

MASTER OF ENGINEERING IN STRUCTURAL ENGINEERING

(Effective Fall 2017)

The Master of Engineering (MEng) degree in Structural Engineering is a one-year program that offers students a professional degree oriented toward structural engineering practice. This degree is targeted at students who hold a B.S. degree in civil engineering and plan to enter professional practice after completion of their Master's degree. Students with B.S. degrees from other disciplines will be accepted into the MEng degree program, but may need to complete prerequisite courses that supplement their undergraduate course work and provide the necessary foundation for this program (see App. A). Students will be informed of these requirements when they are accepted into the degree program.

Justification: The challenges posed by the increasing complexity of structural design concepts and the coordination of multidisciplinary efforts in structural design projects have led to an increase in the demand for graduate programs in Structural Engineering with a strong focus on practical applications and design concepts. In its Policy Statement 465, the American Society of Civil Engineers (ASCE) recognizes the need for a Master's degree as a requisite for obtaining a Professional Engineering License. Thus, the MEng (Structural Engineering) degree has been designed for students planning to pursue careers in structural design practice by providing them with a strong background in structural analysis and design concepts, as well as opportunities for interaction with professionals in related disciplines.

Program Description: A minimum of 26 credit hours are required to complete the MEng (Structural Engineering) degree. Students will be counseled to elect courses that expose them to a broad array of structural engineering faculty members so they have an opportunity to gain the maximum benefit from this program and the resources that support it. Features of the MEng (Structural Engineering) are: 1) the requirement to have a minor area of professional emphasis either within or outside the CEE Department, 2) the requirement to attend two seminar classes, each for 1-credit hour, and 3) the ability to complete all of the degree requirements during two regular semesters (Fall and Winter).

a) Major area of professional emphasis: Structural Engineering (≥ 15 hrs.)

Students are expected to complete at least five structural engineering courses (15 hours) primarily at the 500 or 600 level. Courses offered by other departments may be used if approved by the student's academic advisor. Lower level structural engineering courses may be elected (i.e. CEE 412, CEE 413 and CEE 415), but credit for only one of either CEE 413 or 415 will be counted toward the 26-hour requirement for the MEng degree and the 15 hour requirement in structural engineering. The five structural engineering courses must satisfy the following requirements:

- At least two courses shall be advanced analysis courses selected from CEE 510, CEE 511, CEE 512 and CEE 517.
- At least two courses shall be advanced design courses selected from CEE 513, CEE 514, CEE 515 and CEE 516.

b) Minor area of professional emphasis (≥ 6 hrs.)

A sequence of at least two courses shall be selected for the minor area of professional emphasis. The second (or third) course in the minor area must be at the 500 level or higher. Any of the other concentration areas in the CEE Department or a related technical area from outside the CEE Department will be permitted to satisfy this requirement. The MEng student must obtain approval from their faculty advisor before selecting courses for this requirement. Examples of course sequences that would satisfy this requirement are given in Appendix B.

c) Seminar courses

Students need to enroll in a seminar course during each Fall and Winter semester while enrolled in the MEng degree program. At least one seminar course is to be completed in structural engineering. The other seminar course may be selected from either a concentration area in the CEE Department or a technical area outside the department that is related to a student's future employment. Seminar courses are graded as either S (satisfactory) or U (unsatisfactory).

d) General Program Requirements and Policies

Credit hours and normal progress: A minimum of 26 credit hours of acceptable graduate work must be completed for the MEng degree. Twelve regular course credits plus a one credit seminar is the usual full-time course load per semester. It is recommended that students plan to complete all of the courses required for the MEng degree in two regular semesters.

Grades: The grade point average for the 26 hours of courses used to fulfill the requirements for the MEng degree program must be equivalent to at least a straight B (3.00). Grades below C (2.00) are not acceptable for graduate credit, but are considered in computation of a student's grade point average.

Time limit: A student must complete all work within a period of three consecutive years after first enrollment in the MEng degree program.

