

**Graduate Student Handbook  
for M.S. and Ph.D. Students in Materials Science and Engineering**

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Department of Materials Science and Engineering

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## 1. Introduction

This Handbook provides information about the current practices and policies of the Department of Materials Science and Engineering concerning graduate studies. It is the responsibility of each Graduate Student to familiarize themselves with these practices and policies and to ensure that all procedures relating to his or her degree have been fulfilled. Additionally, the student is expected to be thoroughly familiar with general requirements as detailed in this Handbook.

The Department of Materials Science and Engineering offers four degrees:

- Materials Science and Engineering, MS (Thesis or Problems)
- Materials Science and Engineering, PhD
- Materials Science and Engineering with a concentration in Biomedical Engineering, PhD
- Materials Science and Engineering with a concentration in Mechanical and Energy Engineering, PhD

## 2. Graduate program timelines/sequences

**Table-1: A typical Sequence for M.S. Students (Thesis Option)**

|  |   |
|--|---|
| 6 months - 1 year before intended admission date | Apply to Graduate Program   |
| Week before classes begin                        | Attend Orientation for new graduate students<br>Discuss with Graduate Advisor potential remedial courses if BS not in Materials Science                                 |
| First Year                                       | Take Courses<br>Choose Major Professor (middle of 1st semester) Begin Research<br>Choose Masters Committee (end of 2nd semester) File Degree Plan (end of 1st semester) |
| Second Year                                      | Take Courses<br>Begin writing Thesis  |
| Semester of Graduation                           | File for graduation with the Graduate School<br>Defend Thesis   |

**Table-2: A typical Sequence for M.S. Students (Non-Thesis Option)**

|  |   |
|--|---|
| 6 months - 1 year before intended admission date | Apply to Graduate Program   |
| Week before classes begin                        | Attend Orientation for new graduate students<br>Discuss with Graduate Advisor potential remedial courses if BS not in Materials Science |
| First Year                                       | Take Courses<br>File Degree Plan (end of 1st semester)  |
| Second Year                                      | Take Courses<br>Choose Professor for Special Topics course<br>Write a Report for the Special Topics course                              |
| Semester of Graduation                           | File for graduation with the Graduate School  |

**Table-3: Typical Sequence for Ph.D. Students**

|  |  |
|--|--|
| 6 months - 1 year before intended admission date | Apply to Graduate Program  |
| Week before classes begin                        | Attend Orientation for new graduate students<br>Discuss with Graduate Advisor potential remedial courses if BS not in Materials Science  |
| First Year                                       | Take Courses<br>Choose Major Professor (middle of 1st semester) Begin Research<br>Choose Ph.D. Committee (end of 2nd semester) File Degree Plan (end of 2nd semester)<br>Take Phase I Qualifier exam |
| Second Year                                      | Take Courses<br>Take Phase II Qualifier<br>Conduct Research  |
| Subsequent Years                                 | Take any remaining Courses<br>Conduct Research<br>Take Phase III Qualifier 6-12 months prior to defense  |
| Semester of Graduation                           | File for graduation with the Graduate School<br>Defend Thesis  |

### 3. Admission procedures

#### Holistic Policy

Our admissions focus is on seeking positive indication of potential success in the program. These indications include:

- A personal statement describing the applicant's laboratory, field, or applied interests, career plans, and discussion of how the program can serve to further these interests and plans will be examined for evidence of the appropriateness of the candidate to the program.
- A detailed examination of the student's transcript. Grade point average per se is not weighed heavily as most candidates for admission have grade point averages greater than 3.0. Accordingly, we examine the coursework on the student's transcripts as evidence of his/her research interests. Positive indicators of potential success in our program include greater than average course work in the biological and physical sciences, mathematics, or fields of

engineering. Similarly, evidence of experimental research previously undertaken is viewed as a predictor of future research productivity. For students interested in specialization at the master's level, appropriate coursework in relevant background areas is taken into consideration.

- Letters of recommendation offer evidence of the applicant's commitment to experimental research (as in letters from an undergraduate research sponsor). Evidence of success in relevant employment will be considered for the master's degree.
- A resume indicating the applicant's educational, research, and work experience. Evidence of success in relevant employment will be considered for the master's degree.

The department mission is to train students to be enthusiastic about conducting research. We seek students who show aptitude in as well as motivation for research. Students interested in the M.S. program will have their records examined for indicators of potential to succeed in related settings.

The Department of Materials Science and Engineering follows the application priority dates set by Toulouse Graduate School.

