

Department of Materials Science & Engineering  
University of North Texas

## Doctoral Qualifying Examination Policy

(Effective from January 1, 2024)

**Students are required to take the written qualifier exams no later than the end of the second year after starting the program. Taking the exam in year 1 or 2 is at the discretion of the student's advisor. Each student has two chances to pass the qualifier exams. If the student fails the second time on the exams, he/she needs to graduate with a MS degree and cannot continue in the PhD program. In case a student cannot appear in the qualifier exam due to a health-related reason or an unforeseen emergency, it is essential to send a written notification to the qualifier exam coordinator including a doctor's notice. In that case, the student may take the exam at the next available opportunity. Absence of a qualifying exam without notification will be considered equivalent to failing the exam.**

### **Phase I. Written Qualifier.**

**Written Qualifier** Students starting in the summer or fall semesters are required to take the exam the following May after the end of the spring semester (~1 year after they enter the program). Students starting in the spring semester are required to take the exam in May of the following year (~1.5 years after they enter the program). Written qualifier contains only general fundamental exam.

- **Scopes-** All students will take an exam based on the "Introduction to Materials Science" class which is currently based on the book by Callister. This is intended as a "leveling" exam since students from different natural science and engineering backgrounds are in the graduate MTSE program. All faculty may participate in writing questions.
- **Time-** 2<sup>nd</sup> Monday after final week of spring semester
- **Information session-** Exam coordinator will provide detailed information of qualifying exam at the beginning of each spring semester. Email notification will be sent to students regarding the time and location.
- **Specialty declaration-** When students register qualifying exam, please declare the specialty on one of the following areas:
  - Metals and intermetallics
  - Ceramics/composites
  - Electronic/optical materials
  - Polymers

These exams will be written by faculty committees with the appropriate specializations. The lead committee members will oversee formation of the committees. The exams will be based on specific elective courses and/or a specific reading list (Book(s), edition, specific chapters or pages) made available by the lead committee member. The exams will incorporate fundamentals from the core classes wherever possible. The core classes may be a part of the reading list.

**Phase II. Oral Qualifier / PhD Proposal Defense. (Around the end of August)**

**Must be completed in the same year during which the student passes the written qualifiers.**

**In case the student passes the written section but fails in the oral section of the qualifiers, he/she may re-appear for the oral section in the subsequent year for one last attempt.**

Students will propose and defend a topic that is expected to lead to their PhD dissertation. The topic must therefore be approved by the PhD advisor. The student can consult with their PhD advisor. All faculty may participate in the exam. The PhD committee is expected to participate in the exam. Prior to the Phase II qualifier exam, a student is required to complete the Ph.D. committee selection form with full signatures. Students will be admitted to Doctoral Candidacy after successfully passing the “PhD Proposal defense”. The qualifier examination result form will be completed and submitted Toulouse Graduate School for records after completion of this phase of examination.

The written proposal must be given to all PhD committee members at least one week prior to the student’s scheduled proposal exam date. The student with consultation from their PhD advisor will determine who the members of the committee are. MTSE department requires at least five members for a PhD committee with three of which being MTSE faculty (with primary appointments) and one committee member outside of MTSE. An external committee member needs to be Graduate Advising Faculty Member approved by MTSE and UNT Graduate School.

- **Research Proposal-** Research proposal is up to 10 pages, including at least following sections: Title; Project Overview; Background Introduction; Research Plan; Preliminary Data; References. Every Ph.D. proposal must be presented within the Heilmeier framework and must address the following questions:
  1. What are you trying to do? What is the problem? Why is it hard?
  2. How is it done today, and what are the limits of current practice?
  3. What's new in your approach and why do you think it will be successful?
  4. Who cares?
  5. If you're successful, what difference will it make? What impact will success have? How will it be measured?
  6. What are the risks and the payoffs?
  7. How much will it cost? How long will it take?
  8. What is the midterm and final "exams" to check for success? How will progress be measured?
- **Time-** Students are responsible to discuss with their advisor and reach out committee members to arrange the oral qualifier during following fall semester (Sept.-Dec.)
- **Format of Oral Qualifier-** The total oral qualifier for individual student will be up to 1.5 hours. 1<sup>st</sup> session is specialty fundamental questions from your research committee (30 mins-45 mins); 2<sup>nd</sup> session is research proposal presentation (15 mins presentation + 15-30 mins Q/A).
- **Expectation-** 3 evaluation sheets will be sent out to committee members to grade written proposal, fundamentals on research related specialty, proposal presentation.

For students who have passed the qualifier exams (both phase I and II), it is required that they do a pre-defense presentation to his/her PhD committee members at least six months prior final

dissertation defense. The presentation is to identify weaknesses and shortcomings in the research, and make specific, actionable recommendations to strengthen the dissertation. It is expected that all recommendations would have been implemented by the student at the time of final dissertation defense. The phase III evaluation form will be completed and signed by all the committee members. Complete phase III evaluation form is needed for student to apply for dissertation defense.

**Additional rules for Ph.D. qualifier exams:**

1. For students who change their advisor after partially or fully passing the Ph.D. qualifying exams, he/she needs to retake the Phase I specialty exam and/or Phase II oral exam in the next exam cycle (usually in the following year). If the research specialty (defined based on the four specialties offered in the Phase I of the qualifying exam) related to the student's dissertation research changes due to the change in advisor, the student needs to retake both the specialty exam of Phase I as well as the Phase II exam. If the research specialty remains the same after the change of advisor, then the student only takes the Phase II portion of the qualifying exam in the following year. A departmental "Change of Advisor" form must be completed and signed by the concerned student as well as by both the new and original advisors. Additionally, a written explanation of the reason for the advisor change must be included in this form. The completed form also needs to be approved by the departmental Graduate Advisor and Chair.
  2. Ph.D. students who transferred to UNT MTSE from another institution, e.g. joining with new faculty, will need to take full or partial MTSE qualifier exams based on the following conditions. If a student is from a Materials Science and Engineering (or directly related program such as metallurgy or ceramic science and engineering) Ph.D. program and has passed all qualifier exams in his/her previous institution, a waiver of the qualifier exams can be requested after approval by the Graduate Advisor and the MTSE Chair. For students who have passed qualifier exams but in a different program, they will be required to retake the general written exam. If a student has only passed part of the qualifier exam at his/her home institution, then the student will need to take all parts of the qualifier exams. Written documentation of the student's results from their former institution will be required to consider waiving any part of the qualifier exams.
  3. Announcement of the qualifier time and signup procedure will be provided to the students at least three months ahead. An information session involving participating students, coordinator, and major exam providers is offered around the time of announcement to clarify any issues or questions students may have.
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