

2015

Structural Engineering
and Mechanics Group

UNIVERSITY OF
MASSACHUSETTS
AMHERST



STRUCTURAL ENGINEERING AND MECHANICS GRADUATE STUDENT HANDBOOK

PURPOSE AND SCOPE

We are delighted that you have decided to pursue graduate studies in the Department of Civil and Environmental at the University of Massachusetts Amherst. We wish you well throughout your program of studies and encourage you to keep in close touch with your advisor and the Graduate Program Director (GPD).

The purpose of this booklet is to provide graduate students and faculty with a source of information about the regulations and policies of the CEE Department regarding its graduate program. More detailed information about the graduate program is available on the Civil & Environmental Engineering web page <http://cee.umass.edu/cee/graduate/forms-regulations>. This handbook supplements information in the Graduate Catalog and in the "Graduate School Handbook" published by the Graduate School, found at <http://www.umass.edu/gradschool/policies-forms/graduate-student-handbook>. New students should carefully read all three of these documents. **IT IS THE RESPONSIBILITY OF EACH STUDENT TO SEE THAT ALL OF THE GUIDELINES SET BY THE GRADUATE SCHOOL AND THE DEPARTMENT ARE FOLLOWED.** Any exception to the policy should be approved in writing by the SEM Coordinator and the CEE-GPD¹.

When there are questions not answered in this or one of the publications noted, students should first consult with their advisors, then, if necessary, with the GPD, and finally with the CEE Department Head. All members of the faculty and the Department Head welcome questions or comments from graduate students on academic or personal matters.

¹ Professor Sanjay Arwade (223 Marston Hall) is the CEE Graduate Program Director

THE M.S. PROGRAM

There are two options available to obtain an M.S. Degree within the Structural Engineering and Mechanics (SEM) group of the Civil & Environmental Engineering Department at UMass. These options are called the M.S.-Research Option and the M.S.-Coursework Option. Requirements for each of these options are presented below.

Course Requirements for a Master of Science Degree in Civil Engineering – Research Option

To qualify for an M.S. Degree – Research Option, the student must complete 24 credit hours of graduate coursework, 6 credit hours of MS thesis, and 1 credit hour of structural engineering seminar. Each class in the SEM group is typically 3 credit hours.

The Structural Engineering and Mechanics group offers various classes covering the fundamental aspects of mechanics and design. These classes constitute the basic curriculum of our MS-degree students. They are:

- A. Structural design classes
 - CEE 536 Advanced Topics in Concrete Design
 - CEE 542 Advanced Topics in Steel Design
 - CEE 550 Introduction to Bridge Engineering
 - CEE 646 Seismic Structural Analysis

- B. Structural analysis and mechanics classes
 - CEE 535 Matrix Analysis of Structures
 - CEE 541 Structural Dynamics
 - CEE 549 Structural Stability
 - CEE 605 Finite Element Analysis
 - CEE 615 Probability Methods in Structural Mechanics
 - CEE 630 Advanced Solid Mechanics
 - CEE 631 Civil Engineering Analysis

To complete MS graduate coursework requirements a student must take **5 classes (15 credits)** from courses listed above with **at least two from Group A and two from Group B**. The student must then select and take a **minimum of 3 elective classes (9 credits)** within or outside the SEM group. All classes will be selected in consultation with the student's academic advisor (usually the student's research advisor). Students must also register for CEE 694B and CEE 693B (Structural Engineering Seminar) throughout the duration of their degree. Finally, the MS student must enroll in **6 credits of Master's Thesis (CEE 699)**, preferably 3 credits in two consecutive semesters, for completion of the MS Degree requirements.

M.S. Research Option Timeline

The following is the suggested timeline for M.S. students following the research option. Some deadlines are firm; others have some flexibility. However, this timeline should be helpful to successfully complete the degree within a reasonable timeframe.

First Semester: Academic advisor appointed

First Semester: Prepare program of study

End of First Semester: Select Thesis/Appoint Thesis Committee

Middle of Second Semester: Prepare Thesis Proposal and Presentation (must be at least 4 months prior to Thesis Defense)

Two Weeks Prior to Thesis Proposal Presentation: Thesis Proposal to Committee

Two Weeks Prior to Thesis Defense: Deliver Thesis/Project to Committee

Thesis Defense: Presentation of research and Defense of Thesis. This should occur several weeks prior to the thesis submission date.

After Defense: Corrections and editions made to thesis as required by Thesis Committee.

After Defense: Submit Copy of Thesis/Project to Graduate Program Office.

Course Requirements for a Master of Science Degree in Civil Engineering – Coursework Option

To qualify for an M.S. Degree – Coursework Option, the student must complete 30 credit hours of graduate coursework and 1 credit hour of structural engineering seminar. Each class in the SEM group is typically 3 credit hours.

