

MAJOR IN CONSTRUCTION ENGINEERING

CSU recognizes the industry's interest in developing a workforce pipeline of qualified construction engineers ready to make an immediate impact across the nation. CSU delivers a comprehensive ABET-accredited Construction Engineering program with robust course offerings that focus on the excellence required to make this program unique and exceptional.

The program achieves industry expectations and anticipated future needs by including focus areas aligned with strengths of CSU faculty experts: Heavy Civil/Infrastructure, Structures/Buildings, and Water/Environmental Facilities. The Construction Engineering degree also includes industry-informed curriculum in virtual design and construction and construction safety engineering.

The program includes an engaged industry advisory board with an active commitment to ensure the success of the program and students, and Enrichment Programming with Industry and Peer Mentorship.

Learning Objectives and Outcomes

The Major in Construction Engineering program strives to provide students with the knowledge, training, and opportunity to achieve the primary educational objective of rewarding careers in construction or related fields, in addition to the expectation that these students, within five years of graduation, will:

1. Be successfully employed in engineering, science, technology, or related careers;
2. Assume management or leadership roles;

3. Engage in continual learning by pursuing advanced degrees or additional educational opportunities through coursework, professional conferences and training, and/or participation in professional societies;
4. Pursue professional registration or other appropriate certifications; and
5. Be active in civic engagement.

The outcomes that students are expected to have attained upon graduation with a B.S. in Construction Engineering are the ability to:

1. Apply knowledge of mathematics, science, and engineering;
2. Design and conduct experiments;
3. Analyze and interpret data;
4. Design a sustainable system or component to meet desired performance specifications;
5. Identify, formulate and solve engineering problems;
6. Communicate and demonstrate professional and ethical responsibilities;
7. Communicate effectively through writing and drawing;
8. Communicate effectively through oral presentations;
9. Explain the impact of engineering on society;
10. Engage in life-long learning;
11. Explain contemporary issues in civil, environmental and architectural engineering;
12. Use modern construction engineering tools, skills; and
13. Explain basic concepts in management, business, public policy and leadership.

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
CIVE 260	Engineering Mechanics-Statics		3
CO 150	College Composition (GT-CO2)	1A	3
CON 101	Introduction to Construction Management		3
CONE 103	Virtual Design and Construction I		3
CONE 192	Seminar in Construction Engineering		1
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
Total Credits			31

Sophomore

CIVE 261	Engineering Mechanics-Dynamics		3
CIVE 303	Infrastructure and Transportation Systems		3
CIVE 360	Mechanics of Solids		3
CIVE 367	Structural Analysis		3
CONE 201	Construction Systems and Decision Analysis		3
CONE 203	Virtual Design and Construction II		3
GEOL 150	Dynamic Earth (GT-SC2)	3A	4

2 Major in Construction Engineering

MATH 261	Calculus for Physical Scientists III		4
MECH 237	Introduction to Thermal Sciences		3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		1C	3

Total Credits **35**

Junior

CIVE 300	Fluid Mechanics		3
CIVE 302	Evaluation of Civil Engineering Materials		3
CIVE 355	Geotechnical Engineering		3
CIVE 356	Geotechnical Engineering Laboratory		1
CONE 301	Engineering Contracts		1
CONE 302	Preconstruction and Project Control Systems		5
CONE 401	Construction Safety Engineering		3
CONE 404	Production Planning of Construction Operation		3
CONE 487	Construction Engineering Internship		1
MATH 340	Intro to Ordinary Differential Equations		4
Design Focus Area Electives (select one Focus Area):			6

Heavy Civil/Infrastructure:

- CIVE 467 Design of Reinforced Concrete Structures
- And select one course from the following:
- CIVE 401 Hydraulic Engineering
- CIVE 423 Groundwater Engineering
- CIVE 455 Applications in Geotechnical Engineering
- CIVE 466 Design and Behavior of Steel Structures

Structures/Buildings:

