Boston University College of Engineering
Materials Science & Engineering

Materials PhD Handbook
2024-2025

MSE PhD Handbook

All MSE PhD students must adhere to and meet the PhD degree requirements as set forth by the College of Engineering and the Division of Materials Science and Engineering.

Index:

Division & Engineering Contacts

- **Advisor**
- **Graduate Programs Manager**
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  15 Saint Mary's Street, Room 118
- **Associate Division Head for Graduate Programs**
  Professor Soumendra N. Basu
- **College of Engineering, Graduate Programs Office**
  Stacey Herman, Assistant Dean for Graduate Programs and Deputy Title IX Coordinator
  44 Cummington Mall, Room 114, enggrad@bu.edu

PhD Degree Requirements

All PhD students are assigned an academic advisor when entering the program. The Graduate Programs Manager will notify incoming students about their advisor assignment prior to registration. The student's academic advisor can provide

general information/guidance and help the student to complete his/her course registration.

By April of the first academic year, PhD students should have identified their research advisor and inform the Division Graduate Programs Manager at mse@bu.edu.

- College of Engineering Graduate Bulletin
- PhD Program Overview
- MSE PhD Program Requirements
- **Post-bachelor's PhD Masters Requirements**
  Post-bachelor's PhD students must complete the Masters requirements and declare the masters degree on completion of the Prospectus Defense.

General Guidance

First Year Course Selection: All PhD students are strongly encouraged to take the MS core courses offered on the PhD Qualifying Exam (ENGMS 503, ENGMS 505, ENGMS 577). Dean's Fellows may take 8 additional credits, such as concentration area, Math Requirement or other courses to help with their research.

Students without a prior MSE degree are strongly encouraged to enroll in MS 539 – Introduction to Materials Science and Engineering at the first opportunity.

Transfer Credits: PhD students are not permitted to transfer credits, with one exception. Post-Master's PhD students who obtained their Engineering Masters degree at Boston University may petition to apply credits not used for their Master's degree to their PhD program. Only credits that are applicable to degree requirements are acceptable (i.e., 500-level and above, a B or better, etc.). The student is required to fill out a Graduate Petition Form and have it signed by his/her advisor and Division Associate Head before submitting it to the Division Graduate Programs Manager for processing.

Grades for 900-level Coursework. Only grades of P, F, or J will be assigned to research/dissertation credits.

Audits: After all credit requirements have been fulfilled, PhD students are permitted to audit one course per semester in order to continue to take advantage of course offerings.

Policies and Procedures

Policies and Procedures are outlined in the College of Engineering Graduate Bulletin, the Graduate Programs Office website (graduate life and academic resources), and the Professional Development & Postdoctoral Affairs Office; here are some helpful links.

- Academic Conduct Code
- Auditing Courses
- Childbirth and Adoption Accommodation
  Submit the Childbirth and Adoption Accommodation for Full-Time PhD Students Notification Form to the Graduate Programs Manager at se@bu.edu.
- Course, Grade, and Degree Policies
- Graduate Program Deadlines
- Intellectual Property Policy Agreement
- Laboratory Injuries – Coverage for PhD Students
- Registration and Attendance
  NOTE: Failure to register for classes by the published registration deadlines may cause your appointment to be terminated and/or delay payment of your weekly stipend.
- Student Bereavement
- Student Records

Satisfactory Academic Progress for PhD Students Policy

The College of Engineering is committed to five full years of financial support for graduate students in the CoE PhD program who maintain Satisfactory Academic Progress. This support will be in the form of Teaching Fellowships, Research Assistantships, or Graduate Fellowships. Funding beyond five years is generally provided (but not guaranteed) to students who are working productively toward the

PhD degree. The following achievements are required to maintain Satisfactory Academic Progress:

- Students must complete the required coursework with a B average (GPA of 3.0) or better and pass the PhD qualifier exam within the allotted time frames. Thereafter they need to complete a Dissertation Prospectus and a Dissertation. Details on the course requirements and qualifier exams are found on the respective departmental or division web sites.

