CIVIL ENGINEERING, MS

More Information: https://engineering.case.edu/civil-and-environmental-engineering
Degree: Master of Science (MS)
Field of Study: Civil Engineering

Program Overview

The Civil Engineering MS degree program offers concentrations in Structural Engineering, Geotechnical Engineering, Environmental Engineering, and Engineering Mechanics to prepare students for careers in industry, professional practice, research, and teaching. Experience has shown that job opportunities are excellent for students who receive Master of Science degrees in Civil Engineering from Case Western Reserve University. Recent Master of Science degree recipients have found positions in universities, consulting firms, construction management companies, state and federal agencies, aerospace firms, and the energy industry.

Each student's program of coursework and research is tailored to their interests in close consultation with a faculty advisor. For students working toward the Civil Engineering MS degree, study plans include a thesis-focused, project-focused, or course-focused approach followed by a culminating experience.

All students pursuing graduate studies in the Department of Civil and Environmental Engineering must abide by the academic regulations of the School of Graduate Studies and the Case School of Engineering and with approval of the student's faculty advisor in the Department of Civil and Environmental Engineering.

Admission

Graduate students shall be admitted to one of three MS degree tracks (thesis-focused, project-focused, or course-focused) upon recommendation of the faculty of the department. Requirements for admission include a strong record of scholarship in a completed bachelor's degree program in the field of Civil Engineering or in a related field and fluency in written and spoken English.

Students with a degree other than Civil Engineering will be evaluated for admittance on a case by case basis by the department; and depending on their preparation considered for provisional admittance. A provisional graduate student is expected to complete appropriate course work and to meet the performance standards of the School of Graduate Studies within the first academic year of study.

For a thesis-focused or project-focused track, the University requires all foreign applicants to show English proficiency by achieving a TOEFL score of at least 90 on the internet-based exam. For a course-focused track, a minimum TOEFL score of 80 is required. If there is any professional role that involves student-to-student interaction, e.g. as a teaching assistant, a lab instructor, or a tutor, then a minimum TOEFL score of 90 or other equivalent forms of English proficiency assessment is required.

It is encouraged that all students submit original copies of GRE scores, with the exception of CWRU students applying to the BS/MS program.

Advising

Upon admission to the graduate program, each graduate student is assigned an academic advisor to assist in registration as well as planning a program of study (Academic Program). The academic advisor is a faculty member who holds a primary or secondary appointment in the ECIV department and is willing to serve as the student's advisor. Each student, in consultation with their advisor, must submit an Academic Program preferably before completing 9 credit hours of coursework. This should specify all courses and thesis work that will be counted toward the 30 credit hour requirement.

Students may change advisors for a variety of reasons (e.g., a change of the student's field of interest). It should be noted that a change in advisor could result in delaying graduation. It is the responsibility of the student to inform the ECIV department chairperson in the event of a change in advisor. In addition, the student must file all appropriate forms with Graduate Studies.

Graduate Policies

For graduate policies and procedures, please review the School of Graduate Studies section of the General Bulletin.

Program Requirements

Graduate students shall be admitted to one of three MS degree tracks (thesis-focused, project-focused, course-focused) upon recommendation of the faculty of the Department of Civil and Environmental Engineering.

Thesis-Focused Track

For a thesis-focused Civil & Environmental MS, students must complete a minimum of 30 credit hours of graduate-level credits, including:

a. Completion of 18-21 credit hours of approved graduate coursework at the 400-level or higher.
b. Completion of 9-12 credit hours of MS thesis research, **ECIV 651** , culminating in a written thesis and oral examination of the master's thesis to a committee. The committee shall consist of the student's thesis advisor and two additional faculty members who hold a primary or secondary appointment in the ECIV department. The candidate's thesis advisor customarily serves as the committee chair.

Project-Focused Track

For a project-focused Civil & Environmental Engineering MS, students must complete a minimum of 30 credit hours of graduate-level credits, including:

a. Completion of 21 credit hours of approved graduate coursework at the 400-level or higher.
b. Completion of 3-9 credit hours of MS project research, ECIV 695, culminating in a written report and examination by a committee. The committee shall consist of the student's advisor and two additional faculty members who hold a primary or secondary appointment in the ECIV department.

