MAJOR IN ENVIRONMENTAL ENGINEERING

Environmental engineers design solutions to prevent future environmental damage as well as reduce and resolve existing pollution problems. The undergraduate curriculum in Environmental Engineering is based on a strong foundation in physical, chemical, and biological sciences, mathematics, and engineering fundamentals. 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. Upper-division courses address engineering applications for prevention and control of air, water, and land pollution. Required courses that are specific to the Environmental Engineering major come from several engineering and science disciplines, including organic and environmental chemistry, microbiology, hydrology, statistics, environmental toxicology, and water treatment. Technical electives provide specialization in a particular area of interest. The program culminates in a year-long, term-based, senior capstone design experience. Graduates who pursue advanced studies are prepared for higher-level technical responsibilities.

Participation in student professional societies, other campus organizations, internships, and volunteer activities is highly recommended to foster personal growth and professional development. The Fundamentals of Engineering (FE) exam is the first step toward registration as a licensed Professional Engineer (PE), an important professional credential for environmental engineers. Therefore, students are encouraged to take the FE exam prior to graduation. The educational outcomes and objectives for the Environmental Engineering program, along with additional information on this major, are given at Department of Civil and Environmental Engineering website (https://www.engr.colostate.edu/ce/department/accreditation/). The Environmental 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 environmental 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 Environmental Engineering from CSU are well prepared to solve some of the world's most challenging environmental problems, such as providing sustainable sources of high-quality water and air for the world's expanding population. Students also will be equipped to address growing detrimental impacts resulting from climate change, such as flooding, drought, and famine. The need to solve these challenging problems will contribute to the increased demand for the services of environmental engineers, both in the U.S. and abroad. Environmental engineers typically are employed in designing pollution prevention equipment and systems, designing environmental monitoring systems, implementing both government and industry environmental regulations, designing water and wastewater treatment systems, reclaiming degraded land, remediating existing air, water, and soil pollution, and restoring ecosystem health.

Graduates of the Environmental Engineering degree program from CSU are qualified for entry-level positions with regulatory agencies, engineering consulting firms, and environmental divisions of large corporations, particularly in the energy and manufacturing industries. Some example job titles for graduates include, but are not limited to, hydraulic engineer, water resources engineer, environmental engineer, geoenvironmental engineer, reclamation engineer, stormwater engineer, floodplain manager, groundwater engineer, hydrologist, urban/regional planner, water infrastructure engineer or manager, contract administrator, facilities engineer or manager, irrigation engineer, ecological engineer, and educator. Graduate study in a specific area of interest is highly recommended to enhance the ability to undertake more advanced technical responsibilities upon graduation.

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
CHEM 114	General Chemistry Lab II		1
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
Select four credits from the following course or course pair:			4
Group A:			
BZ 110	Principles of Animal Biology (GT-SC2)	3A	
BZ 111	Animal Biology Laboratory (GT-SC1)	3A	
Group B:			
BZ 120	Principles of Plant Biology (GT-SC1)	3A	
Group C:			
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	
	Total Credits		**34**
Junior			
CHEM 245	Fundamentals of Organic Chemistry		4
CIVE 300	Fluid Mechanics		3
CIVE 301	Fluid Mechanics Laboratory		1
CIVE 322	Basic Hydrology		3
CIVE 339	Environmental Engineering Concepts		3
CIVE 355	Geotechnical Engineering		3
CIVE 356	Geotechnical Engineering Laboratory		1
CIVE 442	Air Quality Engineering		3
MIP 300	General Microbiology		3
Select one course from the following:			3
AREC 202	Agricultural and Resource Economics (GT-SS1)	3C	
ECON 202	Principles of Microeconomics (GT-SS1)	3C	
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
	Total Credits		**33**
Senior			
CIVE 401	Hydraulic Engineering		3
CIVE 402	Senior Design Principles	4A,4B	3
CIVE 403	Senior Project Design	4C	3
CIVE 439	Applications of Environmental Engr Concepts		3
CIVE 441	Water Quality Analysis and Treatment		3
ERHS 446	Environmental Toxicology		3
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
Engineering Technical Electives (see list below)		6
Additional Technical Electives (see list below)		3
Total Credits		**33**
Program Total Credits:		**130**