Students are expected to find a research home by the end of their second semester. A student can either join a research group directly on their arrival, or can go through a rotation program through different laboratories. If a student does not find a research home after two rotations (at least three months each) by the end of the second semester, division support over the summer may be available on a case-by-case basis. A lack of adequate effort to secure a research home by the end of the second semester, or the inability to find a faculty research supervisor willing to support the student with DRF funding by the end of 12 months is interpreted as the student making insufficient progress towards the PhD degree and may be subject to removal from the program.

In rare cases, after the first 12 months a student is able to identify a faculty willing to serve as a research supervisor but neither the faculty nor the student is able secure extramural funding for the second year. This student can petition and request one academic year (2 semesters) of funding from departmental or division resources. Such a request will need to convey to the chair or division head that the student has found a research advisor willing to supervise the student and that the advisor and/or student have a concrete plan to secure extramural funding sources following the additional academic year. Decisions to support this request are at the discretion of the department chair/division head. If approved, and no such funding has emerged after the second year, these students will be deemed as not making satisfactory academic progress and they may not be permitted to complete their PhD studies. After joining a laboratory in accordance with the conditions above, students register for research credits each semester and summer they work in that laboratory. If the supervisor feels the student is not making satisfactory progress, the supervisor will provide a 4-month warning letter (equivalent to a semester or summer). If the progress remains unsatisfactory, the faculty will dismiss the student from their laboratory. The student must then either find an alternative funding source from an individual faculty member or leave the program. After dismissal, the student has one

summer or academic semester to find alternative support. During this period, the department or program is under no obligation to find support for the student but may choose to do so, at the discretion of the department/program leadership.

Any egregious violation of academic or research ethics may result in immediate dismissal from the program at any stage with no opportunity for re-admission.

Program Learning Outcomes

The Division Program Learning Outcomes are designed to provide a given set of courses and other requirements so that students may acquire the knowledge, skills, habits of mind, and attitudes necessary to engage in a materials science career on graduation.

MSE PhD Program Learning Outcomes

1. Apply knowledge of mathematics, science, and engineering to identify, formulate, and solve materials science and engineering problems.
2. Use modern engineering tools and techniques to successfully practice the engineering profession in a variety of settings.
3. Use oral and written communication to convey technical concepts to engineers and nonengineers.
4. Carry out independent research in the area of materials science and engineering, and effectively communicate the results.
5. Lead technical innovation and train future generations of engineers.

MSE PhD Program Completion Schedule

Register for classes	Before the start of each semester. See College of Engineering Graduate Deadlines.

First Semester "Research Rotation" Option	First-Year Materials students may pursue an informal research rotation by seeking a supervised research experience with an MSE faculty member (see guidance below) and registering for ENGMS 900 Research (up to 4 credits), by October 1 of the first semester after matriculation.
Second Semester "Research Rotation" Option	First-Year Materials students may pursue an informal research rotation by seeking a supervised research experience with an MSE faculty member (see guidance below) and registering for ENGMS 900 Research (up to 4 credits) by February 15 of their second semester.
Obtain a research advisor	Before the end of the second semester of matriculation; no later than April 30 for September matriculants or July 31 for January matriculants.
Math Requirement	Must complete no later than the end of the fourth academic semester. See Math Requirement section.
PhD Subject Qualifying Examination	Offered in January and May. In January, usually before the semester start. In May, usually between Commencement and Memorial Day. Must pass within 1.5 years of joining the program.
PhD Candidacy	Candidacy is achieved after passing the PhD Subject Qualifying Examination and completing the Mathematics Requirement. Must achieve by fourth academic semester (end of second year.)

Meet with Major Advisor	Prior to the fall semester each year, complete the Annual Progress Report.
Pre-Prospectus, Advanced RCR Requirement	Prior to the Prospectus Defense, PhD students must complete the Advanced RCR requirement, including the online module and the RCR course ENGEK 800.
Prospectus Defense	**Students are required to present a Prospectus Defense by the end of the sixth semester** of study. No student will be allowed to present a Prospectus who has not become a Candidate in the PhD Program or completed the RCR requirement. See Prospectus Defense Section for further detail.
Declare MS Degree	Post bachelor's PhD students must declare their MS Degree (see MS Handbook for MS program planning sheet) on successful completion of the Prospectus Defense.
Dissertation	Doctoral students must defend a written dissertation before a Dissertation Committee by the end of the fifth year of candidacy. See Dissertation Section for further detail.
Application to Graduate	See Apply to Graduate section for Graduate Deadlines and link to College of Engineering form.
Library Submission	See Library Submission section.

