Degree Requirements

Applicants seeking admission into the Graduate Program in Civil Engineering, leading to M.S. and Ph.D. degrees administered by the Graduate School, should have a B.S. degree with adequate background in science, mathematics and engineering. In order to specialize in Structural Mechanics and Materials the B.S. degree should have emphasis in mechanics, structural engineering and materials. In order to specialize in Multi-modal Transportation Engineering, the B.S. degree should have imparted a basic background in transportation engineering. In order to specialize in Risk and Reliability Engineering, the B.S. degree should emphasize in one of the majors in engineering.

For admission into the Master of Engineering program for specialization in Structural Engineering, or Transportation Engineering, the degree requirements are similar to those of the M.S. program. For specialization in Construction Engineering and Management, the degree requirements are less restrictive and the applicants are advised to go to the home page for Construction Management Program. The Master of Engineering Program is administered by the School of Engineering and the admission requirements are less restrictive.

Credit Hour Requirements: All the graduate degrees require minimum 24 credit hours of graduate level coursework at Vanderbilt University. The M.S. degree with thesis-option requires 24 credit hours of coursework and submission of a M.S. thesis. In the case of non-thesis option, apart from 30 credit hours of coursework it is necessary to submit a final project report. For those admitted with a B.S. degree, the Ph.D. degree requires 36 credit hours of coursework, passing comprehensive and qualifying examinations, and defending a dissertation. For those admitted with an approved M.S. degree, the only exception is that up to 24 credit hours of courses can be transferred from the previous university with the approval of the Director of Graduate Studies in Civil Engineering and the Graduate School. No course, if counted towards undergraduate credit, irrespective of its level, can be transferred for graduate credit.

Comprehensive Examination: The comprehensive examination is normally administered after the end of the second semester and designed to evaluate the level of preparation of the student for pursuing the Ph.D. degree in terms of understanding of the basic concepts, ability to think creatively, aptitude in the chosen specialty, comprehension of scientific publications, and proficiency in written/oral communication.

Qualifying Examination: It is desirable that the qualifying examination is taken within two semesters following the comprehensive examination. During the qualifying examination the student presents the doctoral research proposal for critical evaluation by the doctoral committee members appointed for the purpose, to determine if the successful realization of the stated objectives and scope as
well as the methodologies to be used will eventually satisfy the requirements of
the doctoral degree. Also, the readiness of the student to undertake the proposed
research including a clear understanding of the state-of-the-art in the proposed
research area is thoroughly scrutinized by the committee.

**Time-Line:** The minimum time required for completing the M.S. degree with
thesis-option is three semesters and a summer, but two years is more common.
The minimum time required to complete the Ph.D. degree by those admitted with
a B.S. degree is four years, but five years is more common. Those admitted with
a M.S. degree can complete the Ph.D. degree in the minimum time of three years.

**Research Adviser:** A M.S./Ph.D. student is supposed to have identified and
agreed upon a research advisor before the end of second semester. Normally,
during the first two semesters such a student is supported as Teaching Assistant.
Thereafter, the student is supported as a Research Assistant. If, however, the
student has financial support in the form of Fellowships or Scholarships awarded
by some external agency, no other support is needed and student is free to
undertake the research work under the guidance of an advisor of his/her choice.

**Coursework Requirements:**
During the first two semesters, MS/Ph.D. students specializing in Structural
Mechanics and Materials are required to take the following five core courses

- CE 301: Advanced Mechanics of Solids I
- CE 302: Advanced Mechanics of Solids II
- CE 307: Finite Element Analysis
- CE 309: Structural Dynamics and Control
- CE 310: Probabilistic Methods in Engineering Design

Optional courses offered by the specialty area are

- CE 290: Reliability and Risk Case Studies
- CE 293: Advanced Structural Steel Design
- CE 294: Advanced Reinforced Concrete Design
- CE 295: Mechanics of Composite Materials
- CE 299: Special Topics (decided by need)
- CE 311: Engineering Design Optimization
- CE 313: Advanced Reliability Methods
- CE 317: Stability of Structures
- CE 318: Prestressed Concrete
- CE 325a-325c: Individual Study (Topic as needed)
- CE 371a-371b: Reliability and Risk Engineering Seminar

Other graduate level courses offered by the parent or other department can
be taken by the approval of the academic/research adviser.
M.S./Ph.D. students specializing in Multi-modal Transportation Engineering need to choose courses from the following list.

CE 255: Transportation System Design
CE 256: Urban Transportation Planning
CE 257: Traffic Engineering
CE 259: Geographic Information Systems
CE 262: Intelligent Transportation Systems
CE 290: Reliability and Risk Case Studies
CE 310: Probabilistic Methods in Engineering Design
CE 313: Advanced Reliability Methods
CE 371a-371b: Reliability and Risk Engineering Seminar
CE 351: Public Transportation Systems
CE 353: Airport Planning and Design
CE 355: Advanced transportation Design
CE 356: Advanced Transportation Planning
CE 357: Theory of Traffic Flow
CE 359: Emerging Information Systems Applications
CE 325a-325c: Individual Study (Topic as needed)
CE 371a-371b: Reliability and Risk Engineering Seminar

Other graduate level courses offered by the parent or other department can be taken by the approval of the academic/research adviser.