

MAJOR IN MECHANICAL ENGINEERING, MECHANICAL ENGINEERING CONCENTRATION

Mechanical engineers are creative problem solvers who design, develop, and manufacture the machines and instrumentation that run energy, building, environmental, and transportation systems.

In Mechanical Engineering, students take basic science and mathematics courses while beginning their engineering studies in design and computing. A broad spectrum of classes is designed to sharpen problem-solving skills. The senior year focuses on a year-long capstone design course to help students in the transition from college to an engineering career. Students also choose technical electives from the energy, materials, robotics and automation, biomedical, and aerospace engineering areas. Participation in labs provides an active learning environment and further develops design, modeling, and analytical skills.

Mechanical Engineering at CSU is dedicated to graduating ethical mechanical engineers who:

1. Make an impact on society's global, grand engineering challenges
2. Act as innovative and creative engineering designers who identify, analyze, and solve complex problems
3. Function as accomplished thinkers with hands-on practical skills

4. Serve as local, regional, and global collaborators and communicators
5. Commit to life-long learning

Students in the Major in Mechanical Engineering, Mechanical Engineering Concentration take mechanical engineering and other engineering-related electives to fulfill their degree requirements.

Learning Objectives

Upon successful completion, students will be able to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

Requirements Effective Fall 2026

Freshman

		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
ENGR 111	Fundamentals of Engineering		3
ENGR 114	Engineering for Grand Challenges		3
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	5
Select one group from the following:			5
Group A:			
CHEM 111	General Chemistry I (GT-SC2)	3A	
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	
Group B:			
CHEM 120	Foundations of Modern Chemistry (GT-SC2)	3A	
CHEM 121	Foundations of Modern Chemistry Laboratory (GT-SC1)	3A	
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			3
Total Credits			30

Sophomore

CIVE 260	Engineering Mechanics-Statics	3
MATH 261	Calculus for Physical Scientists III	4
MATH 340	Intro to Ordinary Differential Equations	4
MECH 200A	Introduction to Manufacturing Processes: Lecture	3

MECH 200B	Introduction to Manufacturing Processes : Laboratory		1
MECH 207	Mechatronics I		3
MECH 210	Engineering Design--3D Modeling and Printing		2
MECH 231	Engineering Experimentation		2
MECH 261	Dynamics for Mechanical Engineers		3
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	5
Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
Total Credits			33
Junior			
CIVE 360	Mechanics of Solids		3
MECH 305	Mechanical Engineering Computational Methods		3
MECH 307	Mechatronics II		3
MECH 324	Dynamics of Machines		4
MECH 325	Machine Design with Finite Element Analysis		4
MECH 331A	Introduction to Engineering Materials: Lecture		3
MECH 331B	Introduction to Engineering Materials : Lab		1
MECH 339	Thermodynamics I for Mechanical Engineers		3
MECH 342	Fluid Mechanics for Mechanical Engineers		3
MECH 344	Heat and Mass Transfer	4B	3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Total Credits			33
Senior			
MECH 338	Thermal/Fluid Sciences Laboratory		1
MECH 439	Thermodynamics II for Mechanical Engineers		3
Select one group from the following:			6
Group A:			
MECH 486A	Engineering Design Practicum: I	4A,4C	
MECH 486B	Engineering Design Practicum: II	4C	
Group B:			
MECH 498A	Engineering Research Practicum: I	4A,4C	
MECH 498B	Engineering Research Practicum: II	4C	
Mechanical Engineering Technical Electives (see list below)			12
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	6
Total Credits			31
Program Total Credits:			127

Mechanical Engineering Technical Electives

Select 12 credits of any 400-level or 500-level MECH course except MECH 439 MECH 495, MECH 486A, MECH 486B, MECH 498A,

and MECH 498B, or select 9 credits and an additional 3 credits from the **Alternate Technical Electives** list.

Alternate Technical Electives

Code	Title	AUCC	Credits
AS 301	Leading People and Effective Communication I		3
AS 302	Leading People and Effective Communication II		3

BIOM 350A	Study Abroad--Ecuador: Prosthetics		1-3
BMS 300	Principles of Human Physiology		4
BUS 482D	Study Abroad--Sweden: Climate Tech & Innovation		3
CIVE 367	Structural Analysis		3
CIVE 371	Study Abroad--Peru: Grand Challenges in Engineering in Peru		3
CIVE 438	Fundamentals of Environmental Engr		3
CIVE 560	Advanced Mechanics of Materials		3
CIVE 562	Fundamentals of Vibrations		3
CS 150A	Culture and Coding: Java	3B	3
CS 150B	Culture and Coding: Python	3B	3
CS 163	CS1--No Prior Programming Experience		4
CS 164	CS1--Computational Thinking with Java		4
ECE 411	Control Systems		3
ECE 461	Modern Power Systems		3
ECE 516	Information Theory		3
ECE 521	Satellite Communication		3
ECE 563	Introduction to Power System Markets		3
ECE 566	Grid Integration of Renewable Energy Systems		3
ECE 568	Communication Systems in Smart Grids		3
ECE 570	Microgrids		3
ENGR 370	Study Abroad: Grand Challenges in Engineering--China		3
ENGR 370B	Study Abroad--Netherlands: Engineering and Sustainability		3
ENGR 422	Technology Entrepreneurship		3
ENGR 430	Engineering With Drones		3
ENGR 478	Applied Engineering Data Analytics		3
ENGR 510	Engineering Optimization: Method/ Application		3
HES 207	Anatomical Kinesiology		4
IDEA 310E	Design Thinking Toolbox: Foundations of Woodworking		3
IDEA 310F	Design Thinking Toolbox: Foundations of Textile Design		1
IDEA 310G	Design Thinking Toolbox: Infographics		1
IDEA 310P	Design Thinking Toolbox: Low-Fidelity Prototyping		3
IDEA 310T	Design Thinking Toolbox: Mobile Applications		3
IDEA 310U	Design Thinking Toolbox: Artificial Intelligence		3
MATH 331	Introduction to Mathematical Modeling		3
MATH 332	Partial Differential Equations		3
MATH 369	Linear Algebra I		3
MGT 305	Fundamentals of Management		3