Finding a Research Home

Research Opportunities in the MSE

Most students choose to do their research with a faculty member from the MSE Department or affiliated research centers. To find out more about specific research opportunities, please visit the individual faculty member webpages via the MSE website.

Finding a Research Advisor and Project

A major requirement for the PhD degree is a research-based dissertation. Each student is responsible for finding a research project, conducting scientific studies under the guidance of an approved faculty member, presenting the proposal and results to the general scientific community in a public defense and finally turning in a dissertation to be bound for the library and the MSE Division.

Occasionally, students enter the program with a specific research advisor and project in mind. Such students may start working with their research advisor from the first semester and continue in the same laboratory to completion of their degree. Other students, however, will utilize the first two semesters to determine what their specific interests are in the field of Materials Science and Engineering and identify the opportunities for funding in a professor's lab. These students typically connect with their research advisors through the mechanism of laboratory rotations in their first two semesters. Students who do not have a commitment from an advisor to take them on as PhD student after the first rotation should complete at least one more rotation by the end of the first academic year.

PhD students typically connect with their research advisors through the mechanism of their lab rotations. In general, the procedure involves three steps:
(1) doing rotations and deciding upon a research area;
(2) joining a specific lab; and
(3) developing a dissertation research project.

Students can gain information about faculty research interests from the MSE website. Another valuable way of learning more about specific research opportunities is to speak with other graduate students who are currently working in the various MSE faculty labs. The best measure for learning about working in a

specific lab is to make an appointment to speak with the faculty member in charge of a lab you are interested in.

Some useful questions to ask him/her are:

- What projects are currently going on and what projects are planned for the near future?
- What background is required to work in the lab?
- How is the lab funded and is there the possibility of funds for a new graduate student?
- What expectations does the faculty member have of graduate students?
- If the potential advisor has been at BU for at least a few years, does he/she have a strong history of training students in a timely manner? Have his/her students generally been successful?

Once a student finds a research opportunity and has the consent of a faculty member to be his/her advisor, the process of developing a research project begins.

Academic vs. Research Advisors

Each new student is assigned an academic advisor when entering the program. Incoming PhD students will be notified about their advisor prior to registration by the Graduate Programs Manager. The student's academic advisor can provide general information/guidance and help the student to complete his/her course registration for the first year.

Who Can Be A Research Advisor

For PhD students, any full-time member of the MSE faculty, or any affiliated or adjunct faculty member who has an appointment with the Division, is eligible to serve as a research advisor.

Research Rotations

PhD students are encouraged to engage in laboratory rotations, by enrolling in MS 900 Research under faculty supervision, during the first academic year. This provides the student an opportunity to gain exposure to materials research areas and to help in identifying a good match with a research advisor. MSE does not have

a formal research rotation requirement, so this is done at the initiative of the student.

PhD students are expected to find a research advisor no later than the end of the second semester of matriculation; by April 30 for September matriculants or by July 31 for January matriculants. After finding a research home, that research advisor automatically becomes the student's academic advisor as well. In the case that the student and the MSE faculty from the first rotation mutually agree to continue the collaboration through the completion of the student's PhD, the student need not rotate to a different laboratory in their first year. The research advisor will be in charge of the student's research project and will help coordinate the student's schedule towards fulfilling all of the graduation requirements.

Research Advisor

For PhD students, any full-time member of the MSE faculty, or any affiliated or adjunct faculty member who has an appointment with the Division, is eligible to serve as a research advisor. A Research Advisor commits to provide Doctoral Research Fellowship funding and dissertation supervision.