The Structural Engineering and Mechanics group offers various classes covering the fundamental aspects of mechanics and design. These classes constitute the basic curriculum of our MS-degree students. They are:

A. Design classes

- CEE 536 Advanced Topics in Concrete Design
- CEE 542 Advanced Topics in Steel Design
- CEE 550 Introduction to Bridge Engineering
- CEE 646 Seismic Structural Analysis

B. Analysis and Mechanics classes

- CEE 535 Matrix Analysis of Structures
- CEE 541 Structural Dynamics
- CEE 549 Structural Stability
- CEE 605 Finite Element Analysis
- CEE 615 Probability Methods in Structural Mechanics
- CEE 630 Advanced Solid Mechanics
- CEE 631 Civil Engineering Analysis

To complete MS graduate coursework requirements a student must take **5 classes (15 credits)** from courses listed above with **at least two from Group A and two from Group B**. The student must then select and take a **minimum of 5 elective classes (15 credits)**. All classes will be selected in consultation with the student's academic advisor appointed at the beginning of the first semester. The student must make an appointment with their advisor prior to the start of each semester to select appropriate courses in accordance with a plan of study and specific interests. Courses must be approved by the academic advisor using a course selection form provided to the student in the first semester. Students must also register for CEE 694B and CEE 693B (Structural Engineering Seminar) throughout the duration of their degree.

Other Requirements and Procedures Applicable to M.S. Students

Upon enrollment in the Department of Civil & Environmental Engineering (CEE), each Master's student will be assigned an academic advisor by the SEM Coordinator. The official records of the advisor assignments will be maintained by the CEE Academic Assistant. To ensure that the courses selected by a student are consistent

with degree requirements and with his/her academic needs and career plans, the student will confer with their advisor prior to registering for any courses. A course selection form to complete the degree must be completed and signed by the student and academic advisor. The form is shown in Appendix A. For MS-Research Option students, the research advisor also acts as academic advisor and will direct the student's Master's Project or Master's Thesis and chair the student's Thesis/Project Committee.

The M.S. Thesis or Project Committee members are selected by the student with advice and approval of their research advisor. These committees consist of two to three members of the Graduate Faculty. Thesis and project committee members must agree to serve before they are appointed to the committee. The student must take action to invite faculty members to serve in the thesis or project committee. It is important to note that an M.S. Thesis Committee is not officially appointed until recommended by the Graduate Program Director and approved by the Graduate School.

A 3.0 GPA minimum is required for graduation. Grades in the graduate program below a "B" must be discussed with the advisor and a plan of corrective action developed.

Assistantship and fellowship holders are expected to perform their academic and project duties to the satisfaction of their research advisor. Periodic meetings held with their research advisor are typically conducted to guide and evaluate the student's performance in their research project.

Thesis/Project Proposal and Proposal Defense (MS - Research Option)

M.S. – Research Option students must prepare a proposal describing the scope and relevance of their proposed work. This document must include, at a minimum, a solid literature review, a scope of work, preliminary results, and future work. The student must give an oral presentation to the thesis/project committee members at a time and place approved by all committee members. The student must provide each member with a copy of their proposal that has been approved by their research advisor at least one week in advance of the oral presentation. Changes suggested by thesis/project committee members must be incorporated by the student prior to submission of the proposal to the CEE Academic Assistant and the Graduate School. Committee members will sign the proposal cover page after their changes have been incorporated to their satisfaction. The proposal defense must take place at least 4 months prior to the M.S. Thesis or Project defense. The Graduate School will not allow an M.S. Thesis defense to be scheduled if the above time line is not followed.

M.S. Thesis (MS - Research Option)

An M.S. Thesis is an original document reporting innovative M.S. research. The scope of the research is developed in consultation with the faculty advisor with input from the thesis committee members. A copy of the thesis proposal must be approved by the student's committee and put on file with the CEE Academic Assistant and forwarded to the Graduate School at least four months prior to the final defense of the M.S. Thesis. The format for the thesis must follow the instructions from the Graduate School Catalog and the Graduate School Handbook. A signature sheet bearing the signatures of the thesis committee members indicating their approval as to style and content must be submitted to the CEE Academic Assistant before the Degree Eligibility for a Master's Degree form may be signed by the CEE Department Head. Copies of the M.S. Thesis (either hardbound or electronic) must be provided to thesis committee members. Thesis committee members may require both, in which case the printed copy must be bound in accordance with Graduate School guidelines.