We accept graduate applications year round and review of admission will be on the rolling bases. For fall applicants, we begin evaluation of assistantship funding starting on February 15<sup>th</sup> each year. To be considered for all funding opportunities, we highly encourage students to submit all required application materials by February 15<sup>th</sup>. Later submissions will be considered as well until all the slots are filled.

### **Admission Criteria**

Our admission requirements are the same for M.S. and Ph.D. students. To apply for admission and financial support, the following documents are required:

**Official Transcripts** of all past degrees and currently enrolled programs (if applicable)

**Statement of purpose** for graduate study in the department and after graduation written by the applicant

**Three recommendation letters** indicating research and academic potential as well as ability to work in interdisciplinary teams. Recommenders should state whether they have recommended or are recommending other applicants to the department.

**CV** detailing education, research experiences, publications, conference and presentations, and other critical information related to the graduate admission.

**GRE** is preferred for students with degrees outside of North America. The GRE may be taken into consideration in the evaluation of student files to award teaching assistantships.

Although not required, applicants with publications or other scholarly works are encouraged to include those as part of the package.

### **Application Process**

- Complete and submit the application form with application fees. [GET STARTED HERE!](#)
- Submit your standardized test scores and transcripts to the Toulouse Graduate School

*UNT Graduate School  
1155 Union Circle #310440  
Denton, Texas 76203-5017*

**Transcripts:** Submit official or original academic transcripts (marksheet) and degree certificate from ALL colleges or universities attended to the Toulouse Graduate School. Minimum credential is equivalent to a 4-year U.S. bachelor's degree.

**Standardized tests:** Submit your standardized test scores and provide proof of English language proficiency (TOEFL 213 computer or 550 paper or 79 internet) to the Toulouse Graduate School. If you are unable to take the TOEFL prior to your application, you should write to the department graduate advisor, Dr. Samir Aouadi, requesting permission to complete these requirements prior to registration in the semester for which you are admitted.

- Proof of financial support must be provided to the graduate school before an I-20 document can be issued for international applicants.
- After receiving and setting up your UNT EUID, submit your supplemental documents (statement of purpose, letters of recommendation, etc.) to the department online.
- More information from the Toulouse Graduate School about graduate admissions.

#### 4. Transfer credit policies and procedures

To transfer graduate credits earned at other U.S. institutions of higher learning, the student must file a petition with the Graduate Advisor not later than two semesters after admission. The petition should be endorsed by the student's advisor, and should list the courses to be transferred, the university, the year, and the grade earned. The student should provide proof that the course to be transferred was not part of a program for which a degree was granted. Only courses with grades "A" or "B", taken within the last 5 years, can be transferred. Credit for a course will be transferred only if an equivalent course is given at the University of North Texas and if the equivalent course is not one of the first level or advanced level core courses offered by the program. A maximum of 12 semester credits may be transferred to satisfy either the M.S. or Ph.D. course requirements.

#### 5. Curriculum for each grad program

##### *Course Work for MS Program*

##### *Option 1, Thesis*

The applicant seeking a master's degree with a major in materials science and engineering will plan a degree program with the assistance of the student's major professor and the advisory committee. A graduate major must present credit for at least 32 semester credit hours. The student must maintain a B average in all MTSE courses.

##### **Core courses, 12 hours**

- MTSE 5000 - Thermodynamics of Materials
- MTSE 5010 - Bonding, Structure and Crystallography
- MTSE 5020 - Mechanical Properties of Materials
- MTSE 5500 - Electronic, Optical and Magnetic Materials

##### **Electives, 12 hours**

Twelve hours may be chosen from materials science or related fields, as approved by the major

professor and the advisory committee.

**Seminar in materials science and engineering, 2 hours minimum**

Please see “[Seminar in Current Topics in Materials Science](#)” below.

- [MTSE 5700 - Seminar in Materials Science and Engineering](#)

**Thesis, 6 hours minimum**

Work for the master’s thesis is comprised of independent and original studies that may be experimental, computational, theoretical or a combination of these. As part of these requirements, the student must present a formal written report that must be approved by the major professor and the advisory committee and filed in the graduate dean’s office. Reports for MTSE 5950 must be submitted in a form prescribed by one of the common refereed materials science journals, such as the manuscript form of the American Institute of Physics (see AIP style manual, current edition). See also the graduate school thesis requirements at [gradschool.unt.edu](http://gradschool.unt.edu).

- [MTSE 5950 - Master’s Thesis](#)

***Option 2, Problems in lieu of thesis***

The graduate credit requirement for the Master of Science degree is 35 semester hours chosen in the following manner.

