymer Characterization
CHEM 07.405	Introduction to Polymer Chemistry	CHEM 08.400	Physical Chemistry I
CHEM 07.408	Advanced Biochemistry	CHEM 08.401	Physical Chemistry II
CHEM 07.410	Medicinal Chemistry	CHEM 09.250	Quantitative Analysis

CHEM 07.431	Advanced Topics in Biochemistry	CHEM 09.410	Instrumental Methods
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Computer Science

CS 04.222	Data Structures and Algorithms	CS 07.350	Computer Cryptography
CS 04.225	Data Structures for Engineers	CS 07.360	Intro to Computer Graphics
CS 04.327	Power Java 3	CS 07.370	Intro to Information Visualization
CS 04.380	Object Oriented Design	CS 07.380	Intro to Computer Animation
CS 06.310	Principles of Digital Computers	CS 07.450	Artificial Intelligence (AI)
CS 07.210	Foundations of Computer Science	CS 07.460	Computer Vision
CS 07.310	Robotics	CS 07.470	Theory and Appl of Pattern Recog
CS 07.340	Design and Analysis of Algorithms		

Mathematics

MATH 01.310	College Geometry	MATH 01.354	Introduction to Topology
MATH 01.330	Introduction to Real Analysis I	MATH 01.386	Intro to Partial Diff Equations
MATH 01.331	Introduction to Real Analysis II	MATH 01.430	Introduction to Complex Analysis
MATH 01.332	Numerical Analysis	MATH 03.400	Applications of Mathematics
MATH 01.340	Modern Algebra I	MATH 03.411	Det Models in Oper Research
MATH 01.341	Modern Algebra II	MATH 03.412	Stoch Models in Oper Research
MATH 01.352	Theory of Numbers		

Statistics

STAT 02.260	Statistics I	STAT 02.361	Intro to Prob and Statistics II
STAT 02.261	Statistics II	STAT 02.371	Statistical Design of Experiments I
STAT 02.280	Biometry	STAT 02.372	Statistical Design of Experiments II
STAT 02.360	Intro to Prob and Statistics I		

Physics

PHYS 02.300	Modern Physics	PHYS 02.402	Quantum Mechanics II
PHYS 02.305	Optics and Light	PHYS 02.430	Electricity and Magnetism I
PHYS 02.315	Analytical Mechanics	PHYS 02.431	Electricity and Magnetism II
PHYS 02.325	Mathematical Physics	PHYS 02.440	Advanced Laboratory
PHYS 02.387	Statistical Physics	PHYS 02.470	Selected Topics in Advanced Physics
PHYS 02.401	Quantum Mechanics I	PHYS 08.305	Biophysical Chemistry

Acceptable Technical Electives

Chemical Engineering

ChE 06.201	Principles of Chem Proc I (2 cr)*	ChE 06.474	Fundamentals of Particle Technology
ChE 06.302	Principles of Chem Proc II (2 cr)*	ChE 06.476	Principles of Bioseparation Processes
ChE 06.405	Process Dynamics and Control	ChE 06.477	Fund of Engr Proc Analysis and Exp Des
ChE 06.441	Process Safety	ChE 06.480	Project Optimization in Engineering
ChE 06.442	Fluid Flow in Proc and Manuf	ChE 06.481	Advanced Process Analysis
ChE 06.462	Bioprocess Engineering	ChE 06.482	Principles of Food Engineering
ChE 06.463	Green Engr of Chem Processes	ChE 06.483	Principles of Engr Exercise Physiology
ChE 06.466	Polymer Processing	ChE 06.484	Fundamentals of Controlled Release
ChE 06.468	Principles of Electrochem Engr	ChE 06.485	Fund of Engineering Quality Control
ChE 06.470	Princ of Air Pollution Control	ChE 06.486	Membrane Processes
ChE 06.472	Princ of Biomedical Processes		

Civil and Environmental Engineering

CEE 08.311	Environmental Engineering I	CEE 08.422	Site Remediation Engr Principles
CEE 08.312	Environmental Engineering II	CEE 08.431	Solid and Hazardous Waste Management
CEE 08.342	Water Resources Engineering	CEE 08.432	Pollutant Fate and Transport Principles
CEE 08.351	Geotechnical Engineering	CEE 08.433	Principles of Int Solid Waste Management
CEE 08.361	Transportation Engineering	CEE 08.444	Principles of Hydraulic Design
CEE 08.382	Structural Engineering	CEE 08.445	Principles of Env Fluid Mechanics
CEE 08.383	Analysis and Des of Steel Frames	CEE 08.463	Transp Plan, Demand, and Data Analysis
CEE 08.404	Engineering Est for Seniors	CEE 08.465	Pavement Analysis and Evaluation
CEE 08.412	Env Treatment Process Principles	CEE 08.481	Reinforced Concrete Design

Electrical and Computer Engineering

ECE 09.202	Network II (2 cr) *	ECE 09.411	Modern Solid State Devices
ECE 09.241	Digital I	ECE 09.412	Electronic Packaging
ECE 09.312	Electronics II (2 cr) *	ECE 09.413	Principles of Nondestructive Evaluation
ECE 09.321	Systems and Control I	ECE 09.454	Introduction to Artificial Neural Networks
ECE 09.351	Digital Signal Processing	ECE 09.455	Theory and Apps of Pattern Recognition
ECE 09.403	Sustainable Design in Engineering	ECE 09.471	Instrumentation
ECE 09.404	Princ of Biomed Sys and Devices	ECE 09.483	Digital Design w/VHDL
ECE 09.405	Product Engineering	ECE 09.402	Special Topics: Nanoscale Electronics
ECE 09.406	Forensic Engr and Prod Liability	ECE 09.402	Special Topics: Smart Sensors
ECE 09.408	Power System Engineering	ECE 09.402	Special Topics: Biocomputation

* Note in order to meet the 3 cr. Technical Elective requirement, a student must complete 2 courses that are 2 cr.

