

GUIDELINES
Master of Science in Engineering

Department of Civil and Environmental Engineering
The University of Michigan
(Prior to Fall 2018)

These guidelines have been prepared to assist graduate students in following the proper procedures and satisfying all degree requirements for the MSE Degrees administered by the Department of Civil and Environmental Engineering. Students with questions should seek the assistance of the appropriate program advisor or graduate secretary listed below:

Construction Engineering & Management	C. Menassa
Environmental & Water Resources Engineering	B. Ellis
Geotechnical Engineering	R. Michalowski
Hydraulics	A. Cotel
Infrastructure Systems	J. Scruggs
Materials Engineering	V. Li
Structural Engineering	A. Jeffers
Transportation Systems	N. Masoud
Admissions	A. Speigle

I. Basic Requirements

The basic requirements for the MSE Degree are established by the Horace H. Rackham School of Graduate Studies. For additional information on MSE degree requirements, see the Rackham Graduate School's website for current students at: <https://rackham.umich.edu/current-students/>. The faculty of the Department of Civil and Environmental Engineering has adopted certain additional requirements that are described in these guidelines.

Each MSE student must take personal responsibility for seeing that all requirements are met prior to the deadlines specified by the Graduate School. If special decisions or actions are needed they should be initiated by the student through consultation with the advisor and the chair of the Graduate Committee and must be approved by the Department Chair.

II. Program Information

A. Degrees Offered

Masters of Science in Engineering - MSE programs leading to each of the following degrees are currently administered by the Department of Civil and Environmental Engineering:

1. MSE (Civil Engineering): A study program leading to this degree includes graduate work in one or more of the following specialty areas: construction, environmental, geotechnical, hydraulics and hydrology, infrastructure systems, materials, and structural engineering.
2. MSE (Construction Engineering and Management)
3. MSE (Environmental Engineering)

In addition, the Department offers the Masters of Engineering (Construction Engineering and Management) and (Structural Engineering) as a graduate professional degree in engineering. This is described in a separate document. The purpose of the specialized degrees (items 2 and 3 above) is to permit a higher level of specialization in the area named than required for the general degree listed under item 1.

B. Admission

Admission to the Graduate School is granted to those students who show promise and who provide sufficient evidence that they can meet the scholastic requirements of study at an advanced level.

To be granted regular admission to the program leading to the MSE (Civil Engineering), an applicant would normally hold a degree that represents the equivalent of the BSE in the University's undergraduate Civil and Environmental Engineering program. However, students in other branches of engineering, physical science, or related fields may have achieved the technical background needed to pursue advanced work in a special field of Civil and Environmental Engineering. Regular admission to the MSE (Construction Engineering and Management) program may be granted to graduates in any recognized branch of engineering. Admission to the MSE (Environmental Engineering) program may be granted to graduates in any branch of engineering or science.

Either conditional admission or NCFD (Not Candidate for Degree) admission may be granted to students not meeting the requirement above. Students should consult the Rackham Graduate School's website at: <https://rackham.umich.edu/admissions/non-candidate-for-degree/> for details concerning these types of admission status.

A student may be required to satisfy undergraduate course deficiencies without graduate credit. These conditions are explained below for each of the MSE programs.

1. MSE (Civil Engineering)

A student who does not have an undergraduate degree in Civil and Environmental Engineering and who is admitted to the MSE (Civil Engineering) program is expected to fulfill substantially all the two-year undergraduate core program requirements in the College of Engineering Course Guide and Bulletin at: <https://bulletin.engin.umich.edu/courses/>. In addition, the student is also expected to demonstrate competence by examination or election (without graduate credit) of certain basic undergraduate civil engineering program courses or subjects. The courses will include at least three of the following four:

CEE 312 - Structural Engineering
CEE 345 - Geotechnical Engineering
CEE 351 - Civil Engineering Materials
CEE 421 - Hydrology and Flood Plain Hydraulics

These courses may not be used for credit toward the MSE (Civil Engineering). Additional prerequisites for some of the areas of specialization are also required.

2. MSE (Construction Engineering and Management)

Applicants with undergraduate degrees in fields other than engineering may be granted admission to the MSE (Construction Engineering and Management) program if they have taken a year of calculus and a year of physics and if they have at least a B average in their mathematics and science courses. Before or after admission, these students must complete the following courses, or their equivalent, without credit toward their MSE degree:

CEE 312 - Structural Engineering
CEE 351 - Civil Engineering Materials
CEE 345 - Geotechnical Engineering
CEE 431 - Construction Contracting

Most students who have an undergraduate degree in architecture will have taken the equivalent of CEE 312.

3. MSE (Environmental Engineering)

A student graduating with the MSE (Environmental Engineering) degree is expected to have certain background knowledge. Core requirements for the degree include those normally taken in the University of Michigan BSE program in Civil Engineering with a concentration in Environmental Engineering, namely:

Math	216 - Differential Equations
Chem	210 - Structure and Reactivity
CEE	325 - Fluid Mechanics
CEE	465 - Environmental Process Dynamics and Engineering

It is necessary to satisfy any deficiencies in the core requirements prior to the completion of MSE degree. Not all of these courses may be elected for graduate credit. Refer to the separate guidelines for the Environmental Engineering program for complete details.

C. General Requirements and Policies

1. *Credit Hours and Normal Progress:*

A minimum of 30 credit hours of acceptable graduate work (graduate credit) must be completed for the MSE degrees. Twelve hours of credit per term is the usual full-time graduate load. The usual load for a half term is six hours. It is recommended that a student distribute courses over at least two and one-half terms.