**Core courses, 12 hours**

- [MTSE 5000 - Thermodynamics of Materials](#)
- [MTSE 5010 - Bonding, Structure and Crystallography](#)
- [MTSE 5020 - Mechanical Properties of Materials](#)
- [MTSE 5500 - Electronic, Optical and Magnetic Materials](#)

**Electives, 15 hours**

Fifteen hours may be chosen from materials science or related fields, as approved by the major professor and the advisory committee.

**Seminar in materials science and engineering, 2 hours minimum**

Please see “[Seminar in Current Topics in Materials Science](#)” below.

- [MTSE 5700 - Seminar in Materials Science and Engineering](#)

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**Problem in lieu of thesis, 6 hours**

Research problems in lieu of thesis are independent, original studies that may be experimental, computational, theoretical or a combination of these. As part of the requirements for each problems course, the student must present a formal written report of the work done in the course, which must be approved by the major professor and the advisory committee. Reports for MTSE 5920-MTSE 5930 must be submitted in a form prescribed by one of the common refereed materials science journals, for example, in the manuscript form prescribed by the American Institute of Physics (see AIP style manual, current edition).

- [MTSE 5920 - Research Problems in Lieu of Thesis](#)

- [MTSE 5930 - Research Problems in Lieu of Thesis](#)

### **Seminar in current topics in materials science**

All MS students are expected to attend [MTSE 5700](#) during each term/semester of full-time graduate study.

### **Course work for PhD Program**

For the student who has a BS degree, the approximate requirements follow:

#### **Core courses, 12 hours**

- [MTSE 5000 - Thermodynamics of Materials](#)
- [MTSE 5010 - Bonding, Structure and Crystallography](#)
- [MTSE 5020 - Mechanical Properties of Materials](#)
- [MTSE 5500 - Electronic, Optical and Magnetic Materials](#)

#### **Electives, 24 hours minimum**

Eight 3-hour courses (24 credit hours total) may be chosen from materials science or related fields, as approved by the major professor and the advisory committee.

#### **Individual research, 10–22 hours**

Additional course work may be taken in lieu of individual research hours.

10 hours are required if the individual enters the PhD program after previously having completed an MS.

22 hours are required if the individual enters the PhD program after previously having completed only a bachelor's degree.

- [MTSE 6940 - Individual Research](#)

#### **Seminar in materials science and engineering, 2 hours minimum**

Please see "[Seminar in Current Topics in Materials Science and Engineering](#)".

- [MTSE 5700 - Seminar in Materials Science and Engineering](#) (two semesters; 1 credit hour each).

#### **Dissertation, 9–12 hours minimum**

9 hours are required if the individual enters the PhD program after previously having completed a master's degree.

12 hours are required if the individual enters the PhD program after previously having completed only a bachelor's degree.

- [MTSE 6950 - Doctoral Dissertation](#)

#### **Seminar in current topics**

- All doctoral students are expected to attend MTSE 5700 during each term/semester of full-

time graduate study. A seminar based on the student's dissertation research must be given during the regularly scheduled class time prior to and in addition to the formal defense of the dissertation.

## 6. Degree requirements

### Degree Plans

([Master's degree plan form](#) or [Doctoral degree plan form](#))

**Students must complete a Degree Plan by the end of their second semester.**

Suggested steps to writing your degree plan:

Meet with your research advisor, or if you do not have one assigned yet, then meet with the current graduate advisor.

For the meeting, print out the degree plan form: [Master's degree plan form](#) or [Doctoral degree plan form](#). Take a current unofficial transcript print out or a listing of courses you have taken to date.

Graduate credit transfer from another program is possible for up to 6 hours for an MS and up to 24 hours for a PhD, if none of these credits were used toward another degree and pending Graduate Advisor approval. For total credit requirements of MTSE graduate degrees, please see the Hours at a Glance section below.

Requirements related to number of courses are tabulated below. Some additional points are given here:

Masters students can take more than the prescribed total credit hours and also take research hours.

For all plans, additional research hours will not substitute for in-class course work.

If you have past coursework that overlaps with the core courses, you are encouraged to meet with the professor teaching the core class and review whether you need to take it.

M.S. students can take core courses throughout their program.

Doctoral students should take core courses within the first two semesters, keeping in mind that they need to take the Ph.D. qualifier at the end of their first year. Note that qualifiers are only offered in Summer. Therefore, students joining in Spring will be able to take their qualifier when there is one complete rotation of core courses offered during their enrollment.

For doctoral students, the credit hours related to total in-class course hours represent the minimum required. You can take additional in-class courses and lower the number of research hours that you take. You cannot take more research hours to supplement in-class course requirements.

