PH.D. IN CIVIL AND ENVIRONMENTAL ENGINEERING

The Ph.D. in Civil and Environmental Engineering allows integration of advanced study and research within a variety of subdisciplines, including agricultural water management, construction engineering and management, environmental engineering, geoengineering, hydraulic engineering and environmental fluid mechanics, hydrologic science and engineering, structural engineering and mechanics, water and international development, and water resources planning and management.

The Ph.D. degree requires 72 graduate course credit hours for students without an applicable master's degree and 42 graduate course credit hours for students with an applicable master's degree.

Students interested in graduate work should refer to the Graduate and Professional Bulletin (http://catalog.colostate.edu/general-catalog/graduate-bulletin/).

Learning Objectives

Upon successful completion, students will be able to:

1. Use concepts and frameworks to effectively design, analyze, and implement creative solutions to fundamental and applied research problems using relevant tools and techniques in their chosen focus area within civil and environmental engineering.
2. Evaluate the effectiveness of designed experiments and implications of resulting data.
3. Apply in-depth knowledge and creativity to advance solutions in their chosen focus area within civil and environmental engineering.
4. Demonstrate effective oral and written communication to convey technical concepts to both technical and non-technical stakeholders.
5. Produce significant technical and scholarly contributions to advance the civil and environmental engineering profession in their chosen focus area while demonstrating professional and responsible behavior to society.

Requirements Effective Spring 2025

The Ph.D. requires 72 graduate course credit hours for students without an applicable master's degree and 42 graduate course credit hours for students with an applicable master's degree. Every focus area has different recommended courses.

Courses selected for the Ph.D. are intended to support research and provide depth of study in a particular area of interest. Selection of courses must be approved by faculty advisor who is supervising the dissertation to ensure courses taken complement the dissertation. Some areas of focus have 2-4 required courses. Please reference your area of focus for any required courses. Background courses may be required depending on prior degree. Background courses do not count towards your graduate degree requirements.

Code	Title	Credits
Select at at least 0-18 credit hours in regular graduate-level Civil and Environmental Engineering courses [1,2]		0-18
CIVE 502	Fluid Mechanics	
CIVE 505	Structural Inspection, Management and Repair	
CIVE 506	Wind Effects on Structures	
CIVE 507	Transportation Engineering	
CIVE 508	Bridge Engineering	
CIVE 510	Applied Hydraulic System Design	
CIVE 511	Coastal Engineering	
CIVE 512	Irrigation Systems Design	
CIVE 513	Morphodynamic Modeling	
CIVE 514	Hydraulic Structures/Systems	
CIVE 515	River Mechanics	
CIVE 518	Sprinkler and Trickle Irrigation Systems	
CIVE 519	Irrigation Water Management	
CIVE 520	Physical Hydrology	
CIVE 521	Hydrometry	
CIVE 524/WR 524	Modeling Watershed Hydrology	
CIVE 525	Water Engineering International Development	
CIVE 526	Pollution, Exposure, and the Environment	
CIVE 527	Tools for Food-Energy-Water Systems Analysis	
CIVE 528/GES 528	Assessing the Food, Energy, Water Nexus	
CIVE 529	Environmental Organic Chemistry	
CIVE 530	Environ Engr at the Water-Energy-Health Nexus	
CIVE 531	Groundwater Hydrology	
CIVE 532	Wells and Pumps	
CIVE 533/ BIOM 533	Biomolecular Tools for Engineers	
CIVE 534	Applied and Environmental Molecular Biology	
CIVE 537	Residuals Management	
CIVE 538	Aqueous Chemistry	
CIVE 539	Water and Wastewater Analysis	
CIVE 540/CBE 540	Advanced Biological Wastewater Processing	
CIVE 541	Physical Chemical Water Treatment Processes	
CIVE 542	Water Quality Modeling	
CIVE 543	Instrumental Environmental Analysis	
CIVE 544	Water Resources Planning and Management	
CIVE 546	Water Resource Systems Analysis	
CIVE 547/ STAT 547	Statistics for Environmental Monitoring	
CIVE 549	Drainage and Wetland Engineering	
CIVE 550	Applications in Geotechnical Engineering	
CIVE 551	The Material Point Method	
CIVE 555	Mining Geotechnics	
CIVE 556	Slope Stability, Seepage, and Earth Dams	