Engineering Technical Electives – Select a minimum of 6 credits

Code	Title	Credits
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 437	Wastewater Treatment Facility Design	3
CIVE 440	Nonpoint Source Pollution	3
CIVE 455	Applications in Geotechnical Engineering	3
CIVE 458	Environmental Geotechnics	3
CIVE 502	Fluid Mechanics	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 527	Tools for Food-Energy-Water Systems Analysis	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 558	Containment Systems for Waste Disposal	3
CIVE 572	Analysis of Urban Water Systems	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
ENGR 502	Engineering Project and Program Management	3
ENGR 550/ MATH 550	Numerical Methods in Science and Engineering	3
SYSE 501	Foundations of Systems Engineering	3

Additional Technical Electives – Select a minimum of 3 credits

Code	Title	Credits
AREC 340/ECON 340	Introduction-Economics of Natural Resources	3
AREC 342	Water Law, Policy, and Institutions	3
AREC 444/ECON 444	Economics of Energy Resources	3
ATS 555	Air Pollution	3
ATS 560	Air Pollution Measurement	2
BZ 471	Stream Biology and Ecology	3
BZ 472	Stream Biology and Ecology Laboratory	1
ERHS 320	Environmental Health--Water Quality	3
ERHS 448	Environmental Contaminants	3
ESS 474	Limnology	3
ESS 524	Foundations for Carbon/Greenhouse Gas Mgmt	3
JTC 461	Writing About Science, Health and Environment	3
LIFE 320	Ecology	3
MGT 305	Fundamentals of Management	3
NR 319	Introduction to Geospatial Science	4
NR 323/GR 323	Remote Sensing and Image Interpretation	3
PSY 517/IE 517	Perspectives in Global Health	3
RS 478	Ecological Restoration	3
SOCR 455	Microbiomes of Soil Systems	3
SOCR 467	Soil and Environmental Chemistry	3
SOCR 470	Soil Physics	3

Major Completion Map

Distinctive Requirements for Degree Program:

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, Environmental Engineering majors must achieve a minimum 2.000 grade point average at CSU in all courses in engineering,

mathematics, computer science, statistics, physics, and chemistry as well as courses taken as technical electives.

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)			X	3B	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
CHEM 114	General Chemistry Lab II	X			1
CIVE 202	Numerical Modeling and Optimization	X			3
CIVE 260	Engineering Mechanics-Statics	X			3
MATH 261	Calculus for Physical Scientists III	X			4
Select four credits from the following course or course pair:					4
Group A:					
BZ 110	Principles of Animal Biology (GT-SC2)			3A	
BZ 111	Animal Biology Laboratory (GT-SC1)			3A	
Group B:					
BZ 120	Principles of Plant Biology (GT-SC1)			3A	
Group C:					
LIFE 102	Attributes of Living Systems (GT-SC1)		X	3A	
	Total Credits				**18**
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
MECH 237	Introduction to Thermal Sciences	X			3
	Total Credits				**16**

Junior

Semester 5		**Critical**	**Recommended**	**AUCC**	**Credits**
CHEM 245	Fundamentals of Organic Chemistry		X		4
CIVE 300	Fluid Mechanics	X			3
CIVE 301	Fluid Mechanics Laboratory		X		1
CIVE 355	Geotechnical Engineering	X			3
CIVE 356	Geotechnical Engineering Laboratory		X		1
Select one course from the following:					3
AREC 202	Agricultural and Resource Economics (GT-SS1)			3C	
ECON 202	Principles of Microeconomics (GT-SS1)			3C	
	Total Credits				**15**

Semester 6		Critical	Recommended	AUCC	Credits
CIVE 322	Basic Hydrology		X		3
CIVE 339	Environmental Engineering Concepts	X			3
CIVE 442	Air Quality Engineering	X			3
MIP 300	General Microbiology		X		3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			X	3D	3
	Total Credits				**18**

Senior

Semester 7		Critical	Recommended	AUCC	Credits
CIVE 401	Hydraulic Engineering		X		3
CIVE 402	Senior Design Principles	X		4A,4B	3
CIVE 439	Applications of Environmental Engr Concepts	X			3
ERHS 446	Environmental Toxicology	X			3
Engineering Technical Elective (See List on Requirements tab)		X			3
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 441	Water Quality Analysis and Treatment	X			3
Additional Technical Elective (See List on Requirements Tab)		X			3
Engineering Technical Elective (See List on Requirements tab)		X			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:				**130**