PhD Funding, Overview

PhD students typically receive funding support in the form of BU Doctoral Fellowships (Dean's, MSE, Graduate Teaching Fellowships, Photonics, etc.), Training Grant Fellowships, Doctoral Research Fellowships and other external Fellowships (NSF, NIH, foreign government fellowships or other foundations).

First-year PhD students with one academic-year BU Fellowships (Dean's, MSE, GTF, etc) should secure a funded Doctoral Research Fellowship no later than the end of their first academic year; April 30 for September matriculants or July 31 for January matriculants.

Appointment Requirements for Stipends

A PhD student's stipend rate is based on progress towards the degree.

- **The base stipend** is $41,373 per year.
- **Following successful completion of the Qualifying Exam and Math Requirement, the annual stipend will be increased by 10%** to $45,510. This

increase usually becomes effective at the beginning of the month after the milestone is reached, depending on the policy of the funding department source; division students are generally supported by faculty grants which are administered by their primary department so this can vary.

- **Students must be physically on campus to receive a stipend**, which will be paid weekly every Friday, and will be subject to withholding taxes and reported as income to the IRS by the University. The University will provide students with a full tuition scholarship and student fees, which are not taxable to the recipient (26 USC Section 117(a)). It will not cover the cost of a Sports Pass or any late fees assessed as a result of late registration.
- **The University will also credit the student's account for the cost of individual participation in the Boston University Student Health Insurance Plan (SHIP) at the Basic level.** A credit for half the cost of SHIP at the Basic level will be applied directly to the student account at the beginning of the academic year. For additional information, please refer to this link. If the student has health insurance from another source, the student should file a waiver on the Student Link by selecting "Money Matters," then "Medical Insurance." Please visit the Student Health Services website and select "Waiving SHIP" to view the comparable coverage requirements. Students may waive enrollment in SHIP no later than September 20, 2024, provided their plan meets all the listed requirements.
- **As a condition of the appointment, students are required to be registered every semester (including summers) and to do so by the published registration deadlines, maintain Good Academic Standing, and continue to make satisfactory progress** in research and duties as a Doctoral Research Fellow. Failure to register by the indicated deadlines may cause the appointment to be terminated and delay payment of the weekly stipend. Please also note that it is expected that efforts will be fully directed towards research and coursework. As such, during the period of the appointment, additional employment at Boston University is very limited, and employment outside Boston University is not allowed.

PhD Funding, Semester Hiring Deadlines

The College of Engineering 2024-2025 Rates are:

- **Base Rate:** 795.63 per week, $3,447.75 per month, $41,373 per year

- **Post-Candidacy Rate:** $875.19 per week, $3,792.50 per month, $45,510 per year. Stipend increases will be implemented no later than the beginning of the next semester (spring, fall, or summer) following eligibility.

Semester Hiring Deadlines:

- **Fall Payroll:** Continuing students must be registered and have a DRF by July 1 in order to be set up for the Fall semester on time. New students must fill out I-9 and W-4 paperwork in order to be set up on payroll for the Fall semester on time.
- **Spring Payroll:** Students must register by December 1 and have a DRF commitment by November 1 in order to be set up for the Spring semester on time.
- **Summer Payroll:** All students must register for Fall by April 1 and have a DRF commitment in order to be set up for Summer Payroll on time.
    - First Year Students must have a research advisor and funding secured by April 30.
    - PhD students graduating in September must register for 2 credits of research in SUM1.

If you believe you should have been paid and were not, immediately contact the Graduate Programs Manager at se@bu.edu for assistance in correcting the payroll error.

PhD Funding, Stipend Types

Service Stipends include Doctoral Research Fellows (DRF) and Graduate Teaching Fellows (GTFs). Service stipends are paid weekly on Friday.

Non-Service Stipends include Dean's Fellows (DFs), Division Distinguished Fellows, and some externally funded fellowships, are paid monthly on the 4th Friday of the month.

Students on one-year non-service stipend appointments should expect to transition to a Service Stipend, with weekly pay, starting the first or second Friday in May.