Graduate transfer credit: A maximum of six hours of graduate course credit may be transferred from another institution. These must be from graduate level courses taken either in residence or on-line with a grade of B or better from an accredited institution approved by the Rackham School of Graduate Studies. Students may request the transfer of such credits through the CEE Department after completion of one semester in the MEng program.

Undergraduate transfer credit: A maximum of six hours of graduate level course credit, earned as an undergraduate student at the University of Michigan, with a grade of B or better may be included in the student's graduate study program subject to the following restrictions: (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 MEng degree program and (3) credit was earned in courses approved for graduate credit by the Rackham Graduate School. Students may request the transfer of such credits through the CEE Department any time after admission to the MEng program.

400 level courses: A 400 level course that is listed in the Bulletin of the Rackham Graduate School 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 degree program of the Department of Civil and Environmental Engineering. No more than a total of 9 hours of 400 level courses will be accepted for graduate credit in the MEng degree program.

Independent study courses: Although students are strongly encouraged to take regular classroom courses, up to three credit hours of directed study will be accepted toward the 26 credit hour requirement of the MEng degree.

Appendix A: Undergraduate Requirements for the MEng (Structural Engineering) Degree Program

Students entering the MEng (Structural Engineering) degree program with an undergraduate degree in Civil Engineering, or Civil and Environmental Engineering, will be accepted directly into the degree program. For students entering this program with some other undergraduate degree, there may be some prerequisite courses that need to be completed before formal admission into the program. Students must have completed three semesters of calculus and two semesters of physics. They should also have completed courses in statics, dynamics and solid mechanics. In addition, three core civil engineering courses are required but can be taken after the student enrolls in the MEng degree program. Those courses are:

- Structural Analysis: CEE 412
- Structural Design¹: Either CEE 413 (Design of Metal Structures) or CEE 415 (Design of Concrete Structures)
- Civil Engineering Breadth²: Either CEE 351 (Civil Engineering Materials) or CEE 431 (Construction Contracting) or CEE 345 (Engineering Properties of Soil)

¹Students should consider taking both of these courses, although only one course is required to meet this prerequisite requirement.

²Students should consider their minor area of emphasis when selecting between these courses.

Appendix B: Example Course Sequences That Satisfy The Requirement For Minor Professional Emphasis

- For construction engineering and management: CEE 534 Construction Engineering, Equipment and Methods, and CEE 536 Critical Path Methods
- For geotechnical engineering: CEE 545 Foundation Engineering, and CEE 544 Rock Mechanics or CEE 546 Slopes, Dams and Retaining Structures or CEE 548 Geotechnical Earthquake Engineering.
- For concrete materials: (take 2 of 3) CEE 547 Soils Engineering and Pavement Systems, CEE 574 Materials Selection for Sustainable Design, and CEE 650 Fiber Reinforced Concrete for Sustainable Infrastructure.
- For architecture: Arch 524 Surface Structures, and either Arch 544 Wood Structures or Arch 564 Advanced Materials for Structures
- For applied mechanics: ME 412 Advanced Strength of Materials, and ME 512 Theory of Elasticity or AERO 516 Mechanics of Fibrous Composites.

Appendix C: Course Election Form (example of acceptable 26-credit program)

MEng Degree (Structural Engineering)	Term:				
Student: Sample schedule	F-16	W-17			
Analysis Courses, ≥ 6 credits					
CEE 510	X				
CEE 511		X			
CEE 512		X			
CEE 517	X				
CEE 412					
Design Courses, ≥ 6 credits					
CEE 513	X				
CEE 514		X			
CEE 515					
CEE 516					
CEE 413 or 415					
Minor Area of Emphasis, ≥ 6 credits					
CEE 545	X				
CEE 546		X			
Seminar Courses, 2 credits (maximum)					
CEE 812 (Structural)	X				
CEE 840 (Geotechnical)		X			
Other Courses for MEng Credit					

Note: ≤ 6 credit hours granted for 400-level courses.

Meeting Dates				
Advisor's Initials				