

MAJOR IN CIVIL ENGINEERING

The undergraduate Civil Engineering program provides a solid base in the physical sciences, mathematics, engineering fundamentals, and design and management concepts. The All-University Core Curriculum (AUCC) (<https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/>) provides a broad background in communication, liberal arts, humanities, and social sciences. In addition to offering courses in the various sub-disciplines of Civil Engineering, the Civil Engineering curriculum covers design practices, information technology, technical communications, project management, and engineering ethics. The program culminates in a year-long, term-based, senior capstone design experience. Preparation for high-level professional practice is emphasized. The Fundamentals of Engineering (FE) exam is the first step toward registration as a licensed Professional Engineer (PE), an important professional credential for civil engineers. Thus, students in this major are encouraged to take the FE exam prior to graduation.

Participation in internships, volunteer activities, professional organizations, and cooperative education opportunities is highly recommended to enhance practical training and development. Graduates who pursue advanced studies are prepared for higher level technical responsibilities.

The educational outcomes and objectives of this major can be found on the Department of Civil and Environmental Engineering website (<https://www.engr.colostate.edu/ce/department/accreditation/>). The Civil Engineering major is accredited by the Engineering Accreditation Commission of ABET (<http://abet.org>).

Learning Objectives

Upon successful completion, students will be able to:

1. Identify, analyze, formulate, and design resilient and sustainable civil engineering solutions, both independently and in an interdisciplinary team environment;
2. Apply considerations of technical, legal, regulatory, social, environmental, economic, and ethical factors to develop solutions to multi-faceted and multi-disciplinary projects and programs;

3. Communicate effectively in both technical and non-technical settings using a variety of media and modes of communication with co-workers, clients, stakeholders, policy-makers, and the public;
4. Engage in lifelong learning, professional development, and leadership, including participation in continuing education courses, workshops, and/or graduate study, and the pursuit of licensure as a professional engineer; and
5. Exemplify the skills and capability to participate in activities focused on the betterment of their communities and society as a whole.

Potential Occupations

Students who obtain a Bachelor of Science degree in Civil Engineering from CSU are prepared to solve some of the world's most challenging problems with consideration for climate change, resiliency, and sustainability. Graduates will be able to repair, redesign, and rebuild aging infrastructure around the world, from highways and buildings to water systems and disaster mitigating structures. Employment opportunities should be plentiful for the foreseeable future.

Civil engineers are employed in many different organizations, including small and large consulting firms, local, state, and federal governmental agencies, and industrial companies such as construction, petroleum, mining, and aerospace firms. Civil engineers also may find opportunities in specialized design, research, and teaching.

Some possible job titles for graduates with a Bachelor of Science degree in Civil Engineering (BSCE) include, but are not limited to, civil engineer, transportation engineer, hydraulic engineer, water resources engineer, structural engineer, geotechnical engineer, geoenvironmental engineer, groundwater engineer, hydrologist, urban/regional planner, infrastructure engineer or manager, contract administrator, construction engineer or manager, building construction inspector, facilities engineer or manager, industrial transportation specialist, industrial designer/engineer, construction materials engineer, irrigation engineer, land development engineering, mining engineer, mining and petroleum research engineer, technical sales engineer, and educator.

Requirements Effective Fall 2025

Freshman

		AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	1
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
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3

Total Credits

30

Sophomore

CHEM 113	General Chemistry II		3
CIVE 202	Numerical Modeling and Optimization		3
CIVE 203	Engineering Systems and Decision Analysis		3
CIVE 260	Engineering Mechanics-Statics		3
CIVE 261	Engineering Mechanics-Dynamics		3
CIVE 360	Mechanics of Solids		3
MATH 261	Calculus for Physical Scientists III		4
MATH 340	Intro to Ordinary Differential Equations		4
MECH 237	Introduction to Thermal Sciences		3
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
Total Credits			32

Junior

CIVE 300	Fluid Mechanics		3
CIVE 301	Fluid Mechanics Laboratory		1
CIVE 302	Evaluation of Civil Engineering Materials		3
CIVE 303	Infrastructure and Transportation Systems		3
CIVE 322	Basic Hydrology		3
CIVE 355	Geotechnical Engineering		3
CIVE 356	Geotechnical Engineering Laboratory		1
CIVE 367	Structural Analysis		3
CIVE 467	Design of Reinforced Concrete Structures		3
Science Technical Elective (see list below)			3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
Total Credits			32