- CIVE 466 Design and Behavior of Steel Structures
- CIVE 467 Design of Reinforced Concrete Structures

Water/Environmental Facilities:

- CIVE 401 Hydraulic Engineering
- CONE 410 Environmental Systems in Construction

Total Credits **33**

Senior

CIVE 322	Basic Hydrology		3
CONE 402	Senior Project Design I	4A,4B	3
CONE 403	Senior Project Design II	4A,4C	3
Design Focus Area Electives (select the same Focus Area as Junior year above):			3

Heavy/Civil Infrastructure - select one course from the following not previously taken:

- CIVE 401 Hydraulic Engineering
- CIVE 423 Groundwater Engineering
- CIVE 455 Applications in Geotechnical Engineering
- CIVE 466 Design and Behavior of Steel Structures

Structures/Buildings - select one course from the following:

- CIVE 455 Applications in Geotechnical Engineering
- CONE 405 Virtual Design and Construction III

Water/Environmental Facilities - select one course from the following:

- CIVE 330 Ecological Engineering
- CIVE 405 Sustainable Civil/Environmental Engineering
- CIVE 423 Groundwater Engineering

CIVE 437	Wastewater Treatment Facility Design		
CIVE 440	Nonpoint Source Pollution		
CIVE 441	Water Quality Analysis and Treatment		
CIVE 458	Environmental Geotechnics		
Technical Electives (see list below)			
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
Total Credits			27
Program Total Credits:			126

Technical Electives

Code	Title	Credits		
BC 351	Principles of Biochemistry	4	CIVE 533/BIOM 533	Biomolecular Tools for Engineers 3
CHEM 245	Fundamentals of Organic Chemistry	4	CIVE 538	Aqueous Chemistry 3
CHEM 341	Modern Organic Chemistry I	3	CIVE 540/CBE 540	Advanced Biological Wastewater Processing 3
CIVE 305	Intermediate AutoCAD	3	CIVE 541	Physical Chemical Water Treatment Processes 3
CIVE 330	Ecological Engineering	3	CIVE 542	Water Quality Modeling 3
CIVE 405	Sustainable Civil/Environmental Engineering	3	CIVE 544	Water Resources Planning and Management 3
CIVE 413	Environmental River Mechanics	3	CIVE 547/STAT 547	Statistics for Environmental Monitoring 3
CIVE 423	Groundwater Engineering	3	CIVE 549	Drainage and Wetland Engineering 3
CIVE 437	Wastewater Treatment Facility Design	3	CIVE 550	Foundation and Retaining Wall Engineering 3
CIVE 439	Applications of Environmental Engr Concepts	3	CIVE 555	Mining Geotechnics 3
CIVE 440	Nonpoint Source Pollution	3	CIVE 556	Slope Stability, Seepage, and Earth Dams 3
CIVE 442	Air Quality Engineering	3	CIVE 558	Containment Systems for Waste Disposal 3
CIVE 455	Applications in Geotechnical Engineering	3	CIVE 559	Special Topics in Geotechnical Engineering 3
CIVE 458	Environmental Geotechnics	3	CIVE 560	Advanced Mechanics of Materials 3
CIVE 502	Fluid Mechanics	3	CIVE 561	Advanced Steel Behavior and Design 3
CIVE 505	Structural Inspection, Management and Repair	3	CIVE 562	Fundamentals of Vibrations 3
CIVE 507	Transportation Engineering	3	CIVE 565	Finite Element Method 3
CIVE 508	Bridge Engineering	3	CIVE 566	Intermediate Structural Analysis 3
CIVE 510	Applied Hydraulic System Design	3	CIVE 567	Advanced Concrete Design 3
CIVE 511	Coastal Engineering	3	CIVE 568	Design of Masonry and Wood Structures 3
CIVE 512	Irrigation Systems Design	3	CIVE 571	Pipeline Engineering and Hydraulics 3
CIVE 513	Morphodynamic Modeling	3	CIVE 572	Analysis of Urban Water Systems 3
CIVE 514	Hydraulic Structures/Systems	3	CIVE 573	Urban Stormwater Management 3
CIVE 519	Irrigation Water Management	3	CIVE 574	Civil Engineering Project Management 3
CIVE 520	Physical Hydrology	3	CIVE 575	Sustainable Water and Waste Management 3
CIVE 521	Hydrometry	3	CIVE 576	Engineering Applications of GIS and GPS 3
CIVE 524/WR 524	Modeling Watershed Hydrology	3	CIVE 578	Infrastructure and Utility Management 3
CIVE 525	Water Engineering International Development	3	CON 370	Asphalt Pavement Materials and Construction 3
CIVE 529	Environmental Organic Chemistry	3	ENGR 550/MATH 550	Numerical Methods in Science and Engineering 3
CIVE 530	Environ Engr at the Water-Energy-Health Nexus	3	ERHS 446	Environmental Toxicology 3
CIVE 531	Groundwater Hydrology	3	FIN 305	Fundamentals of Finance 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
MGT 305	Fundamentals of Management	3
MIP 300	General Microbiology	3
MKT 305	Fundamentals of Marketing	3
NR 319	Introduction to Geospatial Science	4