Requirements for the Thesis from the Graduate School can be found at:

http://www.umass.edu/gradschool/sites/default/files/thesis_and_dissertation_guidelines.pdf

M.S. Project (MS Research Option)

An M.S. Project has the same features as the thesis, except that its final report does not have to abide by the Graduate School formatting guidelines. Substitution of an M.S. Project for an M.S. Thesis can only be done after approval from thesis committee members. A signature sheet bearing the signatures of the project committee members indicating their approval as to style and content must be submitted to the CEE Academic Assistant before the Degree Eligibility for a Master's Degree form may be signed by the Graduate Program Director. Copies of the M.S. Project (either hardbound or electronic) must be provided to project committee members. Project committee members may require both, in which case the printed copy must be bound using a **red** covers with the university logo provided by the CEE Department.

Thesis/Project Defense (MS Research Option)

The M.S. candidate must defend his or her thesis/project in front of the Thesis/Project Committee. Prior to The M.S. candidate must submit thesis proposal to each member of the Thesis/Project Committee and must an oral presentation of his/her proposal. The time and place for this presentation must be approved by the Thesis/Project Committee. A draft copy (hard or electronic) of the Thesis/Project must be submitted to committee members at least 2 weeks in advance of the defense date.

The defense date and time must be announced to all CEE faculty members at least 7 days prior to the exam. The defense includes an open meeting for the presentation followed by a closed meeting only with the Thesis/Project committee members.

Additional Graduation Requirements

In addition to fulfilling the Graduate School requirements for graduation, students must complete a check-out list available from the CEE Administrative Assistant prior to graduation. The completed and signed check-out list will be kept in the student's file after departure. In addition, all requirements for graduation established by the Graduate Program, the Graduate School and the University must be satisfied for graduation. For timely completion of the M.S. Degree it is essential to adhere to all of the Graduate School's policies and deadlines.

The student must obtain a Master's Degree Eligibility Form from the Graduate School website. This form shall be completed and submitted to the Graduate School Office for approval. Please note that the Master's Degree Eligibility Form will only be accepted after approval of the original M.S. Thesis or Project by all committee members.

THE PH.D. PROGRAM

General Requirements

The Ph.D. program is intended to prepare the student for a research career in industry, academia or National laboratories. A dissertation, presenting original information, is the primary requirement of the degree. Other requirements for the Ph.D. degree include:

- A minimum of one academic year in residency. Residency is defined as one continuous academic year of full-time graduate work (9 credits per semester).
- Successful completion of a comprehensive examination (qualifying examination).
- An approved dissertation proposal (written and oral presentation), also known as prospectus.
- Completion of an approved course curriculum.
- A Ph.D. dissertation.
- A final oral examination.

Additional University requirements are listed in the Graduate School Bulletin. Note that the CEE Department does not require a student to demonstrate competency in a foreign language.

Ph.D. Timeline

The following is the suggested timeline for students enrolled in the Ph.D. program. Some deadlines are firm; others are more flexible. It is the student's obligation to read the Handbook thoroughly. However, we hope that this timeline is useful to plan your schedule. Please do not hesitate to ask questions at any point in time.

First Semester: Advisor Appointed

First Semester: Prepare Program of Study

End of First Semester/Mid-second Semester: Take Comprehensive Exam

End of First Year: Register for Dissertation Credit

End of First Year: Select Dissertation Committee

Two Weeks Prior to Dissertation Prospectus Presentation: Prospectus to Dissertation Committee

Seven Months Prior to Defense: Defend Dissertation Prospectus (Oral Presentation)

Notify Graduate Program Office of Defense Date

Two Weeks Prior to Dissertation Defense: Deliver Dissertation to Committee

Dissertation Defense: Presentation and oral examination of research.

After Defense: Corrections made to Dissertation as required by Committee. Hand in copy of dissertation to the Graduate School

Curricular Components for Ph.D. Degree

The minimum course requirement for the Ph.D. degree is enrollment in 18 credits of CE-ENGIN 899 (Doctoral Dissertation). Course requirements consistent with the student's academic background, research topic, and career plans will be determined in consultation with the research advisor. Students entering the Ph.D. program without an M.S. or an M.Eng. degree must complete at least 24 credits of graduate coursework in addition to the dissertation credits.

A 3.0 GPA minimum is required for graduation. Grades in the graduate program below a “B” must be discussed with the student’s research advisor and a plan of corrective action developed. PhD students are expected to attend SEM seminars regularly.

The CEE Ph.D. Preliminary Comprehensive Exam

Each student enrolled in the Ph.D. program must pass a preliminary comprehensive exam (qualifying examination). The examination consists of a written portion and an oral portion. The examination is generally scheduled by the comprehensive examination committee to be taken no later than 12 months after the student enters the doctoral program. Delays of more than six (6) months beyond this period must be requested by the student with approval from the student’s research advisor. This request must be finally approved by the SEM faculty. Before the exam, the student's research advisor will inform the student about general examination procedures. Students not passing the exam may be allowed to retake the exam within 6 months if so determined by the comprehensive examination committee. A student will be dismissed from the doctoral program if they do not pass this examination within this period

CEE PhD Dissertation

After successful completion of the preliminary comprehensive examination, the student will select at least three graduate faculty members to serve in the student’s dissertation committee in consultation with the research advisor. One of those members will be the research advisor who will serve as the chairperson of the dissertation committee. A formal request will be submitted to the Graduate Program Director to be forwarded to the Dean of the Graduate School. One member of the dissertation committee must be an “outside member” (as defined by the Graduate School), a faculty member in a department outside of CEE. It is important to note that the dissertation committee is not official until recommended by the Graduate Program Director and appointed by the Dean of the Graduate School.