PhD Funding, Taxes

Non-Service Stipend Recipients

Non-Service Stipend recipients will not receive a W-2 for the period of the award. Non-service stipends include the Dean's Fellowship, Clare Boothe Luce Fellowship, or other Non-Service Division Fellowships. Keep this in mind for your taxes for both years.

- Click here for further information and click again on "4) Financial Activities and Services Training (FAST) sheets".
- Click here for Click here for Payroll Resources information".

International Students, Tax Set-up and Tax Treaties

Depending on a student employee's country of origin, a student may be eligible to sign a tax treaty. Otherwise, international students are asked to fill out and submit a Form W-4 to the Student Employment office. Please read the International Taxation Set-Up Procedure and follow the instructions to ensure you are taxed at the proper rate. **The tax treaty process must be completed every calendar year, in January.**

International Students, General Acknowledgement

International Students understand that their visa and work-permission status must be up to date before they can begin work. They further understand US visa regulations prohibit any additional work, either on or off campus, during the duration of the DRF appointment.

US Citizens and Permanent Residents, General Acknowledgement

US Citizens and Permanent Residents understand that the Doctoral Research Fellowship is a form of financial aid and it may affect eligibility for certain need-based funds, including but not limited to: Direct Loans, Federal Work-Study, and Perkins Loans. Students also understand that if they have already received need-based funds prior to the DRF appointment, terms of their financial aid package may be adjusted.

PhD Funding, Summer Tax Withholding

PhD students must register for MS 900S or MS 991S for the Summer I term (2 credits) prior to the start of the summer session.

Students funded on DRFs and fellowships other than NIH will have FICA taxes withheld from their paychecks during the summer (May, June, July and August). The Student Employment Office outlines the FICA tax withholding and rebate criteria on their website.

MSE PhD Travel Award

The Division of Materials Science & Engineering has a limited number of Student Travel Awards to defray the cost of attending a conference or other worthwhile meeting related to a student's research.

The student must be an author or co-author of a paper accepted for presentation and the paper must be included in the conference/meeting program. The student must also be the one who presents the paper at the conference/meeting.

Every Division student who has passed the PhD qualifying exam is eligible for a Student Travel Award. The student's advisor must nominate the student before the travel event occurs by sending a message to the Associate Head, Professor Soumendra Basu. The message should be accompanied by:

(a) a copy of the paper abstract, and
(b) evidence that the paper is included in the conference/meeting program (e.g., web site containing the program or a page showing where the paper is scheduled in the program).

- Each student is allowed one award per calendar year.
- The award will be a reimbursement of actual expenses up to a limit of $500.00 per student.
- Awards will be made on a first-come-first, served basis during the year.
- If more requests are received than the budget allows, then the Head and Associate Head will make selections based on the students' qualifications, and with priority given to first-time applicants and students who are still early in their research and can benefit most by attending a conference/meeting.

- On completion of travel, the student will submit receipts using the Division Business and Travel Expense Report form.

Teaching Practice Requirement

All MSE PhD students are required to teach for two semesters. Typically the first teaching assignment (ENGMS 801) is during the second year and the second assignment (ENGMS 802) is during the third year.

During the semester in which the student is enrolled in ENGMS 801 or 802, he/she may only register for 8 credits (ENGMS 801 or 802 plus 4 credits of ENGMS 900). Students may take a structured course while teaching only if they receive permission from their research advisor (credit limit would then be 10 – 4 for ENGMS 801 or 802, 4 for the course and 2 for ENGMS 900).

PhD Candidacy, Math Requirement

The PhD student achieves Candidacy upon successful completion of the MSE PhD Qualifying Exam and the Math Requirement. All PhD students are required to fulfill the Math Requirement no later than the end of their fourth academic semester. The list of courses will be reviewed periodically by the MSE Graduate Committee.