Senior

CIVE 401	Hydraulic Engineering		3
CIVE 402	Senior Design Principles	4A,4B	3
CIVE 403	Senior Project Design	4C	3
CIVE 438	Fundamentals of Environmental Engr		3
CIVE 466	Design and Behavior of Steel Structures		3
Civil Engineering Technical Electives (see list below)			15
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	3
Total Credits			36
Program Total Credits:			130

Science Technical Electives – Select a minimum of 3 credits

Code	Title	AUCC	Credits
BSPM 102	Insects, Science, and Society (GT-SC2)	3A	3
BZ 110	Principles of Animal Biology (GT-SC2)	3A	3

BZ 120	Principles of Plant Biology (GT-SC1)	3A	4
ESS 210/GR 210	Physical Geography		3
GEOL 120	Geology and Society (GT-SC2)	3A	3
GEOL 122	Geoscience–Climate and Environmental Change (GT-SC2)	3A	3
GEOL 150	Dynamic Earth (GT-SC2)	3A	4
HORT 171/SOCR 171	Environmental Issues in Agriculture (GT-SS3)	1C	3
LAND 220/LIFE 220	Fundamentals of Ecology (GT-SC2)	3A	3
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	4
MIP 149	The Microbial World		3
NR 120A	Environmental Conservation (GT-SC2)	3A	3
NR 130	Global Environmental Systems (GT-SC2)	3A	3
NR 150	Oceanography (GT-SC2)	3A	3
SOCR 240	Introductory Soil Science		4

Civil Engineering Technical Electives – Select a minimum of 15 credits

Select a minimum of 9 credits from the Engineering Technical Electives; a maximum of 6 credits may be selected from the Additional Technical Electives. Only 3 credits of a 4- or 5-credit course will apply toward this requirement.

Code	Title	Credits
Engineering Technical Electives – Select 9-15 credits from the following:		
CIVE 305	Intermediate AutoCAD	3
CIVE 330	Ecological Engineering	3
CIVE 405	Sustainable Civil/Environmental Engineering	3
CIVE 421	Global Water Challenges	3
CIVE 423	Groundwater Engineering	3
CIVE 439	Applications of Environmental Engr Concepts	3
CIVE 440	Nonpoint Source Pollution	3
CIVE 442	Air Quality Engineering	3
CIVE 502	Fluid Mechanics	3
CIVE 505	Structural Inspection, Management and Repair	3
CIVE 507	Transportation Engineering	3
CIVE 508	Bridge Engineering	3
CIVE 510	Applied Hydraulic System Design	3
CIVE 511	Coastal Engineering	3
CIVE 512	Irrigation Systems Design	3
CIVE 513	Morphodynamic Modeling	3
CIVE 514	Hydraulic Structures/Systems	3
CIVE 515	River Mechanics	3
CIVE 519	Irrigation Water Management	3
CIVE 520	Physical Hydrology	3
CIVE 521	Hydrometry	3
CIVE 524/WR 524	Modeling Watershed Hydrology	3

CIVE 525	Water Engineering International Development	3
CIVE 526	Pollution, Exposure, and the Environment	3
CIVE 529	Environmental Organic Chemistry	3
CIVE 530	Environ Engr at the Water-Energy-Health Nexus	3
CIVE 531	Groundwater Hydrology	3
CIVE 533/BIOM 533	Biomolecular Tools for Engineers	3
CIVE 538	Aqueous Chemistry	3
CIVE 540/CBE 540	Advanced Biological Wastewater Processing	3
CIVE 541	Physical Chemical Water Treatment Processes	3
CIVE 542	Water Quality Modeling	3
CIVE 544	Water Resources Planning and Management	3
CIVE 547/STAT 547	Statistics for Environmental Monitoring	3
CIVE 549	Drainage and Wetland Engineering	3
CIVE 550	Applications in Geotechnical Engineering	3
CIVE 555	Mining Geotechnics	3
CIVE 556	Slope Stability, Seepage, and Earth Dams	3
CIVE 558	Containment Systems for Waste Disposal	3
CIVE 559	Special Topics in Geotechnical Engineering	3
CIVE 560	Advanced Mechanics of Materials	3
CIVE 561	Advanced Steel Behavior and Design	3
CIVE 562	Fundamentals of Vibrations	3
CIVE 564	Principles of Structural Load Modeling	3
CIVE 565	Finite Element Method	3
CIVE 566	Intermediate Structural Analysis	3
CIVE 567	Advanced Concrete Design	3
CIVE 568	Design of Masonry and Wood Structures	3
CIVE 571	Pipeline Engineering and Hydraulics	3
CIVE 572	Analysis of Urban Water Systems	3
CIVE 573	Urban Stormwater Management	3
CIVE 574	Civil Engineering Project Management	3