The thesis/dissertation hours represent the maximum permitted on your degree plan. They require continuous enrollment. Therefore, it is recommended that you take these hours close to the semester when you expect to defend your thesis/dissertation.

### Hours at a glance

Four core courses are required for all MTSE graduate students:

- MTSE 5000 - Thermodynamics of Materials
- MTSE 5010 - Bonding, Structure and Crystallography
- MTSE 5020 - Mechanical Properties of Materials

- MTSE 5500 - Electronic, Optical and Magnetic Materials

PhD students who do not have a previous materials-related degree and do not have relevant fundamental materials courses listed in their transcripts must take MTSE 5100 “Fundamental Concepts of Materials Science”. These students must also take the Fundamental Concepts of Materials Science, Part II currently listed as MTSE 5800 Advanced Topics of Material Science.

PhD students are required to consult with their advising faculty on required specialty courses for their qualifying examinations. More information regarding PhD qualifying exams can be found at our website (<https://materials.engineering.unt.edu/graduate/qualifying-exams>).

See the [UNT Catalog page](#) for the full listing of core and elective courses for the MTSE Department. Offered courses differ from year to year. Please visit Registrar’s Office webpage (<http://registrar.unt.edu/registration/schedule-of-classes.html>) for the up-to-date information.

| Degree                           | MS (Thesis)                              | MS (Problems)*                           | PhD with prior MS†                           | PhD after a Bachelors Degree                   |
|----------------------------------|--|--|--|--|
| Core courses                     | 12 hours (Four 3 credit courses)         | 12 hours (Four 3 credit courses)         | 12 hours (Four 3 credit courses)             | 12 hours (Four 3 credit hour courses)          |
| Elective courses                 | 12 hours (Four 3 credit courses)         | 15 hours (Five 3 credit courses)         | Minimum 9 hours (three 3 credit courses)     | Minimum 24 hours (eight 3 credit hour courses) |
| Seminar                          | 2 hours (Two semesters of 1 credit each) | 2 hours (Two semesters of 1 credit each) | 2 hours (Two semesters of 1 credit each)     | 2 hours (Two semesters of 1 credit each)       |
| Problems/. Research Dissertation | 6 hours of Thesis                        | 6 hours of Problems in lieu of thesis    | 10 research hours<br>9 hours of Dissertation | 22 research hours<br>12 hours of Dissertation  |
| <b>Total</b>                     | <b>32</b>                                | <b>35</b>                                | <b>42</b>                                    | <b>72</b>                                      |

[\*] *Students with prior MS degrees in Materials, Metallurgy, Ceramics or Polymers may consider substituting the core for electives*

Ph.D. students are allowed up to two special problems/special study course and M.S. students are allowed to take one special problem/special study course in their degree plan.

For more information on graduate degree plans, contact

**Lisa Dunlop**

*MTSE Student Relations*

E-mail: [Lisa.Dunlop@unt.edu](mailto:Lisa.Dunlop@unt.edu)

Phone: 940-369-7147

Fax: 940-565-4824

### **7. Pass-through master's procedure**

This option is available to students who were admitted to the Ph.D. program and did not successfully complete the degree requirements. Students under this track must first complete the necessary work for the M.Sc. degree including successfully completing all of the required coursework and successfully defending his/her thesis

### **8. Academic advising**

A graduate advisor is one of the first people a student would want to contact when he/she is ready to begin your studies. The advisor can help you choose courses and guide you to create your degree plan.

### **9. Selection of major professor and advisory committee**

Students admitted to the MTSE Program should make every effort to choose a thesis (research) advisor during the first semester of their enrollment in the Program. A student entering the program with GA-UGS support or UGS-only support should, before choosing his/her thesis or advisor, contact faculty members of the Program to determine an area of mutual research interest. The selection of the research advisor is the most important decision the student will make in the early stages of their career study. This selection should be made in writing using the degree plan form (signed by the student and the faculty advisor), and approved by the Graduate Advisor and the Chair of the Department.

If the research advisor is not a primary MTSE faculty member, the student must still have a primary MSE faculty member as the academic advisor. In this case, the student would still perform research for their research advisor. Furthermore, the primary MTSE faculty member would assist in organizing the student's dissertation committee. Both may assist in organizing the student's progress review and act as dissertation advisor. The advisor(s) will advise the student on all phases of the progress towards the degree objective, including their academic program and the thesis or dissertation research project, which is carried out under close guidance by the research advisor. The student should, therefore, keep their advisor(s) informed at all times of their academic progress, courses taken, grades received, examinations passed, etc. The award of financial support beyond the first year invariably will depend on the academic performance of the student, as well as on the availability of financial resources. The Graduate Advisor must be advised of this support in writing.

