

# Procedures for the PhD Preliminary Exam in CEE-Structures and Materials Engineering

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The purpose of this document is to outline the standard operating procedure for the Civil Engineering PhD Preliminary Exam for students specializing in Structural and Materials Engineering. Presently, the faculty who administrate this program are:

## **Structures:**

- Jim Wight, [jwight@umich.edu](mailto:jwight@umich.edu)
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## **Materials:**

- Will Hansen, [whansen@umich.edu](mailto:whansen@umich.edu)
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The Preliminary Exam Coordinator (PEC) for Structural Engineering and Materials Engineering are listed below:

- Jason McCormick, Structural Engineering
- Will Hansen, Materials Engineering

## **Planning and Scheduling**

### *Departmental Policy*

Per the CEE departmental guidelines, each PhD student in Civil & Environmental Engineering must take the Preliminary Exam no later than 17 months after the beginning of their first semester as a PhD student at the University. Students may elect to take the exam sooner, but the exam will be administered the same way irrespective of how long a student has been enrolled at the University.

The research advisor of a student planning to take the Preliminary Exam is considered to be the Chair of the student's exam committee. As the Chair, they are required to send a memo to the Chair of the Graduate Committee, specifying the date of the exam, and requesting authorization to hold the exam. This memo should be sent no later than one week before the time of the exam. After the exam is over, the advisor is required to send another memo to the Chair of the Graduate Committee, notifying them of the outcome. Standard templates for both these memos can be obtained from the CEE Graduate Programs Coordinator. All memos sent to the Graduate Committee Chair should be CC'd to the Graduate Programs Coordinator, as well as the student's Preliminary Exam Committee.

The Graduate Committee Chair will formally notify the student of the outcome of their exam through an official letter sent to the student via email. In the case where a student has failed the exam, options for future action will be specified in this letter.

### *Standard Exam Schedule*

Preliminary Exams in the Structural and Materials Engineering areas will be held bi-annually, during the first week of January and the first week of May. Students planning to take the exam during either period must first consult with their research advisor, and then must notify (via email) the appropriate PEC of their intent to take the exam in either structural engineering or materials engineering. The student must send this email **no later than November 1** of the prior semester for the January exam or **March 1** of the prior semester for the May exam. This will allow time for scheduling all the exams, forming the committees, and developing the exam questions. The PEC will send an email reminding Structural and Materials Engineering Faculty and PhD students of the deadline in early October and February.

Each student's Preliminary Exam Committee will consist of 4 members, including at least 3 CEE faculty members from the Structural and Materials Engineering areas. The specific members of the committee will be assigned by the PEC. Committee assignments will be made by **December 15** and **April 15** for the January and May exams, respectively.

### *Ad-hoc Exams*

Students in the Structural and Materials Engineering areas are expected to take their exam during one of the standard times (January or May), and students should begin planning for this exam upon arrival at the University of Michigan. However, if extenuating circumstances require a student to take the exam at a different time of the year, an ad-hoc exam can be administered on a case-by-case basis. However, ad-hoc exams should only be planned as a last resort.

A student wishing to plan an ad-hoc Preliminary Exam must petition to do so. Petitions should be emailed to the PEC. The petition will then be voted on by the Structural and Materials Engineering faculty (including affiliated members). If approved, the ad-hoc exams are planned (including committee assembly, scheduling, and notifications to the Graduate Committee Chair) by the student's research advisor, not the PEC. However, the PEC should be copied on all correspondence.

### **Format**

The Structural and Materials Engineering Preliminary Exams are made up of a written and oral portion. The student is not allowed to bring reference materials of any kind to the exam, but is expected to bring a calculator. The student will be notified of the exam location at least 24 hours prior to the exam.

For the written portion of the exam, the student is given three written questions covering general topics within structural and materials engineering based on which PEC, structural engineering or materials engineering, he/she contacted and his/her emphasis in either structural engineering or materials engineering in their doctoral studies. These questions are meant to test the student's competency in the areas of structural mechanics, structural analysis, structural design, structural dynamics (structural

engineering students only), and materials (materials engineering students only). The student will have 3 uninterrupted hours to complete the written portion of the exam. During this time they are to solve in a neat and organized manner the three problems in their entirety or provide their best explanation of the solution process if they are unable to solve them. The student's solutions will be collected after 3 hours and graded by three of the faculty members making up the Preliminary Exam Committee.

After a period of at least 1 hour, but within the same day, the Preliminary Exam Committee will meet with the student for the oral portion of the exam. The oral portion of the exam will last 2 hours and allow the Preliminary Exam Committee to ask the student questions about his/her solutions and delve further into topics associated with structural mechanics, structural analysis, structural design, structural dynamics (structural engineering students only), and materials (materials engineering students only). However, these topics are typically related to the problems being discussed. The 2 hour time period will not necessarily be divided evenly between the three questions, but will follow the discretion of the Preliminary Exam Committee in order to ensure the competence of the student taking the exam. Upon completion of the oral portion of the exam, the student will be asked to leave the room and each member of the Preliminary Examination Committee will provide a score for each problem discussed during the oral portion of the examination and any additional comments that they may have.

After all exams are completed, the Preliminary Examination Committees will deliberate to determine the outcome of each exam. All faculty who participated on Preliminary Exam Committees for that exam period will deliberate as a group on all exams. Students will be notified of the decisions regarding the exams within 48 hours of the end of the last exam. This notification will be in the form of an official letter from the student's advisor, which states the outcome and provides feedback from the committee.

Students are prohibited from discussing any Preliminary Exam problems with others, even after decisions have been communicated. Violations of this rule will be considered a breach of the Honor Code.

## **Topic Areas**

The Preliminary Exam is designed to test a student's proficiency in the broad topics of structural and materials engineering including structural mechanics, structural analysis, structural design, structural dynamics (structural engineering students only) and materials (materials engineering students only). It is not designed to test a student's proficiency with specific topics covered in a given class they may have taken. If the student is asked a question that was not covered in a particular class taken by the student, this is not considered a valid excuse for failing to answer the question.