# CIVIL ENGINEERING (M.S.)

The civil engineering graduate program at Wayne State University is designed to accommodate the needs of both full-time on-campus students and part-time students concurrently employed by local industry or government. To this end, many of the graduate classes are held in the evening. Full-time students have the opportunity to participate in research and experimental work with the faculty, while pursuing their graduate courses.

## Admission Requirements

Admission to this program is contingent upon admission to the Graduate School (http://bulletins.wayne.edu/graduate/general-information/admission/). Additionally, all applicants must satisfy the following:

1. The student must have earned a Bachelor of Science (or Bachelor of Engineering) degree. The undergraduate degree should be from an Accrediting Board for Engineering and Technology (ABET) institution or from a comparable foreign institution. In the event that the undergraduate degree is from a field other than civil engineering or from a non-ABET accredited institution, the student may be required to complete a set of prerequisite undergraduate courses before graduate degree credit may be accrued
2. The student must have an overall grade point average (g.p.a.) of 3.2 for regular admission. Qualified or probationary admission may be granted to students with a lower g.p.a. Conditions of such admissions are specifically mandated and applicants should contact the Department for details.

## Program Requirements

The Master of Science is offered by this department under the following options:

**Plan A:** Thirty credits including a six-credit thesis.

**Plan C:** Thirty credits of coursework.

For either plan, credits must be distributed as follows: at least twenty-four credits must be taken in Civil Engineering (CE) designated courses. There must be two courses numbered 7000-8999. Students must select a concentration from one of the following areas: construction engineering management, environmental engineering, geotechnical engineering, structural and materials engineering, and transportation engineering.

Students may elect to pursue a dual concentration option. For this option, students must satisfy the concentration requirements for each individual concentration. Courses completed may not be applied to more than one concentration.

Students must maintain a grade of 'B' or better in all core courses. The credit distribution requirements do not include thesis credit for Plan A candidates.

Within the first twelve credits of graduate work, the student should file an advisor-approved Plan of Work. All course work must be completed in accordance with the regulations of the Graduate School (http://bulletins.wayne.edu/graduate/general-information/academic-regulations/) and the College of Engineering (http://bulletins.wayne.edu/graduate/college-engineering/academic-regulations/).

M.S. students may take a maximum of three credits of CE 7990 and a maximum of three credits of CE 7996. Registration in CE 7990 and/or CE 7996 must be approved by a faculty advisor and the graduate program director.

### Construction Engineering Management Concentration Requirements

| Code | Title | Credits |
|---|---|---|
| **Core courses - Choose a minimum of four courses from the following list:** | | **12** |
| CE 6010 | Advanced Construction Engineering and Management | 3 |
| CE 6050 | Construction Cost Estimating | 3 |
| CE 6060 | Construction Techniques and Methods | 3 |
| CE 6880 | Building Information Modeling (BIM) | 3 |
| CE 7020 | Construction Safety | 3 |
| CE 7830 | Construction Planning and Scheduling | 3 |
| CE 7860 | Construction Accounting and Financial Management | 3 |
| **Elective courses** | | **18** |

Elective requirements may be completed via other CE-designated courses. A maximum of 6 credit hours of electives may be completed outside Civil Engineering and must be approved by the faculty advisor and the graduate program director. Students must complete a minimum of 24 CE-designated credits between their core and elective courses.

### Environmental Engineering Concentration Requirements

| Code | Title | Credits |
|---|---|---|
| **Core courses - Choose a minimum of four courses from the following list:** | | **12** |
| CE 5220 | Environmental Chemistry | 3 |
| CE 5240 | Air Pollution Engineering | 3 |
| or CE 7240 | Advanced Air Pollution Engineering | |
| CE 6130 | Open Channel Hydraulics | 3 |
| CE 6150 | Hydrologic Analysis and Design | 3 |
| CE 7270 | Big Data Applications in Environmental Engineering | 3 |
| CE 7280 | Applied Environmental Microbiology | 3 |
| **Elective courses** | | **18** |

Elective requirements may be completed via other CE-designated courses. A maximum of 6 credit hours of electives may be completed outside Civil Engineering and must be approved by the faculty advisor and the graduate program director. Students must complete a minimum of 24 CE-designated credits between their core and elective courses.

### Geotechnical Engineering Concentration Requirements

| Code | Title | Credits |
|---|---|---|
| **Core courses - Complete both courses listed below:** | | **7** |
| CE 5510 | Geotechnical Engineering I | 4 |
| CE 5520 | Geotechnical Engineering II | 3 |
| **Elective courses** | | **23** |

Elective requirements may be completed via other CE-designated courses. A maximum of 6 credit hours of electives may be completed outside Civil Engineering and must be approved by the faculty advisor and the graduate program director. Students must complete a minimum of 24 CE-designated credits between their core and elective courses.

## Structural and Materials Engineering Concentration Requirements

| Code | Title | Credits |
|---|---|---|
| **Core courses - Choose a minimum of five courses from the following list:** | | **15** |
| CE 5370 | Finite Element Analysis Fundamentals | 3 |
| CE 5390 | Design of Prestressed Concrete Structures | 3 |
| or CE 7395 | Advanced Design of Prestressed Concrete Structures | |
| CE 6340 | Bridge Design and Evaluation | 3 |
| CE 6370 | Advanced Reinforced Concrete Design | 3 |
| CE 6410 | Advanced Steel Design | 3 |
| CE 7070 | Risk and Reliability in Civil Engineering | 3 |
| CE 7300 | Advanced Structural Mechanics | 3 |
| CE 7385 | Advanced Topics in Reinforced Concrete Design | 3 |
| CE 7460 | Advanced Composite Materials for Civil Infrastructure | 3 |
| **Elective courses** | | **15** |
| Elective requirements may be completed via other CE-designated courses. A maximum of 6 credit hours of electives may be completed outside Civil Engineering and must be approved by the faculty advisor and the graduate program director. Students must complete a minimum of 24 CE-designated credits between their core and elective courses. | | |

## Transportation Engineering Concentration Requirements

| Code | Title | Credits |
|---|---|---|
| **Core courses - Choose a minimum of four courses from the following list:** | | **12** |
| CE 5370 | Finite Element Analysis Fundamentals | 3 |
| CE 5610 | Advanced Highway Design | 3 |
| CE 5640 | Advanced Transportation Systems Design and Operation | 3 |
| CE 6660 | Pavement Asset Management | 3 |
| CE 7080 | Civil Engineering Research Methods | 3 |
| CE 7630 | Urban Transportation Planning | 3 |
| **Elective courses** | | **18** |

Elective requirements may be completed via other CE-designated courses. A maximum of 6 credit hours of electives may be completed outside Civil Engineering and must be approved by the faculty advisor and the graduate program director. Students must complete a minimum of 24 CE-designated credits between their core and elective courses.