### **10. Satisfactory progress**

A student having a grade of "F", "I", or, "NG" or "UP" in any course for which he/she has registered is not considered to have completed the degree requirements. An "F" grade is permanent on the student's transcript and is included in the GPA. The student cannot graduate without retaking the course with the "F" grade and obtaining a Pass (A, B, C, etc) grade. In unusual cases, an alternative procedure may be permitted, provided that such procedure has the approval of the course instructor and the advisor.

The student must maintain at least a 3.0 cumulative GPA in graduate courses at UNT and within the Graduate Program. Failure to maintain at least a 3.0 GPA may result in probation in the following semester (consult the 'Graduate Student's Responsibilities', for details about probation).

No student with a GPA below 3.0 will be recommended for graduation.

Satisfactory progress is also required for all thesis requirements. For an MS degree, the thesis committee needs to approve that the candidate successfully finished all his/her degree requirements. For Ph.D. candidates, he/she needs to pass all phases of the qualifier exam (see section 13).

### **11. Publication and research requirements**

The doctoral research work of a student must be independent and original, leading to at least two accepted refereed publications in reputable journals with the candidate as the first author. The dissertation itself is a stand-alone, coherent document that reflects the highest quality that the MTSE Program at UNT strives to maintain. This document is archived by the UNT Libraries and by the international professional community through the services of the "Dissertation Abstracts".

### **12. Plan/guidelines for students to successfully exit the program(s)**

The degree plan, highlighted in section 6, provides a plan for students to successfully exit the program. Students that satisfy the requirements highlighted in the degree plan, that maintained a GPA greater than 3.0, that successfully passed their thesis defense, and for Ph.D. students all of their qualifier exams may successfully exit the program.

### **13. Qualifying/comprehensive exam(s)**

The Ph.D. qualifying exam will consist of the three phases described below and will be required of all doctoral students.

#### **Phase One**

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).

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 pursue the graduate MTSE PhD program. All faculty may participate in writing questions.

#### **Phase Two**

Must be completed in the same year during which the student passes the written qualifiers (for Phase I exams in May, that will cover the period till the end of December). 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 exam will also include fundamental questions on one of the following areas:

- Metals and intermetallics
- Ceramics/composites
- Electronic/optical materials

- Polymers

The exams will be based on specific elective courses and/or a specific reading list (book(s), edition, specific chapters or pages or core classes), and will incorporate fundamentals from the core classes wherever possible.

### **Phase Three**

A Pre-Dissertation Presentation must be conducted between 6 and 12 months prior to final dissertation defense.

This presentation is to the Ph.D. committee members only. Committee members will identify weaknesses and shortcomings in the research, and will 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.

### **Qualifying Exam Policies:**

(Effective from January 1, 2018)

**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 by including a doctor's note. In that case, the student may take the exam at the next available opportunity. Absence at a qualifying exam without a prior notification will be considered equivalent to failing the exam.**

#### Phase I. Written Qualifier. (Around mid-May)

On day one, all the students will take an exam based on the "Introduction to Materials Science" class (MTSE5100) which is currently based on the book by W. Callister "Fundamentals of Materials of Materials Science and Engineering". 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.

**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.**

#### Phase II. Oral Qualifier / PhD Proposal Defense.

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

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 (~15 pages in length) must be given to all PhD committee members *at least one week prior* to the student’s Phase II exam date. The student, with the consultation of their PhD advisor, will determine the members of the PhD committee. 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.

Every PhD proposal must be presented within the Heilmeier framework, which consists of a series of questions proposed by Dr. George Heilmeier (the former director of DARPA) to evaluate scientific proposals, and must address the following questions:

- a) What are you trying to do? What is the problem? Why is it hard?
- b) How is it done today, and what are the limits of current practice?
- c) What's new in your approach and why do you think it will be successful?
- d) Who cares?
- e) If you're successful, what difference will it make? What impact will success have? How will it be measured?
- f) What are the risks and the payoffs?
- g) How much will it cost? How long will it take?
- h) What are the midterm and final "exams" to check for success? How will progress be measured?

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 filled and signed by all the committee members. A phase III evaluation form is needed for student to apply for dissertation defense.

### **Additional rules for the Ph.D. qualifier exam.**

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.

#### 14. Candidacy for doctoral program

##### Phase Two

*Oral Qualifiers / Ph.D. Proposal Defense* Must be completed after the end of year 1, but no later than the end of year 2 in the Ph.D. program.