Course-Focused Track

For a course-focused Civil & Environmental Engineering MS, students must complete a minimum of 30 credit hours of graduate-level credits, including:

a. Completion of 30 credit hours of approved graduate-level coursework at the 400-level or higher.
b. Satisfactory completion of the culminating course-focused experience, i.e., passing the course ENGR 600. This is an oral presentation or written report which may be a standalone experience

or be integrated within coursework requirements for the degree. The culminating experience is evaluated by a faculty member who holds a primary or secondary appointment in the ECIV department, as selected by the ECIV chairperson, and will include a final assessment of whether the student has passed or failed.

Concentration Requirements

The Civil and Environmental Engineering MS degree program offers concentrations in Structural Engineering, Geotechnical Engineering, Environmental Engineering, and Engineering Mechanics. Students will select courses from the list below, in consultation with their advisor. Other technical, math, and science courses outside of ECIV may be acceptable with approval of their advisor.

The choice of concentration courses are in addition to the requirements for ECIV 651 (thesis-focused track), **ECIV 695** (project-focused track), and **ENGR 600** (course-focused track), as explained above. A student's desire to complete 300-level coursework toward degree requirements must be approved by the Graduate Studies petition process.

Structural Concentration

Structural concentration students will pick a minimum of three courses each from Groups 1 and 2.

Code	Title	Credit Hours
Group 1: Choose a minimum of three courses from the following		
ECIV 413	Theory of Elasticity and Plasticity	3
ECIV 415	Fracture Mechanics and Size Effect	3
ECIV 416	Matrix Analysis of Structures	3
ECIV 417	Structural Dynamics	3
ECIV 420	Finite Element Analysis	3
ECIV 426	Probabilistic Analysis	3
ECIV 435	Elasticity and Data-driven Mechanics	3
ECIV 455	Data Analysis for Civil and Environmental Engineering	3
Group 2: Choose a minimum of three courses from the following		
ECIV 418	Bridge Engineering	3
ECIV 419	Damage and Deterioration of Structures	3
ECIV 430	Foundation Engineering	3
ECIV 456	Intelligent Infrastructure Systems	3
ECIV 472	Timber and Masonry Design	3
ECIV 473	Advanced Topics in Reinforced Concrete Design	3
ECIV 474	Advanced Structural Steel Design	3
ECIV 476	Structural Fire Engineering	3

Geotechnical Concentration

Code	Title	Credit Hours
Choose a minimum of four courses from the following:		
ECIV 420	Finite Element Analysis	3
ECIV 430	Foundation Engineering	3
ECIV 426	Probabilistic Analysis	3
ECIV 435	Elasticity and Data-driven Mechanics	3
ECIV 437	Pavement Analysis and Design	3
ECIV 455	Data Analysis for Civil and Environmental Engineering	3
ECIV 456	Intelligent Infrastructure Systems	3
ECIV 462	Solid and Hazardous Waste Management	3
DSCI 432	Spatial Statistics for Near Surface, Surface, and Subsurface Modeling	3

Environmental Concentration

Code	Title	Credit Hours
Choose a minimum of four courses from the following:		
ECIV 426	Probabilistic Analysis	3
ECIV 427	Environmental Organic Chemistry	3
ECIV 450	Environmental Engineering Chemistry	3
ECIV 455	Data Analysis for Civil and Environmental Engineering	3
ECIV 461	Environmental Engineering Biotechnology	3
ECIV 462	Solid and Hazardous Waste Management	3
ECIV 463	Environmental Engineering Green Stormwater Infrastructure	3

Engineering Mechanics Concentration

Code	Title	Credit Hours
Choose a minimum of four courses from the following:		
ECIV 413	Theory of Elasticity and Plasticity	3
ECIV 415	Fracture Mechanics and Size Effect	3
ECIV 416	Matrix Analysis of Structures	3
ECIV 417	Structural Dynamics	3
ECIV 420	Finite Element Analysis	3
ECIV 426	Probabilistic Analysis	3
ECIV 435	Elasticity and Data-driven Mechanics	3
ECIV 455	Data Analysis for Civil and Environmental Engineering	3