MGT 340	Fundamentals of Entrepreneurship	3
MKT 305	Fundamentals of Marketing	3
MSE 502A	Materials Science and Engineering Methods: Materials Structure and Scattering	1
MSE 502B	Materials Science and Engineering Methods: Computational Materials Methods	1
MSE 502C	Materials Science and Engineering Methods: Materials Microscopy	1
MSE 502D	Materials Science and Engineering Methods: Materials Spectroscopy	1
MSE 502E	Materials Science and Engineering Methods: Bulk Properties and Performance	1
MSE 502F	Materials Science and Engineering Methods: Experimental Methods for Materials Research	1
PH 314	Introduction to Modern Physics	4
PH 341	Mechanics	4
PH 353	Optics and Waves	4
PH 451	Introductory Quantum Mechanics I	3
STAT 315	Intro to Theory and Practice of Statistics	3
SYSE 501	Foundations of Systems Engineering	3

Major Completion Map

Distinctive Requirements for Degree Program:

TO PREPARE FOR FIRST SEMESTER: The curriculum for this major assumes students enter college prepared to take calculus.

Freshman

Semester 1		Critical	Recommended	AUCC	Credits
CO 150	College Composition (GT-CO2)		X	1A	3
ENGR 111	Fundamentals of Engineering	X			3
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
Select one group from the following:					5
Group A:					
CHEM 111	General Chemistry I (GT-SC2)	X		3A	
CHEM 112	General Chemistry Lab I (GT-SC1)	X		3A	
Group B:					
CHEM 120	Foundations of Modern Chemistry (GT-SC2)		X	3A	
CHEM 121	Foundations of Modern Chemistry Laboratory (GT-SC1)		X	3A	
Total Credits					15
Semester 2		Critical	Recommended	AUCC	Credits
ENGR 114	Engineering for Grand Challenges	X			3
MATH 161	Calculus for Physical Scientists II (GT-MA1)	X		1B	4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	X		3A	5
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)					3
CO 150 must be completed by the end of Semester 2.					
Total Credits					15

Sophomore

Semester 3		Critical	Recommended	AUCC	Credits
CIVE 260	Engineering Mechanics-Statics	X			3
MATH 261	Calculus for Physical Scientists III	X			4

MECH 210	Engineering Design–3D Modeling and Printing	X			2
PH 142	Physics for Scientists and Engineers II (GT-SC1)	X		3A	5
Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			X	3C	3

Total Credits	17
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Semester 4		Critical	Recommended	AUCC	Credits
MATH 340	Intro to Ordinary Differential Equations	X			4
MECH 200A	Introduction to Manufacturing Processes: Lecture	X			3
MECH 200B	Introduction to Manufacturing Processes : Laboratory	X			1
MECH 207	Mechatronics I	X			3
MECH 231	Engineering Experimentation	X			2
MECH 261	Dynamics for Mechanical Engineers	X			3

Total Credits	16
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Junior

Semester 5		Critical	Recommended	AUCC	Credits
CIVE 360	Mechanics of Solids	X			3
MECH 305	Mechanical Engineering Computational Methods	X			3
MECH 307	Mechatronics II	X			3
MECH 331A	Introduction to Engineering Materials: Lecture	X			3
MECH 331B	Introduction to Engineering Materials : Lab	X			1
MECH 339	Thermodynamics I for Mechanical Engineers	X			3

Total Credits	16
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Semester 6		Critical	Recommended	AUCC	Credits
MECH 324	Dynamics of Machines	X			4
MECH 325	Machine Design with Finite Element Analysis	X			4
MECH 342	Fluid Mechanics for Mechanical Engineers	X			3
MECH 344	Heat and Mass Transfer	X		4B	3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3

Total Credits	17
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Senior

Semester 7		Critical	Recommended	AUCC	Credits
MECH 338	Thermal/Fluid Sciences Laboratory	X			1
MECH 439	Thermodynamics II for Mechanical Engineers	X			3
Select one course from the following:					3
MECH 486A	Engineering Design Practicum: I	X		4A,4C	
MECH 498A	Engineering Research Practicum: I	X		4A,4C	
Mechanical Engineering Technical Elective (See List on Requirements Tab)		X			6
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3

Total Credits	16
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Semester 8		Critical	Recommended	AUCC	Credits
Select one course from the following:					3
MECH 486B	Engineering Design Practicum: II	X		4C	
MECH 498B	Engineering Research Practicum: II	X		4C	
Mechanical Engineering Technical Electives (See List on Requirements Tab)		X			6
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)			X	1C	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3

The benchmark courses for the 8th semester are the remaining courses in the entire program of study. X

Total Credits	15
Program Total Credits:	127