Students will propose and defend a topic that is expected to lead to their Ph.D. dissertation. The topic must therefore be approved by the Ph.D. advisor. All faculty may participate in the exam. The Ph.D. committee is expected to participate in the exam. Students will be admitted to Doctoral Candidacy after successfully passing the "Ph.D. proposal defense".

#### 15. Dissertation proposal

Every Ph.D. proposal must be presented within the Heilmeyer framework and must address the following questions:

- What are you trying to do? What is the problem? Why is it hard?
- How is it done today, and what are the limits of current practice?
- What's new in your approach and why do you think it will be successful?
- Who cares?
- If you're successful, what difference will it make? What impact will success have? How will it be measured?
- What are the risks and the payoffs?
- How much will it cost? How long will it take?
- What are the midterm and final "exams" to check for success? How will progress be measured?

#### 16. Thesis preparation and requirements

The doctoral research work of a student must be independent and original, leading to at least two refereed publications in a reputed journal with the student as the first author. A total of two papers is required prior to graduation. The dissertation itself is a stand-alone, coherent document that

reflects the highest quality that the MTSE Program at UNT strives to maintain. This document is archived by the UNT Libraries and by the international professional community through the services of the “Dissertation Abstracts”.

## **17. Dissertation preparation and requirements**

The student should initiate the process by submitting the Dissertation Defense application (use relevant form) to the Graduate Advisor.

The University of North Texas (UNT), as a member of the Council of Graduate Schools (CGS), endorses the fundamental tenet on openness and access of thesis and dissertation research as stated in the CGS policy manual *The Doctor of Philosophy Degree: A Policy Statement* (CGS, 2005).

In compliance with CGS, it is the policy at UNT that “an essential aspect of dissertation [and thesis] research and scholarship is the free and full dissemination of research results. Restrictions, either in the conduct of dissertation [and thesis] research or in the sharing of its results, are antithetical to that spirit.” *The free and full dissemination of research results covers every aspect of the dissertation including oral presentation and electronic thesis.*

Student thesis and/or dissertation examinations must be conducted and defended in a public forum, according to the procedures outlined in the University Graduate Handbook of the Graduate College. The defense must be scheduled no later than four weeks before the end of the semester in which the degree is expected. Public announcement of the upcoming defense must be made by the MTSE Department office at least 7 business days in advance of the examination date. Prior to scheduling and announcement, the student is required to receive the approval from the MTSE Graduate Program Coordinator to ensure that all the pre-requisites for the final defense are met.

The Graduate Program Office will initiate the Ph.D. Dissertation Defense Approval form for the thesis advisory committee approval. A final copy of the dissertation, incorporating all recommended revisions, must be approved by the thesis advisor before the student can be certified (use relevant form) for graduation. In exceptional cases, the Graduate Studies Committee or Program head, may require additional revisions to the dissertation. One copy of the final document must be deposited with the program for archival purposes.

## **18. Requirements for successful continuation in program**

### **A. Graduate Student Responsibilities.**

The graduate student is responsible for monitoring progress toward the advanced degree by meeting the deadlines for specific events such as selecting the advisor, taking the qualifying examination, completing course requirements, etc. A checklist will be reviewed by the Director of Graduate Studies periodically, and the student will be notified in writing about his/her progress towards the degree. If the student is found to be in violation of any of the regulations (such as failing to maintain a “B” average in courses, failing to meet the appropriate deadlines, etc.), he/she may be recommended for probation for that academic semester. If a student is on probation for two consecutive semesters or three non-consecutive semesters, he/she may be denied further financial aid and dismissed from the program.

### **B. Course Deficiencies.**

A new graduate student who is deficient in undergraduate studies may be required by his/her advisor to take certain undergraduate courses to make up such deficiencies. Graduate credit, however, will not be granted for these courses, unless they are listed as equivalent courses offered

by the University. All students who enter the Graduate program with Materials Science and Engineering as their major subject must be familiar with the fundamental principles and laboratory techniques that are characteristic of this discipline. Usually, the students with deficiencies in undergraduate studies will not receive a graduate teaching assistantship (UGA) from the Department.

### **C. Graduate Committees.**

The various committees, for the MS thesis defense, PhD dissertation research progress report, and PhD dissertation defense, must be formally appointed by the Graduate Advisor with approval from the Graduate Studies Committee. The request for appointment of a thesis committee must be initiated by the graduate student, with the approval of his/her thesis advisor.

