

MAJOR IN MECHANICAL ENGINEERING

Mechanical engineers are creative problem solvers who design, develop, and manufacture the machines and instrumentation that run energy, building, environmental, and transportation systems. Early within the program students learn hands-on skills that allow them to work on projects that include biomedical devices, ground/air/space vehicles, robots, environmental control equipment, and power plants.

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 and early participation in hands-on labs provides an active learning environment and further develops design, modeling, and analytical skills.

Student in their senior year focus on a year-long capstone design course to help them transition from college to an engineering career. Students choose technical electives from the energy, automotive, material science, manufacturing, dynamic systems, robotics and controls, simulation and modeling, and biomedical engineering areas to further immerse themselves in areas of interest.

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

- Make an impact on society's global, grand engineering challenges.
- Act as innovative and creative engineering designers who identify, analyze, and solve complex problems.
- Function as accomplished thinkers with hands-on practical skills.
- Serve as local, regional, and global collaborators and communicators.
- Commit to life-long learning.
- Uphold the CSU Principles of Community which encompass inclusion, integrity, respect, service, and social justice.

Learning Objectives

Mechanical Engineering Bachelor of Science graduates will be able to accomplish the following within the first few years after graduation:

1. Identify, analyze, formulate, and solve complex engineering problems associated with their professional position, both independently and in a team environment.
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. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
4. Manage multi-faceted and multi-disciplinary projects with significant legal, ethical, regulatory, social, environmental, and economic considerations using a broad systems perspective.
5. 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.
6. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
7. Communicate effectively with colleagues, professional clients, and the public.
8. Demonstrate commitment and progress in lifelong learning, professional development, and leadership.

Potential Occupations

Graduates from the Department of Mechanical Engineering are expected to have the fundamental knowledge required for the successful practice of mechanical engineering. CSU engineering graduates are well prepared for a professional career. The Department boasts a 100% pass rate on the Fundamentals of Engineering professional examination. Participating in internships, co-curricular and volunteer activities, and cooperative education opportunities are highly recommended to enhance practical training and development. Students who continue to pursue a graduate education can attain more responsible positions with the possibility of rising to top professional levels.

Concentrations

- Advanced Manufacturing Concentration (<https://catalog.colostate.edu/general-catalog/colleges/engineering/mechanical/mechanical-engineering-major-advanced-manufacturing-concentration/>)
- Aerospace Engineering Concentration (<https://catalog.colostate.edu/general-catalog/colleges/engineering/mechanical/mechanical-engineering-major-aerospace-engineering-concentration/>)
- Mechanical Engineering Concentration (*coming soon for Fall 2026*)
- Robotics and Automation Concentration (*coming soon for Fall 2026*)

Requirements Effective Fall 2025

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:			

2 Major in Mechanical Engineering

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)		3D	3
Total Credits			30
Sophomore			
CIVE 260	Engineering Mechanics-Statics		3
CIVE 261	Engineering Mechanics-Dynamics		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
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/> 3B #arts-humanities) 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
BMS 300	Principles of Human Physiology		4
CIVE 367	Structural Analysis		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 (GT-AH3)	3B	3
CS 150B	Culture and Coding: Python (GT-AH3)	3B	3
CS 155	Introduction to Unix		1
CS 156	Introduction to C Programming I		1
CS 157	Introduction to C Programming II		1
CS 163	CS1—No Prior Programming Experience		4
CS 164	CS1—Computational Thinking with Java		4
ECE 411	Control Systems		3
ECE 465	Electrical Energy Generation Technologies		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
HES 207	Anatomical Kinesiology		4
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
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)			X	3D	3
CO 150 must be completed by the end of Semester 2.		X			
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

Semester 4		Critical	Recommended	AUCC	Credits
CIVE 261	Engineering Mechanics-Dynamics	X			3
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
Total Credits					16

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

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
----------------------	--	--	--	--	-----------

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
----------------------	--	--	--	--	-----------

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
-------------------------------	--	--	--	--	------------