

# MASTER OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING, PLAN A

The Master of Science (M.S) is viewed by some employers as the entry-level degree in civil and environmental engineering. The M.S. allows integration of advanced study and research within a variety of subdiscipline areas, including agricultural water management, environmental engineering, 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 M.S. degree, Plan A, is completed with a thesis requiring 30 graduate course credit hours.

Students interested in graduate work should refer to the Graduate and Professional Bulletin (<https://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 engineering and practical problems using relevant tools and techniques in their chosen focus area within civil and environmental engineering.
2. Apply in-depth knowledge and creativity to advance solutions in their chosen focus area within civil and environmental engineering.
3. Achieve a level of understanding that will allow them to contribute to the advancement of the civil and environmental engineering profession in their chosen focus area while demonstrating professional behavior and ethics.
4. Demonstrate effective oral and written communication skills to convey technical concepts to both technical and non-technical stakeholders.
5. Apply technical and research competencies to successfully undertake further advanced study at the doctoral level in civil and environmental engineering or a related area.

## Requirements Effective Spring 2025

Courses selected for the M.S. Plan A (thesis) option are intended to provide depth of study in a particular area of interest. Selection of courses must be approved by faculty advisor who is supervising the thesis to ensure courses taken complement the thesis. 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 least 12 credit hours in regular graduate-level Civil and Environmental Engineering courses from the following: <sup>1</sup>		
CIVE 502	Fluid Mechanics	12
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 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 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 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 9 -15 3XX-7XX credits<sup>2</sup> 9-15

Select 0-3 credits of independent study from the following: 0-3

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 3-6 credits of thesis from the following: 3-6	
CIVE 699A	Thesis: Fluid Mechanics and Wind Engineering
CIVE 699B	Thesis: Hydraulics
CIVE 699C	Thesis: Hydrologic Science and Engineering
CIVE 699D	Thesis: Mechanics
CIVE 699E	Thesis: Geotechnical Engineering
CIVE 699F	Thesis: Structures
CIVE 699G	Thesis: Environmental Engineering
CIVE 699H	Thesis: Water Resource Planning and Management
CIVE 699J	Thesis: Bioresource and Agricultural Engineering
CIVE 699K	Thesis: Water and International Development

**Program Total Credits: 30**

A minimum of 30 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> 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.

## Requirements for All Graduate Degrees

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