### **D. Time Constraints for Submission of Written Documents**

The students must submit the various written documents to the appropriate committees at least 7 business days prior to the date of the exam. Such written documents include the MS thesis, literature review report for PhD qualifying examination, and PhD progress report & dissertation.

### **E. Changing Advisor.**

It is recognized that occasionally, a student may have to change his/her academic advisor during the course of his/her tenure in the graduate program. Normally, such a change should be driven by academic considerations but, in any event, an approval form must be processed through the Graduate Advisor and Graduate Program Office, before the student can officially change his/her advisor. Approval and agreement by all parties to this change should indicate that all research obligations to the current advisor are met as a pre-condition for the student to change advisor.

### **F. Advisors from Other Departments.**

A student enrolled in the Program of Materials Science and Engineering may sometimes need to have an advisor from another department in the College or University, because of the interdisciplinary nature of the program he/she may plan to pursue. Approval may be requested from the Graduate Advisor. A condition for approval is that the student must also have a program advisor who will guide his/her academic progress within the program. A graduate student may not choose an outside advisor in the first year if he/she is receiving an MSE Program GA that year. The outside advisor may not advise more than two MSE graduate students at any given time. A graduate student who was admitted and has received financial aid from the MSE program is considered a graduate student of the Program and must abide by the prevailing graduate regulations, even when the research advisor is from another department.

### **G. Maximum Number of Credit Hours.**

The University has set an upper limit for the number of credit hours that a graduate student can earn and still be eligible for financial aid (UGS, GA, etc.). For students who start in the graduate program at UNT after a BS degree this upper limit is 174 graduate semester credit hours. For students starting after an M.S. degree from another institution this upper limit is 134 graduate credit hours. For students transferring from another department within the University of Cincinnati, graduate credits earned in different departments are counted cumulatively in determining whether the above stated upper limit has been reached.

### **H. Certification for Graduation.**

The Graduate Program Coordinator certifies the students for award of the MS and PhD degrees. At the time of certification, the entire academic file is reviewed to assure compliance with all the academic requirements for graduation. It is the student's responsibility to make sure that he/she follows all the academic requirements. A student is expected to graduate within 12 months of the date of his/her thesis/dissertation defense. Any extension of this limit must be approved by the entire thesis/dissertation Examination Committee. Failure to comply with this time limit may result also in non-certification for graduation. Under these conditions, the Graduate Studies Director may recommend that an MS student be not allowed to continue in the PhD program, and that a PhD student be asked to again defend his/her dissertation.

### **I. Part-time Students.**

All provisions stated in this Handbook are applicable to part-time students as well as to full-time students. However, part-time students are not subject to the time limitations set for Ph.D. qualifying examination and for dissertation research progress oral review. They are subject, however, to other time limits set by the University Graduate Handbook. A change in the status of a student from full-time to part-time or vice versa will require approval by the student's advisor and the Director of Graduate Studies.

### **J. Conflict and Grievance Resolution**

Students who have a conflict with their advisor, course instructor, staff member or other students should bring the issue to the attention of the Graduate Advisor, who will initiate the necessary ameliorative steps. If this route is not available, the student may make an appeal directly to the Program Head.

### **K. Degree Progress Review.**

The MSE Graduate Program Office will maintain all records to monitor the progress of graduate students. Degree Progress Audit (DPA) forms summarizing the student's progress towards the stated degree objective will be made available to the advisor, periodically. The student is ultimately responsible to be thoroughly familiar with and comply with the Program, College, and University graduate regulations.

The MSE Graduate Studies Office will maintain all records appropriate for monitoring the progress of graduate students towards their degree objectives. Degree Progress Audit (DPA) forms summarizing the student's progress towards the stated degree objective will be made available to the advisor, periodically. The student must be familiar with these procedures, and is responsible for complying with all Program, College, and University graduate regulations.

## **19. Policies and procedures for student termination from program(s)**

The graduate student is responsible for monitoring progress toward the advanced degree by meeting the deadlines for specific events such as selecting the advisor, taking the qualifying examination, completing course requirements, etc. A checklist will be reviewed by the Director of Graduate Studies periodically, and the student will be notified in writing about his/her progress towards the degree. If the student is found to be in violation of any of the regulations (such as failing to maintain a "B" average in courses, failing to meet the appropriate deadlines, etc.), he/she may be recommended for probation for that academic semester. If a student is on probation for two consecutive semesters or three non-consecutive semesters, he/she may be denied further financial aid and dismissed from the program.

