

# PH.D. IN CIVIL AND ENVIRONMENTAL ENGINEERING

## 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 <sup>1,2</sup>		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 <sup>3</sup>		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 <sup>4</sup>		0-30
<b>Program Total Credits:</b>		<b>72</b>

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

<sup>1</sup> 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).

<sup>2</sup> At least 18 credit hours must be in regular graduate-level CIVE courses beyond the bachelor's degree.

<sup>3</sup> 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.

<sup>4</sup> A maximum of 30 credits may be accepted from a prior master's degree.

<sup>5</sup> 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.