CIVE 575	Sustainable Water and Waste Management	3
CIVE 576	Engineering Applications of GIS and GPS	3
CIVE 577	GIS in Civil and Environmental Engineering	3
CIVE 578	Infrastructure and Utility Management	3
ENGR 550/ MATH 550	Numerical Methods in Science and Engineering	3

Additional Technical Electives – Select 0-6 credits from the following:

BC 351	Principles of Biochemistry	4
CHEM 245	Fundamentals of Organic Chemistry	4
CHEM 341	Modern Organic Chemistry I	3
CON 370	Asphalt Pavement Materials and Construction ¹	3
ERHS 446	Environmental Toxicology	3
GEOL 442	Applied Geophysics	4
GR 323/NR 323	Remote Sensing and Image Interpretation	3
LIFE 320	Ecology	3
MATH 332	Partial Differential Equations	3
MATH 369	Linear Algebra I	3
MIP 300	General Microbiology	3
NR 319	Introduction to Geospatial Science	4

A maximum of one course may be selected from the following:

Freshman

Semester 1

		Critical	Recommended	AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	X		3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	X		3A	1
ENGR 111	Fundamentals of Engineering	X			3
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)					3

Total Credits

15

Semester 2

		Critical	Recommended	AUCC	Credits
CO 150	College Composition (GT-CO2)	X		1A	3
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

Total Credits

15

Sophomore

Semester 3

		Critical	Recommended	AUCC	Credits
CHEM 113	General Chemistry II		X		3
CIVE 202	Numerical Modeling and Optimization	X			3
CIVE 260	Engineering Mechanics-Statics	X			3
MATH 261	Calculus for Physical Scientists III	X			4
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)					3

Total Credits

16

Semester 4

		Critical	Recommended	AUCC	Credits
CIVE 203	Engineering Systems and Decision Analysis	X			3
CIVE 261	Engineering Mechanics-Dynamics	X			3
CIVE 360	Mechanics of Solids	X			3
MATH 340	Intro to Ordinary Differential Equations		X		4

FIN 305	Fundamentals of Finance ¹	3
MGT 305	Fundamentals of Management ¹	3
MKT 305	Fundamentals of Marketing ¹	3

¹ Students may need to obtain an override or approval from the respective department to take this course.

Major Completion Map

TO DECLARE MAJOR: Engineering is a controlled major: students are admitted into the major only if they meet established academic standards. Please see competitive major requirements or the advisor in the department for more information.

TO PREPARE FOR FIRST SEMESTER: The curriculum for this major assumes students enter college prepared to take calculus. To qualify for graduation, Civil Engineering majors must achieve a minimum 2.000 grade point average at CSU in all courses in engineering, mathematics, physics, and chemistry as well as courses taken as technical electives.

Distinctive Requirements for Degree Program:

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

MECH 237	Introduction to Thermal Sciences	X			3
Total Credits					16
Junior					
Semester 5					
		Critical	Recommended	AUCC	Credits
CIVE 300	Fluid Mechanics	X			3
CIVE 301	Fluid Mechanics Laboratory		X		1
CIVE 302	Evaluation of Civil Engineering Materials	X			3
CIVE 367	Structural Analysis		X		3
Science Technical Elective (see list below)			X		3
Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			X	3C	3
Total Credits					16
Semester 6					
		Critical	Recommended	AUCC	Credits
CIVE 303	Infrastructure and Transportation Systems	X			3
CIVE 322	Basic Hydrology		X		3
CIVE 355	Geotechnical Engineering	X			3
CIVE 356	Geotechnical Engineering Laboratory		X		1
CIVE 467	Design of Reinforced Concrete Structures	X			3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3
CIVE 367 must be completed by the end of Semester 6.			X		
Total Credits					16
Senior					
Semester 7					
		Critical	Recommended	AUCC	Credits
CIVE 401	Hydraulic Engineering	X			3
CIVE 402	Senior Design Principles	X		4A,4B	3
CIVE 466	Design and Behavior of Steel Structures	X			3
Civil Engineering Technical Electives (See list on Major Requirements Tab)			X		6
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)			X	1C	3
Total Credits					18
Semester 8					
		Critical	Recommended	AUCC	Credits
CIVE 403	Senior Project Design	X		4C	3
CIVE 438	Fundamentals of Environmental Engr	X			3
Civil Engineering Technical Electives (See list on Major Requirements tab)			X		9
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)				3B	3
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.					
Total Credits					18
Program Total Credits:					130