GUIDELINES FOR M.S.E. DEGREE IN CIVIL ENGINEERING
CONCENTRATION IN GEOTECHNICAL ENGINEERING

Introduction
The growth in world population has led to an unprecedented development of civil infrastructure, with Geotechnical Engineering needed for every structure and facility supported by soil or rock. Geotechnical Engineering played a leading role in prominent historical projects such as the Panama Canal, Hoover Dam and Europe’s Chunnel. Geotechnical engineers provide their expertise towards challenging development of underground space, whether related to urban transportation infrastructure or the development of the underground lifeline systems. The Geotechnical Engineering concentration has been designed for students planning to pursue careers focusing on projects related to geotechnical engineering and design, assessment of the safety of geotechnical structures, or on research.

General
An applicant for the M.S.E. degree is expected to have an undergraduate degree in Civil Engineering or similar related preparation. Students with undergraduate degrees from other disciplines will be accepted into the M.S.E. degree program, but they may need to complete prerequisite courses that supplement their undergraduate course work and provide the necessary foundation in mathematics, physics, and engineering fundamentals. Students will be informed of these requirements when they are accepted into the degree program. The prerequisite courses include:

- Calculus and Differential Equations equivalent to UM MATH 216 and its prerequisites
- Solid and Structural Mechanics equivalent to UM CEE 212
- Introductory Geotechnical Engineering equivalent to UM CEE 345

Coursework
A student pursuing a M.S.E. degree in Geotechnical Engineering must complete at least 30 credit hours of acceptable graduate work. This usually corresponds to 10 courses. A thesis is not required. In satisfying the credit hour requirement, the following requirements must be met:

- At least 9 credit hours must correspond to courses within the Geotechnical Engineering concentration area, but no more than 21. Examples of acceptable courses:

  CEE 446 Engineering Geology & Site Characterization
  CEE 535 Excavation and Tunneling
  CEE 540 Advanced Soil Mechanics
  CEE 542 Soil and Site Improvement
  CEE 543 Numerical Modeling in Geotechnical Engineering
  CEE 544 Rock Mechanics
  CEE 545 Foundation Engineering
  CEE 546 Slopes, Dams and Retaining Structures

- At least 15 of the credit hours must be from courses offered by the Department of Civil and Environmental Engineering (CEE) at the University of Michigan; the 15 credit hour requirement includes the courses in Geotechnical Engineering. Examples of acceptable courses are:

  CEE 421 Hydrology and Floodplain Hydraulics
  CEE 428 Groundwater Hydrology
  CEE 504 Engineering Economics and Finance

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1 For additional information on M.S.E. degree requirements, see the Rackham Graduate School’s website for current students at: https://rackham.umich.edu/current-students/ and the CEE Department Guidelines found on the CEE website at: https://cee.engin.umich.edu/academics/graduate/masters/.
CEE 510  Finite Element Methods in Solid and Structural Mechanics
CEE 547  Soils Engineering and Pavement Systems
CEE 573  Data Analysis in CEE
CEE 574  Materials Selection for Sustainable Design
CEE 575  Sensing for Civil Infrastructure Systems

• At least one course (3 credits) must be taken in an area outside of the field of specialization (cognate). Courses cross-listed with CEE 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 (see Rackham’s website at: https://rackham.umich.edu/academic-policies/section5/#5-3 for more information). The cognate course must be chosen from a list of Rackham-approved graduate courses and should be relevant to the student’s program of study. Typical areas from which the cognate can be selected are: mechanical engineering, theoretical mechanics, computer science, earth science, environmental science, electrical engineering.

• 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 Department of Civil and Environmental Engineering of the University of Michigan. A course used to satisfy this math requirement also can be used toward the 3 credit hour cognate requirement provided that it is taken outside the Department of Civil and Environmental Engineering or is cross-listed with another department and is outside the student’s subfield of study. Examples of advanced math courses:
  
  Math 417  Matrix Algebra I  
  Math 451  Advanced Calculus I  
  CEE 553  Infrastructure Systems Optimization  
  CEE 571  Linear System Theory  
  CEE 572  Dynamic Infrastructure Systems  
  CEE 573  Data Analysis in CEE

Grades
The grading system used for graduate studies is based on the following scale:

  A+ = 4.3;  A = 4;  A- = 3.7;  B+ = 3.3;  B = 3.0;  B- = 2.7;  C+ = 2.3;  C = 2;  C- = 1.7

A minimum cumulative graduate grade point average (GPA) of 3 on this 4-point scale is required for all graduate courses taken for credit and applied toward the Master’s Degree.

Diploma
To be considered for a master’s degree diploma, a student must submit a formal application to the Office of Graduate Academic Records of the Graduate School. The deadline for the Graduate School to receive the degree application form is four weeks after the first day of classes in a full term and one week after the first day of classes in a half term. These dates can usually be found on the Rackham Graduate School web site http://www.rackham.umich.edu/.
Checklist

The checklist below can be used to monitor your progress toward your M.S.E. degree.

Student Name:__________________________________________

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*No more than 21 credits can be taken from the Geotechnical concentration area (see page 1)

Advisor Approval: _______________________________ Date: _______________