The Ph.D. candidate must submit a copy (electronic or hard copy) of the dissertation proposal (prospectus) to each member of the dissertation committee. The Ph.D. candidate must make an oral presentation of his/her proposal at a meeting with the dissertation committee, and upon unanimous approval by the committee, a copy of the proposal signed by all members shall be submitted to the Dean of the Graduate School. This action must take place at least 7 months prior to the final oral examination (defense) of the Ph.D Dissertation. The Graduate School will not allow a defense to be scheduled if the above time line is not followed. The Graduate School provides guidelines for writing of the dissertation at:

http://www.umass.edu/gradschool/sites/default/files/thesis_and_dissertation_guidelines.pdf

When all members of the dissertation committee have approved a draft of the dissertation, the final oral examination may be scheduled. See the Graduate School Handbook for scheduling regulations. Notice of the final oral examination must be given to all CEE faculty members at least seven days prior to the exam with help from the CEE Administrative Assistant.

The final oral examination is primarily, but not necessarily, limited to a dissertation defense. The defense includes an open meeting for a presentation of research followed by a meeting with the dissertation committee members. The examination will be conducted with all members of the candidate's dissertation committee present. To pass, the candidate must receive the unanimous vote of the entire dissertation committee. Two negative votes shall constitute a failing status in the examination. A single negative vote will result in the degree being held in abeyance pending review and action by the Graduate Council of the Graduate School.

The Graduate School Handbook and the Graduate School website must be consulted for detailed regulations and procedures on preparation and submission of the dissertation copies and steps for graduation. Hard copies or electronic copies (Word and PDF), as required by each dissertation committee member, must be submitted prior to graduation.

Additional Graduation Requirements

In addition to fulfilling the Graduate School requirements for graduation, students must complete a check-out list available from the CEE Administrative Assistant prior to graduation. The completed and signed check-out list will be kept in the student's file after departure. In addition, all requirements for graduation established by the Graduate Program, the Graduate School and the University must be satisfied for graduation. For timely completion of the Ph.D. Degree it is essential to adhere to all of the Graduate School's policies and deadlines.

The student must obtain a Doctoral Degree Eligibility Form from the Graduate School website. This form shall be completed and submitted to the Graduate School Office for approval. Please note that the Doctoral Degree Eligibility Form will only be accepted after approval of the original Ph.D. Dissertation by all committee members.

APPENDIX A: COURSE SELECTION FORMS



UNIVERSITY OF MASSACHUSETTS
 AMHERST
 224 Marston Hall
 130 Natural Resources Road
 Amherst, MA 01003-9293

Department of Civil and
 Environmental Engineering
 voice: 413.545.2508
 fax: 413.545.2840
<http://www.cee.umass.edu/>

STRUCTURAL ENGINEERING AND MECHANICS: M.S. DEGREE COURSE SELECTION FORM

To fulfill the graduation requirements for a Masters of Science in the Structural Engineering and Mechanics Group of the Department of Civil and Environmental Engineering a total of 31 credits are required. At least 12 credits must be at the 600 level or higher. Five specific courses are required by the group and may only be waived if the student has previously taken an equivalent course and the advisor waives the requirement. Student must maintain a 3.0 minimum GPA to graduate.

Course	Notes (Semester taken)	Credits
Group A -		3
Group A -		3
Group B -		3
Group B -		3
Group A or B -		3
Elective ¹		
Elective ¹		
Elective ¹		
Elective ¹ (Coursework Student only)		
Elective ¹ (Coursework Student only)		
CEE 699 (Thesis Degree Students only)		
CEE 694B Structural Engineering Seminar (To be enrolled in every semester)		1
Total credits (31 minimum)		

¹To be approved by Academic Advisor. Students often take approved courses in Structural Engineering and Mechanics, Geotechnical Engineering, Mechanical and Industrial Engineering and Construction Materials or other areas to fulfill electives. The above courses will be completed to fulfill the Masters of Science degree. This document constitutes the agreed upon courses required to complete the degree. Any deviation from this agreement requires a written justification signed by the Advisor in order to meet graduation requirements.

 Student's Signature

 Advisor's Signature

 Student's Printed Name

 Advisor's Printed Name