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
CON 101	Introduction to Construction Management	X			3
CONE 192	Seminar in Construction Engineering	X			1
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	X		3A	5
Total Credits					16

Semester 2		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
CIVE 260	Engineering Mechanics-Statics	X			3
CONE 103	Virtual Design and Construction I	X			3
MATH 161	Calculus for Physical Scientists II (GT-MA1)	X		1B	4
Total Credits					15

Sophomore

Semester 3		Critical	Recommended	AUCC	Credits
CIVE 360	Mechanics of Solids	X			3
CONE 201	Construction Systems and Decision Analysis	X			3
GEOL 150	Dynamic Earth (GT-SC2)	X		3A	4
MATH 261	Calculus for Physical Scientists III	X			4
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)				1C	3
Total Credits					17

Semester 4		Critical	Recommended	AUCC	Credits
CIVE 261	Engineering Mechanics-Dynamics	X			3
CIVE 303	Infrastructure and Transportation Systems	X			3
CIVE 367	Structural Analysis	X			3
CONE 203	Virtual Design and Construction II				3
MECH 237	Introduction to Thermal Sciences	X			3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)				X	3B
Total Credits					18

Junior

Semester 5		Critical	Recommended	AUCC	Credits
CIVE 300	Fluid Mechanics	X			3
CIVE 302	Evaluation of Civil Engineering Materials	X			3
CONE 301	Engineering Contracts	X			1
CONE 401	Construction Safety Engineering	X			3
MATH 340	Intro to Ordinary Differential Equations	X			4
Design Focus Area Elective (see list on Program Requirements tab)				X	3
Total Credits					17

Semester 6		Critical	Recommended	AUCC	Credits
CIVE 355	Geotechnical Engineering	X			3
CIVE 356	Geotechnical Engineering Laboratory	X			1
CONE 302	Preconstruction and Project Control Systems	X			5
CONE 404	Production Planning of Construction Operation	X			3
CONE 487	Construction Engineering Internship	X			1
Design Focus Area Elective (see list on Program Requirements tab)		X			3
Total Credits					16

Senior					
Semester 7		Critical	Recommended	AUCC	Credits
CIVE 322	Basic Hydrology	X			3
CONE 402	Senior Project Design I	X		4A,4B	3
Technical Electives (see list on Program Requirements tab)					3
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)				3C	3
Total Credits					15

Semester 8		Critical	Recommended	AUCC	Credits
CONE 403	Senior Project Design II	X		4A,4C	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			X	3D	3
Design Focus Area Elective (see list on Program Requirements tab)		X			3
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.		X			
Total Credits					12
Program Total Credits:					126