CIVE 558	Containment Systems for Waste Disposal
CIVE 559	Special Topics in Geotechnical Engineering
CIVE 560	Advanced Mechanics of Materials
CIVE 561	Advanced Steel Behavior and Design
CIVE 562	Fundamentals of Vibrations
CIVE 564	Principles of Structural Load Modeling
CIVE 565	Finite Element Method
CIVE 566	Intermediate Structural Analysis
CIVE 567	Advanced Concrete Design
CIVE 568	Design of Masonry and Wood Structures
CIVE 571	Pipeline Engineering and Hydraulics
CIVE 572	Analysis of Urban Water Systems
CIVE 573	Urban Stormwater Management
CIVE 574	Civil Engineering Project Management
CIVE 575	Sustainable Water and Waste Management
CIVE 576	Engineering Applications of GIS and GPS
CIVE 577	GIS in Civil and Environmental Engineering
CIVE 578	Infrastructure and Utility Management
CIVE 604	Fluid Turbulence and Modeling
CIVE 607	Computational Fluid Dynamics
CIVE 610	Special Topics in Hydraulics
CIVE 612	Open Channel Flow
CIVE 613	River Restoration Design
CIVE 622	Risk Analysis of Water/Environmental Systems
CIVE 625	Quantitative Eco-Hydrology
CIVE 626	Integrated Analysis of Coupled Water Issues
CIVE 631	Computational Methods in Subsurface Systems
CIVE 638	Groundwater Quality and Contaminant Transport
CIVE 645	Computer-Aided Water Management and Control
CIVE 655	Advanced Soil Mechanics
CIVE 657	Oral Communication in Geo-Engineering
CIVE 658	Remediation Systems - Subsurface Contamination
CIVE 659	Advanced Topics in Geoengineering
CIVE 661	Stochastic Methods in Structural Dynamics
CIVE 662	Foundations of Solid Mechanics
CIVE 663	Structural Stability
CIVE 664	Mechanics of Fatigue and Fracture
CIVE 665	Wind Engineering
CIVE 667	Advanced Structural Analysis
CIVE 668	Structural Reliability--Theory, Application
CIVE 703	Special Topics in Fluid Mechanics
CIVE 721	Stochastic Water and Environmental Systems
CIVE 724	River Basin Morphology
CIVE 742	Advanced Topics in Environmental Engineering
CIVE 751	Soil Dynamics
CIVE 766	Theory of Plates and Shells
CIVE 767	Structural Dynamics and Earthquake Engineering
Select 21-36 3XX-7XX credits [3]	21-36
Select 0-9 credits of independent study from the following:	0-9
CIVE 695A	Independent Study: Fluid Mechanics and Wind Engineering
CIVE 695B	Independent Study: Hydraulics
CIVE 695C	Independent Study: Hydrologic Science and Engineering
CIVE 695D	Independent Study: Mechanics
CIVE 695E	Independent Study: Geotechnical Engineering
CIVE 695F	Independent Study: Structures
CIVE 695G	Independent Study: Environmental Engineering
CIVE 695H	Independent Study: Water Resource Planning and Management
CIVE 695J	Independent Study: Bioresource and Agricultural Engineering
CIVE 695K	Independent Study: Water and International Development
CIVE 695L	Independent Study: Construction Engineering and Management
Select 12-24 credits of dissertation from the following:	12-24
CIVE 799A	Dissertation: Fluid Mechanics and Wind Engineering
CIVE 799B	Dissertation: Hydraulics
CIVE 799C	Dissertation: Hydrologic Science and Engineering
CIVE 799D	Dissertation: Mechanics
CIVE 799E	Dissertation: Geotechnical Engineering
CIVE 799F	Dissertation: Structures
CIVE 799G	Dissertation: Environmental Engineering
CIVE 799H	Dissertation: Water Resource Planning and Management
CIVE 799J	Dissertation: Bioresource and Agricultural Engineering
CIVE 799K	Dissertation: Water and International Development
CIVE 799L	Dissertation: Construction Engineering and Management
Master Degree Credit [4]	0-30
Program Total Credits:	**72**

A minimum of 72 credits are required to complete this program.

1. Regular graduate-level Civil and Environmental Engineering courses include courses with a CIVE prefix that are numbered 5XX, 6XX, or 7XX and with the last two digits ranging from 00 through 82 (e.g., CIVE 655).
2. At least 18 credit hours must be in regular graduate-level CIVE courses beyond the bachelor's degree.
3. Common course prefixes include CIVE, AREC, BZ, CBE, CHEM, CON, CS, DSCI, ECOL, ECE, ERHS, ESS, GEO, GRAD, MATH, MECH, MIP, NR, PBHL, SOCR, STAA, STAT, SYSE, WR.
4. A maximum of 30 credits may be accepted from a prior master's degree.

[5] The department requires a qualifying exam in addition to the University prelim requirement and at least one publication must be submitted to a journal before defending.

Requirements for All Graduate Degrees

For more information, please visit Requirements for All Graduate Degrees (http://catalog.colostate.edu/general-catalog/graduate-bulletin/graduate-study/procedures-requirements-all-degrees/) in the Graduate and Professional Bulletin (http://catalog.colostate.edu/general-catalog/graduate-bulletin/).

Summary of Procedures for the Master's and Doctoral Degrees

NOTE: Each semester the Graduate School publishes a schedule of deadlines. Deadlines are available on the Graduate School website (https://graduateschool.colostate.edu/deadline-dates/). Students should consult this schedule whenever they approach important steps in their careers.

Forms (https://graduateschool.colostate.edu/forms/) are available online.

Step	Due Date
1. Application for admission (online)	Six months before first registration
2. Diagnostic examination when required	Before first registration
3. Appointment of advisor	Before first registration
4. Selection of graduate committee	Before the time of fourth regular semester registration
5. Filing of program of study (GS Form 6)	Before the time of fourth regular semester registration
6. Preliminary examination (Ph.D. and PD)	Two terms prior to final examination
7. Report of preliminary examination (GS Form 16) - (Ph.D. and PD)	Within two working days after results are known
8. Changes in committee (GS Form 9A)	When change is made
9. Application for Graduation (GS Form 25)	Refer to published deadlines from the Graduate School Website
9a. Reapplication for Graduation (online)	Failure to graduate requires Reapplication for Graduation (online) for the next time term for which you are applying
10. Submit thesis or dissertation to committee	At least two weeks prior to the examination or at the discretion of the graduate committee
11. Final examination	Refer to published deadlines from the Graduate School Website
12. Report of final examination (GS Form 24)	Within two working days after results are known; refer to published deadlines from the Graduate School website
13. Submit a signed Thesis/Dissertation Submission Form (GS Form 30) to the Graduate School and Submit the Survey of Earned Doctorates (Ph.D. only) prior to submitting the electronic thesis/dissertation	Refer to published deadlines from the Graduate School website.
14. Submit the thesis/dissertation electronically	Refer to published deadlines from the Graduate School website
15. Graduation	Ceremony information is available from the Graduate School website