

MASTER OF ENGINEERING IN STRUCTURAL ENGINEERING

(revised August 2009)

The Master of Engineering (M.Eng) degree program in Structural Engineering offers students a professional degree that is oriented toward structural engineering practice. This degree is targeted at students who hold a B.S.E. (CEE) degree 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 M.Eng 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 M.Eng (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 30 credit hours are required to complete the M.Eng (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 M.Eng (Structural Engineering) are the requirement to have a minor area of professional emphasis either within or outside the CEE Department, and the requirement for a structural engineering project based on professional practice in structural engineering.

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

Students are expected to complete at least five structural engineering courses (15 hours) 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 design courses may be elected (i.e. CEE 413 and CEE 415), but credit for these courses will not be counted toward either the 30 hour requirement for the M.Eng degree or the 15 hour requirement in the area of major professional emphasis. 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 or CEE 517.
- At least two courses shall be advanced design courses selected from CEE 513, CEE 514, CEE 515 or CEE 519.

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 sequence must be at the 500 level or higher.

Any of the other concentration areas in the CEE Department or a technical area from outside the CEE Department will be permitted to satisfy this requirement. The M.Eng student should 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) Structural Engineering Project (3 hrs.)

Students are required to enroll for one semester in the Structural Engineering Project course, CEE 811. Each M.Eng student will be expected to complete an individual structural engineering project or participate in a group project. Students will be expected to submit a final written report and make an oral presentation of their structural design project to a faculty review panel. Material for the project may be developed either from the student's prior professional work experience or through participation in a project developed by a faculty member and the students enrolled in CEE 811. The involvement of practicing structural engineers in the development of the project is desirable, but not required. Students are also expected to attend all official Structural Engineering Seminars presented during the semester they are enrolled in the project course. The project course will be graded on a S/U basis. CEE 811 will normally be available during the Winter term. If a M.Eng student can only complete the project course during the Fall term, he/she may enroll in CEE 910 and work with any structural engineering faculty member to develop a project with a design (not research) emphasis.

d) Breadth Beyond Engineering (≥ 3 hrs.)

Areas of emphasis can be Business, Management, Law, Information Technology, Statistics, Economics or other approved courses of study. These courses must be at the 400 level or above. Students will need to seek approval from their academic advisor before enrolling in a course intended to satisfy this requirement.

e) General Program Requirements and Policies

Credit hours and normal progress: A minimum of 30 credit hours of acceptable graduate work must be completed for the M.Eng. degree. Twelve hours of credit is the usual full-time graduate load per semester. It is recommended that a student distribute courses over at least two and one-half terms.

Grades: The grade point average for the 30 hours of courses used to fulfill the credit hour requirement for the M.Eng degree program must be equivalent to at least a straight B. A grade below C is not acceptable for graduate credit, but is considered in computation of the grade point average.

Time limit: A student must complete all work within a period of five consecutive years after first enrollment in the M.Eng 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 in residence with a grade of B or better from an accredited institution approved by the Rackham School of Graduate Studies.

Undergraduate transfer credit: A maximum of six hours of undergraduate course credit with a grade of B or better earned by the student at the University of Michigan 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 M. Eng degree program and (3) credit was earned in courses approved for graduate credit by the Rackham Graduate School. The student may request the transfer of such credits through the Department of Civil and Environmental Engineering any time after admission.

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 this degree program.

Independent study courses: No more than six credit hours of directed study, including the project course, will be accepted toward the 30 credit hour degree requirement.

Appendix A: Undergraduate Requirements for the M.Eng (Structural Engineering) Degree Program

Students entering the M.Eng (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 being admitted 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 M.Eng degree program. These 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 can be taken to meet this prerequisite requirement. The other would be taken to supplement a student's preparation for advanced design courses in the M.Eng degree program.

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 Stability of Earth Masses or CEE 548 Geotechnical Earthquake Engineering.
- For concrete materials: CEE 518 Fiber Reinforced Cement Composites, and CEE 547 Soils Engineering and Pavement Systems or CEE 650 Fracture and Mechanics of Fibrous Composites.

- 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 (CEE 509) Theory of Elasticity or AERO 516 Mechanics of Fibrous Composites.

Appendix C: Sample Course Election Form

M.Eng Degree (Structural Engineering)	Term:				
Student:					
Analysis Courses, ≥ 6 hrs.					
CEE 510					
CEE 511					
CEE 512					
CEE 517					
Other					
Design Courses, ≥ 6 hrs.					
CEE 513					
CEE 514					
CEE 515					
CEE 519					
Other					
Structural Engineering Project, 3 hrs.					
CEE 811					
Minor Area of Emphasis, ≥ 6 hrs.					
Breadth Beyond Engineering, ≥ 3 hrs.					
Other Courses for M Eng Credit					
Other Non-Credit Courses					

Note: ≤ 9 credit hours granted for 400-level courses.

Meeting Dates									
Advisor's Initials									