

# Materials Science & Engineering (MSE) PhD Preliminary Examination Policy

## Exam Overview

- **Purpose.** The purpose of the exam is to determine if the student is *prepared* to do PhD-level research. The exam tests the student's foundational knowledge in Materials Science and Engineering, the relevant literature of the proposed research, and the methods for the proposed research. The exam tests the student's ability to think critically, develop an experimental plan, and interpret data. The exam does not test the feasibility of the research. The committee will use the student's CU transcript, a letter from the research advisor, and performance during the exam to evaluate the student's preparedness.
- **Timing.** The preliminary exam is normally given in the spring of the student's second year, but must be completed before the third year begins (defined by a calendar year). For example, if a student enters the program in August 2019, then the prelim exam must be completed before classes begin in August 2021. Students with a Master's degree will complete the preliminary exam in the third semester of study.
- **Exam committee.** A committee of three faculty, at least two of which must be MSE Program or Affiliate Faculty, is assembled for each student. The student's faculty advisor is not on the committee. One committee member is randomly assigned by the MSE program to serve as chair of the committee.
- **Exam format.** The exam is an oral presentation prepared in advance and delivered in a "chalk talk" format. Questions from the committee may occur during and at the end of the presentation. The student may or may not get through his/her presentation, either is acceptable and neither dictates necessarily a pass or fail.
- **Exam attempts.** If the first attempt is failed, a second attempt is scheduled the following semester, nominally in the fifth semester. Two successive failures result in a terminal M.S. as the highest possible degree.

## Committee Formation, MSE Program Responsibilities, and Student Responsibilities

### **Committee Formation and MSE Program Responsibilities.**

- The three-member exam committee is determined based on a combination of the student's recommendation, recommendations of the Director/Assoc. Director, and faculty availability.
- The student's research advisor submits a confidential letter to the MSE Graduate Program Advisor that describes the student's progress and recommendation for continuation in the PhD program.
- The MSE Graduate Program Advisor identifies the date and time for the exam based on availability of the committee and the student's class schedule and reserves a room that has a whiteboard or schedules a zoom meeting. If using Zoom, the student will use their personal zoom link so that all zoom functionality is available at the time of the exam.
- A committee chair will be appointed by the MSE Graduate Program Advisor. The chair will be responsible for submitting feedback after the exam to the MSE Graduate Program Advisor.
- The committee receives the student packet, which is an electronic document that includes the student's research abstract, CU transcript, and advisor letter of recommendation.

### **Student Preparation and Responsibilities**

- When prompted by the Graduate Advisor (usually 2-3 months prior to the exam) the student provides a list of 5-7 potential committee members.
- In advance of the exam (usually 2-3 months prior to the exam), the student must provide an abstract to the MSE Graduate Advisor. The abstract should be a succinct summary no more than 300 words of the student's research, which should include motivation, research question, approach, preliminary findings, and future directions. The abstract is also used to make the final selection of the exam committee members.

- The student prepares a short oral presentation (20-30 minutes) in the form of a “chalk talk” that is focused on his/her research. Pre-prepared slides (PowerPoint, Google Slides, etc) are not allowed.
- The student may prepare a one-page document of figures. The document can be no more than 8”x11” in size and limited to one side. The one-page document is optional and can be provided at the time of the exam.

### **Examination Logistics and Format Details**

- The exam in its entirety is one hour.
- The student should plan to arrive at least 10 minutes in advance.
- Committee members are asked to arrive on time. If all committee members are not present at 15 minutes past the appointed time, the exam will be rescheduled. The rescheduled exam does not count as the student’s second attempt.
- The committee may interrupt at any time during the student’s presentation. The student should expect to be interrupted. The student should also expect that he/she may not get through the entire prepared presentation.
- The presentation combined with Q&A ends at 50 minutes after the start time. At this time, the student is excused from the room. In the case of a zoom meeting, the student or committee may be put in a breakout room. The committee has 10 min to discuss the student’s performance in the exam and the documentation provided to the committee (i.e., grades, performance in any TA/RA position, etc.) to arrive at a decision of pass or fail. **There is no conditional pass for the exam.**

### **Committee Evaluation and Feedback**

- **Evaluation.** During the discussion the committee should decide whether the student is prepared to continue in the program, and capable of completing a PhD. Relevant questions during discussion should include: “Can the student elucidate the impact, specific aims and methods used to carry out the proposed research?” and “Does the student understand the technical background and relevant fundamental literature to carry out the proposed research?” If there is significant doubt about the student’s grasp on their project, and preparedness for the remainder of the PhD, the student will fail the exam.
- **Voting and Pass/Fail Decision.** The committee may take a vote or arrive at a consensus on whether the student has passed the exam. A student may pass by majority vote or consensus. The student should be informed of the committee’s decision immediately. **The verbal result shared with the student is final.** If the committee needs clarification on any aspect of evaluation, a delay in confirming the result is acceptable. The committee chair should connect with the MSE Graduate Advisor and Assoc Director immediately to resolve the issue.
- **Feedback.** Following the exam, the committee provides feedback to the chair of the committee, who writes a summary of the student’s examination that includes strengths, weaknesses and any recommendations. The summary is submitted to the MSE Graduate Advisor within two days after the exam, but no later than one week of the exam. The summary may be 1-2 paragraphs in length. The feedback should not disclose any content in the confidential letter from the advisor. Committee recommendations and feedback should take into account the timing of a second attempt (if applicable); MSE students are expected to retake the exam if a first attempt is unsuccessful about three months later.
- **Pass/Fail Letter.** The student and the student’s research advisor receive the feedback and an official letter from the MSE Graduate Program Advisor stating the outcome of the exam.