Post-BS students:

Complete with grade B+ or better one of:

- ENG EK 501 Mathematical Methods I (Fourier transformations, Linear algebra, Vector analysis, Complex variables, Algorithms)
- MS 508 Computation Methods in Materials Science (ODEs, Fourier transformations, PDEs, Linear algebra, Complex variables, Probability and statistics, Algorithms, Optimization, Functional spaces)
- MS/ME 527 Transport Phenomena in Materials Processing (ODEs, Vector analysis, PDEs, Linear algebra, Complex variables)

- ENG ME 538 Introduction to Finite Element Methods and Analysis (ODEs, PDEs, Linear algebra)
- ENG MS/EC 574 Physics of Semiconductor Materials (ODEs, Fourier series and Fourier transformations, PDEs, Functional spaces)

Other math-intensive courses may be approved to satisfy the math requirement by petition. Approval of such a petition must be sought before taking the course.

Post-MS Students:

- Post BS requirement or
- Submit a Graduate Petition with a course syllabus and transcript as evidence of successful completion B+ or better of equivalent course as determined by the MSE Graduate Committee.

MSE PhD Qualifying Examination

All students are expected attempt the examination within 1.5 years after matriculation, and **must pass within 2 years of joining the program**. Any student not attempting the qualifying examination within 2 years of joining the program will be removed from the program. A student can have a **maximum of 2 attempts** to pass the examination. Any student not attempting the qualifying examination within 1.5 years of joining the program will be given only one attempt at passing the examination. No additional examinations will be made up for students just so that they can meet these deadlines, unless special circumstances exist. Such cases will have to be approved by the MSE Executive Committee.

Timing: The MSE qualifying examination will be offered, once in January, and once in May, as needed.

Coverage: The coverage of the examination will be from the topics covered in some of the core courses as listed below. The examination will be divided into 3 sections. It is expected that the questions asked in the qualifying examination are more open-ended than questions asked in the course examinations.

Section I: MS 577/EC 577, Electrical, Optical and Magnetic Properties of Materials

Section II: MS 505/ME 505, Thermodynamics and Statistical Mechanics

Section III: MS 503/ME 503, Kinetic processes in materials

Nature of the Qualifying Examination: The examination will have a 3-hour written component, and a 1-hour oral component, typically within a few days to a week of each other.

- The written examination will have 2 questions from MS 577 (Section I), MS 505 (Section II), and MS 503 (Section III).
- Students have to answer 5 out of the 6 questions.
- All questions carry equal weight.
- A passing grade for the written examination is 55%.
- It is expected that qualifying questions will be set and corrected by faculty members, who taught the courses most recently.
- In general, all topics of the examination will be **closed book**, unless specified otherwise.
- The Qualifying Examination Committee and the advisor(s) of the student will administer the oral examination.
- The committee, consisting of a chair and 2 other members, are also responsible for scheduling and setting up the written and oral examinations.

Results: A student has to pass both the written and oral portion of the examination, and any retake will involve both parts of the examination. The student will only be informed of the overall result.

There can be four overall results of the examination; i) Pass, ii) Partial pass, retake a portion of the examination (only for students taking the examination for the first time), iii) Fail, recommend retake of the entire examination (only for students taking the examination for the first time), and iv) Fail, remove from program. The last option can be exercised for a student taking the examination for the first time, if it is clear that the student is not of PhD quality.

Sample Exams

- May 2024
- January 2024
- May 2023

Pre-Prospectus Requirement, Advanced RCR

All College of Engineering PhD students are required to complete the Advanced Responsible Conduct of Research program prior to completing the Prospectus. The Advanced RCR program includes an online module through CTI and the one-credit RCR course, ENGEK 800. PhD candidates are required to complete the Responsible Conduct of Research (RCR) requirement before they can receive the post-prospectus stipend rate increase.

Prospectus Defense

By the end of the sixth semester following matriculation, PhD candidates are required to form a Prospectus Committee and defend a dissertation prospectus. The student is responsible for forming the Prospectus Committee and scheduling his/her Prospectus Defense.

Prospectus Committee

The PhD Prospectus Defense Committee must consist of at least four (4) members. The student's research advisor will be the chairman of the prospectus committee. Membership of the Prospectus Committee constitutes the nucleus of the Final Oral Thesis Examination Committee (Dissertation Defense).

The Prospectus Defense Committee is charged with assessing the appropriateness of the research problem and the student's preparation, based on the written proposal and the oral presentation. The Prospectus Committee must approve that the Prospectus is at a stage appropriate for scheduling the examination via their signature on the PhD Prospectus Defense form.