2. *Grades:*

A cumulative grade point average of "B" (3.0) is required for all courses taken for graduate credit at the University of Michigan. A grade below C- will not be counted towards the graduate credit requirement; however, it is considered in the computation of the grade point average. In addition, a cumulative grade point average of "B" is required for all courses taken for graduate credit at the University of Michigan in a student's area(s) of specialization. **Individual concentration areas in the Department may enforce more stringent grading requirements.**

3. *Thesis:*

A thesis is not required.

4. *Language:*

Knowledge of a foreign language is not required.

5. *Comprehensive Examination:*

Normally, a comprehensive examination covering all course work is not required.

6. *Residence Requirements:*

The Graduate School residency requirements are easily satisfied by full-time students. Students pursuing the MSE degree on a part-time basis should become familiar with special requirements. See Rackham Graduate School's website at: <https://rackham.umich.edu/policy/section5/>

7. *Time Limit:*

A student must complete all work within a period of five consecutive years after the first enrollment in the Graduate School.

8. *Transfer Credit:*

Rackham rules permit transfer of up to *half the minimum number of credit hours required for the MSE Degree* from inter-university and intra-university sources combined.

a. **Graduate Credit:**

A maximum of six hours of graduate credit may be transferred from another institution. These must be approved graduate level courses taken in residence with a grade of B or better from an organized graduate school of an accredited institution approved by the Horace H. Rackham School of Graduate Studies. Graduate

extension courses will be considered only from The University of Michigan, Wayne State University, Michigan State University, Western Michigan University, Central Michigan University, Eastern Michigan University, Northern Michigan University and Oakland University. Credit will be transferred only upon written application of the student to the Graduate School through the Department of Civil and Environmental Engineering. The credit will be applied after the student has established an overall graduate grade point average of B or better in resident work. Courses cannot be transferred for credit if already applied toward a degree or if taken more than five years before beginning graduate study at The University of Michigan.

b. Pre-graduate Credit:

Pre-graduate course credit with a B grade or better earned by the student as an undergraduate at The University of Michigan College of Engineering may be included in the student's graduate study program subject to the following regulations: (1) credit was not used to meet the bachelor's degree requirement, either required courses or required credit hours, (2) credit was earned no more than two years before formal admission to the Graduate School and (3) credit was earned in courses approved for graduate credit by the Graduate School. The student may request the transfer of such credits through the Rackham Graduate School's website at: <https://rackham.umich.edu/navigating-your-degree/transfer-of-credit-information>.

9. Employment Load:

A graduate student who is employed in remunerative work is permitted to take course work up to the maximum credit hours per term specified in the following table.

<u>Employment</u>	<u>Maximum Credit Hours</u>
Full-time	<u>Enrolled</u> 6 term hours
Three-fourths	8 term hours
One-half	10 term hours
One-fourth	12 term hours

D. Program of Study

1. Objectives

The goal of master's degrees offered through the Department of Civil and Environmental Engineering is to prepare engineers for advanced practice in their disciplines and for professional interaction with practitioners of related disciplines.

It is believed that these goals can best be met by developing a specific program designed to meet the special needs of each student. The student should study under as many of the faculty in the specialty as possible.

2. Program Content

In all cases the courses used in an MSE program must be approved by the advisor in the student's area of specialization.

3. Distribution (hours)

a. The Civil and Environmental Engineering and other course credit hour requirements in the various degree programs are as follows:

MSE (Civil Engineering):

At least 15 hours in Civil and Environmental Engineering courses. A student should expect to take at least eight hours in the area of specialization but will not be permitted to apply more than 21 hours in one area of specialization toward the graduate requirement.

MSE (Construction Engineering and Management):

At least 18 hours in courses emphasizing construction of which 12 hours must be in Civil and Environmental Engineering courses.

MSE (Environmental Engineering):

Refer to the separate guidelines for the Environmental Engineering degree program for more details on course requirements.

b. **Cognate Courses:** The 30 hours of graduate work must include at least 4 *credit hours* of cognate courses related to the field of specialization, but offered outside the Civil and Environmental Engineering Department, to increase the intellectual breadth of the graduate education. Courses cross-listed with the Civil and Environmental Engineering Department may satisfy the cognate requirement provided that the course is in a subfield different from the student’s own. Cognate courses must be passed with a B- or better. At least one course used to fulfill the cognate requirement must be at minimum 2 *credit hours* and, at most, 1 *credit hour* of a seminar course offered by a different department can be used toward meeting the cognate requirement. See Rackham Graduate School’s policy for more information at: <https://rackham.umich.edu/policy/section5/>

c. **CEE Department Math Requirement:** The student must complete at least one course (minimum of 3 *credit hours*) in mathematics or math intensive studies, probability, statistics, or mathematical programming, beyond the minimum undergraduate requirements of the Civil and Environmental Engineering Department of The University of Michigan. A course used to satisfy this math requirement also can be used toward the 4 *credit hour* cognate requirement provided that it is taken outside the Civil and Environmental Engineering Department or is cross-listed with another department and is outside the student’s subfield of study. Approved courses within the department (listed below) can be used to satisfy the math requirement.

- CEE 501 - Special Topics in CEE – Infrastructure Systems Optimization
- CEE 571 - Linear System Theory
- CEE 572 - Dynamic Infrastructure Systems
- CEE 573 - Data Analysis in CEE

d. A 400 level course that is listed in the Rackham Program of Study website at: <https://rackham.umich.edu/programs-of-study> may be elected for graduate credit when approved by the student's advisor except for those 400 level courses that are required in the current undergraduate program of all Civil and Environmental Engineering students. Of all the 400 level courses elected, no more than a total of 12 hours and no more than 9 hours of 400 level Civil and Environmental Engineering courses will be accepted for graduate credit.

e. No more than six credit hours of directed study, seminar and research will be accepted for graduate credit.