

## Structural Engineering

### **M.S. in Structural Engineering**

**General Information:** Master of Science (M.S.) in Structural Engineering concentration in the field of study of Civil Engineering has as its primary objective the development of students' understanding of the subject matter through an emphasis on either in-depth research (Plan A) or on a more general nature (Plan B, non-thesis option). The M.S. can lead to a professional career in civil engineering.

### **Requirements:**

#### **Plan A (Thesis Option)**

To earn the Structural Engineering M.S. Plan "A" degree, all students must:

- Have completed a minimum of 21 credits of advanced coursework, of which at least 18 credits must be at the graduate level. No more than 3 credits may be taken as independent study.
- Have taken three core courses CE 5122 (Advanced Mechanics of Materials), CE 5164 (Finite Elements I), and either CE 5610 (Advanced Reinforced Concrete Structures) or CE 5620 (Advanced Steel Structures).
- Have earned final overall GPA of 3.0 or higher.
- Have completed at least 9 credits of GRAD 5950 – M.S. Thesis Research.
- Have successfully completed public defense of an original thesis.
- Have submitted the final M.S. thesis approved by the Advisory Committee to the Graduate School. It is expected that one journal paper will be submitted or ready for submission by the time of the defense, resulting from the MS thesis research.

#### **Plan B (Non-Thesis Option)**

To earn the Structural Engineering M.S. Plan "B" degree, all students must:

- Have completed a minimum of 30 credits of advanced coursework, of which at least 27 credits must be at the graduate level.
- Have taken three core courses CE 5122 (Advanced Mechanics of Materials), CE 5164 (Finite Elements I), and either CE 5610 (Advanced Reinforced Concrete Structures) or CE 5620 (Advanced Steel Structures).
- Have earned final overall GPA of 3.0 or higher.
- Students must conduct a capstone project as an Independent Study course in consultation with the student's major advisor. The student needs to submit a final project report and present his/her work to members of graduate advisory committee.

## Structural Engineering

### **Ph.D. in Structural Engineering**

**General Information:** Ph.D. in Structural Engineering concentration in the field of study of Civil Engineering provides the highest level of formal preparation for the engineering profession. The Ph.D. program is both competitive and challenging and offers special opportunities for learning, research, and application. Together with their professors, doctoral students comprise a true community of scholars. The student's advisory committee, which is responsible for overseeing the student's final achievement, is an integral part of such a community. Doctoral study is normally completed in three to five years.

**Requirements:** To earn the Ph.D. degree in the Structural Engineering area of concentration, all students must satisfy following requirements:

#### **(A) Course Work and Dissertation Research Credits:**

- Students with M.S. degree will have completed minimum of 18 credits of advance-level course work in structural engineering and applied mechanics or related to student's PhD research.
- Students with B.S. degree will have completed minimum of 39 credits of advance-level course work in structural engineering and applied mechanics or related to student's PhD research.
- No more than 6 credits may be taken as independent study.
- Have earned final overall GPA of 3.0 or higher.
- Have completed at least 21 credits of GRAD 6950 - Dissertation Research Credits.

#### **(B) Faculty Advisory Committee and Plan of Study (POS) Form:**

A PhD student's Advisory Committee consists of at least three faculty members including the major advisor (or two co-major advisors, if desired) and at least two associate advisors. For students who began the PhD program with an M.S. degree, the Plan of Study (POS) form must be submitted to the Office of The Registrar within the first 2 semesters (or before completion of 12 credits of coursework). For students who began PhD program with a B.S., the POS form must be submitted within the first 4 semesters (or before completion of 18 credits of coursework).

#### **(C) General Examination (GE):**

The general examination is intended to evaluate the suitability of the student for PhD studies. The POS form must have been approved by the Graduate School before taking the general exam. The general exam will be held in written format, but the advisory committee may decide to add an oral exam as part of the general examination. The general examination committee consists of at least 5 faculty members including all members of the student's advisory committee. The major advisor in consultation with the student will select 5 subject areas for the general exam. The major advisor contacts the examination committee members for exam questions. Each exam will be designed for half-day (4 hours) in a take-home format. Each exam subject has to be administered separately, but some of the examination committee members may choose to merge their exams in one unit that is proportionally longer (e.g. an exam that covers two technical subjects will be designed for full day (8 hours)). For consistency, all 5 exams must be administered in one week. To pass, at least 70% should be scored in each of the 5 subjects. If the student fails one or two subjects, 2<sup>nd</sup> opportunity is given to take the exam in the failed subjects. If students fails more than two subjects or fails any of the subject for the second time, the advisory committee will make decision on the continuation of the students in PhD program. The retake of the exams should be completed within 3 months of the 1<sup>st</sup> set of exams.