## 20. Travel grant opportunities

Travel grants are available to graduate students who are in good academic standing. The 2021/2022 Travel Grants will support the cost of conference registration to professional meetings that are relevant to their degree. Please consult the following website to apply for such grants:

<https://tgs.unt.edu/new-current-students/travel-grants>

<https://engineering.unt.edu/students/scholarships>

## 21. Important campus contacts, like Dean of Students, UNT-International, TGS

## 22. Appendices could include forms, samples from thesis/dissertation announcements, TA/TF/grader applications

### Additional requirements:

M.S. students that choose the thesis option are expected to join a research group **no later than the end of their first semester** in the program (TA/RA recipients are required to choose the thesis option). Non-thesis students are also encouraged to find their research advisors before the end of their first year in the program.

All M.S. students need to prepare a [degree plan](#) based on the department's degree requirements and seek approval from the department and the college **no later than the end of their second semester** in the program.

### *Ph.D. Requirements*

The Doctor of Philosophy degree represents the attainment of a high level of scholarship and achievement in independent research that culminates in the completion of a dissertation of original scientific merit. Hence, it cannot be prescribed in terms of a fixed semester credit hour requirement.

Generally, the degree consists of 72 semester credit hours beyond a bachelor's degree and 42 hours beyond the master's degree. Of these credit hours, 12 semester credit hours are allocated for the dissertation (after a bachelor's degree) and 9 semester credit hours are allocated for the dissertation (after a prior master's degree).

It is expected that the candidate will have published at least two original research articles in refereed journals prior to graduation.

### Admission to the doctoral program

Departmental admission to doctoral candidacy in materials science requires a satisfactory score on the written and oral sections of the qualifying examination (see "Examinations" section below). Contact the Toulouse Graduate School or the program for current admission requirements, or see information posted on the graduate school web site at [gradschool.unt.edu](http://gradschool.unt.edu)

Approximately a year after the candidate is admitted to candidacy, the student is examined on the chosen area of specialization: metallic, ceramic, polymer or electronic materials (see "Examinations" section below for details).

Enrollment in [MTSE 6950](#) is not allowed until the student has been admitted to candidacy and has successfully passed the examination on the chosen specialization.

### Examinations

A written qualifying examination consisting of a "general exam" that tests core MTSE concepts

and a “specialty exam” in one of the following areas: electronic materials, ceramics, metals, polymers or mechanics and energy systems.

After passing the written exam, students are required to complete and defend an original research proposal that, if executed, would lead to a PhD dissertation.

Upon passing the written and oral examination by the examination committee, the applicant is admitted to candidacy.

A comprehensive oral exam related to the area of specialization of the student (metallic, ceramic, polymer or electronic materials), not to be confused with the student’s PhD dissertation defense, is taken by doctoral candidates approximately one year after they have completed the oral and written qualifying exam.

Details of the examination schedule, expectations and criteria for successful completion are available in the Materials Science and Engineering Graduate Student Handbook available in the department office and posted to the department web site.

### **Final examination**

This oral examination is primarily a defense of the dissertation, which must be submitted in final form to the final examination committee at least seven days prior to the scheduled oral examination.

### **Additional Requirements:**

Ph.D. students must join a research group **no later than the end of their first semester** in the program, regardless of the source of funding.

Ph.D. students must prepare a degree plan and seek approval from the department and the college **no later than the end of their second semester** in the program.

### **Ph.D. Thesis Committee**

A Ph.D. student’s thesis committee will consist of five members. The major professor of the Ph.D. student must be from the Department of Materials Science and Engineering (Note: Faculty outside of Materials Science but within UNT can serve as major professor, only if championed by a Materials Science faculty member and approved by the department). In addition to the major professor, three other committee members must also come from the Department of Materials Science and Engineering. The fifth member should either be from another UNT department or external to UNT if the major professor and co-advisors agree that is appropriate. External committee members must be nominated by the major professor and approved by the grad school before they can serve.

### ***M.S. Requirements***

The applicant seeking a master’s degree with a major in materials science and engineering will plan a degree program with the assistance of the student’s major professor and the advisory committee. A graduate major must present credit for at least 32 semester credit hours. The student must maintain a B average in all courses.

### **Examinations**

An entrance interview and proficiency examination concerning fundamental materials science is

required of all students. The results are used for advisory, placement and remedial purposes.

An oral presentation of the master's thesis is required. A decision on acceptance of the thesis is made by the student's advisory committee after an oral examination is successfully completed. A decision on the acceptance of a written report based on problems in lieu of thesis is made by the student's advisory committee. Guidelines for thesis preparation are available from the department secretary. See also the graduate school requirements at [gradschool.unt.edu](http://gradschool.unt.edu)