**(D) Dissertation Research Proposal Defense (DRPD):**

- The proposal/prospectus is a written description of the student's proposed graduate research. Student must defend his/her proposal in an oral presentation. Successful PD form and approved proposal document need to be submitted to the graduate school. Student has to schedule the proposal defense within 6 months or 2 semesters from completion of GE. Student has to submit his/her dissertation research proposal (approximately 12 pages) to the Advisory Committee members and 2 faculty members as reviewers two weeks before the oral presentation of the dissertation proposal. If revision of the dissertation proposal is required, the student will revise dissertation proposal to incorporate the comments received from the Advisory Committee members and other faculty reviewers in attendance at the dissertation proposal presentation. If the Advisory Committee and reviewers approve the revised dissertation proposal, the student will be able to collect signature of "Dissertation Proposal for The Doctoral Degree" form. The student submits 3 copies of the final dissertation proposal with the signed cover sheet attached to the CEE Department for signature by the Department Head or the Graduate Program Director. After signature by the Department, the student submits the 3 copies of the signed dissertation proposal to the Graduate School.
- **Dissertation Defense (DD):** The student must submit his/her PhD dissertation draft to his/her advisory committee members 14 days prior to dissertation defense. The earliest the dissertation defense can be scheduled is 6 months after the approval of the dissertation research proposal. Prior to scheduling their dissertation defense, students need to show evidence of quality research results in the form of journal publications: at least 1 published (or in-press), 1 accepted and 1 submitted or in preparation.

## Applied Mechanics

### **Ph.D. in Applied Mechanics**

**General Information:** Ph.D. in Applied Mechanics concentration in the field of study of Civil Engineering provides the highest level of formal preparation for the engineering profession. The Ph.D. program is both competitive and challenging and offers special opportunities for learning, research, and application. Together with their professors, doctoral students comprise a true community of scholars. The student's advisory committee, which is responsible for overseeing the student's final achievement, is an integral part of such a community. Doctoral study is normally completed in three to five years.

**Requirements:** To earn the Ph.D. degree in the Applied Mechanics area of concentration, all students must satisfy following requirements:

#### **(A) Course Work and Dissertation Research Credits:**

- Students with M.S. degree will have completed minimum of 18 credits of advance-level course work in applied mechanics, structural engineering or related to student's PhD research.
- Students with B.S. degree will have completed minimum of 39 credits of advance-level course work in applied mechanics, structural engineering or related to student's PhD research.
- No more than 6 credits may be taken as independent study.
- Have earned final overall GPA of 3.0 or higher.
- Have completed at least 21 credits of GRAD 6950 - Dissertation Research Credits.

#### **(B) Faculty Advisory Committee and Plan of Study (POS) Form:**

A PhD student's Advisory Committee consists of at least three faculty members including the major advisor (or two co-major advisors, if desired) and at least two associate advisors. For students who began the PhD program with an M.S. degree, the Plan of Study (POS) form must be submitted to the Office of The Registrar within the first 2 semesters (or before completion of 12 credits of coursework). For students who began PhD program with a B.S., the POS form must be submitted within the first 4 semesters (or before completion of 18 credits of coursework).

#### **(C) General Examination (GE):**

The general examination is intended to evaluate the suitability of the student for PhD studies. The POS form must have been approved by the Graduate School before taking the general exam. The general exam will be held in written format, but the advisory committee may decide to add an oral exam as part of the general examination. The general examination committee consists of at least 5 faculty members including all members of the student's advisory committee. The major advisor in consultation with the student will select 5 subject areas for the general exam. The major advisor contacts the examination committee members for exam questions. Each exam will be designed for half-day (4 hours) in a take-home format. Each exam subject has to be administered separately, but some of the examination committee members may choose to merge their exams in one unit that is proportionally longer (e.g. an exam that covers two technical subjects will be designed for full day (8 hours)). For consistency, all 5 exams must be administered in one week. To pass, at least 70% should be scored in each of the 5 subjects. If the student fails one or two subjects, 2<sup>nd</sup> opportunity is given to take the exam in the failed subjects. If students fails more than two subjects or fails any of the subject for the second time, the advisory committee will make decision on the continuation of the students in PhD program. The retake of the exams should be completed within 3 months of the 1<sup>st</sup> set of exams.

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## Structural Engineering

Master of Engineering (MENG) degree in Structural Engineering

**General Information:** Master of Engineering (MENG) degree in Structural Engineering concentration the field of study of Civil Engineering is a 30-credit graduate degree merging the benefits of technical engineering courses with professional development classes. The target audience includes students who are employed full-time in industry as practicing engineers, as well as those interested in expanding their skills before entering industry. All MENG students ultimately complete and defend a final project, typically connected to a work-related problem requiring a solution.

### **Requirements:**

To earn the Master of Engineering (MENG) degree, all students must take MENG Core Courses (12 credits) and Structural Engineering Concentration Courses (18 credits), with a final overall GPA of 3.0 or higher, as follows:

MENG Core Courses (12 credits)

- ENGR 5311: Professional Communication and Information Management
- ENGR 5312: Engineering Project Planning and Management
- ENGR 5314: Advanced Engineering Mathematics
- ENGR 5300: Capstone Project – Students are encouraged to work on a company-sponsored project

Structural Engineering Core Courses (9 credits)

- CE 5122: Advanced Mechanics of Materials
- CE 5164: Finite Elements I
- CE 5610: Advanced Reinforced Concrete Structures or CE 5620: Advanced Steel Structures

Structural Engineering Elective Courses (9 credits): must take at least one course

- CE 5126 – Structural Reliability
- CE 5128 – Elastic Stability
- CE 5150 –Structural Vibrations
- CE 5151 –Experimental Structural Dynamics
- CE 5163 –Fracture Mechanics
- CE 5166 –Finite Element Methods in Applied Mechanics II
- CE 5380 – Bridge Structures
- CE 5610 – Advanced Reinforced Concrete Structures (if not taken as a core course)
- CE 5620 – Advanced Steel Structures (if not taken as a core course)
- CE 3640 – Prestressed Concrete