Special Service Appointment Form

If a researcher from outside the University serves on a PhD student's committee, a Special Service Appointment Form (see Forms section, below) must be completed and submitted to the Division Graduate Programs Manager for division approval. The completed form and a copy of the person's curriculum vitae, with the Associate

Chair for Graduate Studies' signature, will then be submitted to the Graduate Programs Office.

Dissertation Topic

A research problem is selected after initial discussions between the research advisor and the student. The development of a dissertation topic is typically a cooperative effort between the student and research advisor. Commonly, the advisor initially suggests a problem to be addressed, but the student is expected to contribute ideas and thought as to how to approach the problem.

Written Prospectus

Before undertaking this phase, the student should consult the Guide for Writers of Theses & Dissertations for formatting requirements. The Prospectus document should include a signature page, a statement of the problem to be investigated, its background and significance, methods and approach(es) to be followed for its resolution, preliminary results, anticipated timetable for completion and pertinent bibliography.

The format is similar to a typical research proposal.

- The prospectus should specifically document the anticipated contribution of the work to the body of knowledge.
- A separate page listing the proposed title, author's name, research advisor's name and an abstract of approximately 150 words.
- The prospectus should address the anticipated contribution of the work to the body of knowledge and the format must be similar to that of proposals submitted to a Federal Agency.
- There is a 20 page (single-spaced) limit on the scientific portion of the proposal, which includes tables and figures but does not include the list of references.
- The prospectus should include an up-to-date copy of the student's curriculum vitae (not part of the 20-page limit).

Prior to scheduling the Prospectus Defense, the student must provide a copy of the Prospectus document to all members of the Prospectus Defense Committee. The student must also confirm with the committee members a date, time and location (currently virtual) for the examination. The Division Graduate Programs Manager

will be responsible for providing publicity for the student's Prospectus Defense to the MSE students and faculty.

Scheduling the Prospectus Defense

1. Register Your Prospectus Defense Online at least two weeks prior to defense date.
1. **Forms.** The Graduate Programs Manager will create and distribute the appropriate form(s) to you and/or your committee members via AdobeSign. The committee's electronic signatures indicate that they have read the Dissertation document and approve that the examination be scheduled.
2. **Publicity & Catering:** The Division Graduate Programs Manager and Communciations Manager will be responsible for providing publicity and ordering the catering (coffee service) for the student's Prospectus Defense to the SE students and faculty.

Conduct and Length

The faculty research advisor should chair the Prospectus Defense, beginning with the introduction of the PhD student and his/her academic background. The student's presentation should be around 45 minutes. The student should be able to defend his/her knowledge of the mathematical, physical and analytical tools to be used and how they may relate to other areas outside of his/her particular project. During this period, Prospectus Committee members or the audience may ask questions. The chair should guard against digressions and inappropriate questioning during the presentation. Following a reasonable question period, the student and the audience are dismissed and the Prospectus Committee remains to complete its assessment of the prospectus proposal examination.

Assessment

The Prospectus Defense Committee recommends that the student should pass, fail, or be given additional requirements (e.g., an additional written progress report or additional studies) to be completed no later than one year from the Prospectus Defense examination. In the case of failure, the Prospectus Committee recommends the appropriate action: a recommendation of failure may include a suggestion that the student re-take the Prospectus Defense exam or that the student be terminated from the PhD program. In the latter case, the student has the

option of pursuing an MS or MEng degree but must complete all the requirements for that degree.

All Post-Bachelor's PhD degree students should declare a Master of Science degree when they successfully complete their PhD Prospectus Defense. This is not automatic and the student needs to complete an MS Program Planning Sheet and apply online for graduation.

If a student's Prospectus Defense deadline has passed, he/she needs to petition the MSE Graduate Committee for an extension, including indicating a timeline for completion of the prospectus.

Reporting on Results

The chair of the Prospectus Defense Committee will complete the "Prospectus Defense Results" section on the PhD Prospectus Defense form. If the student is required to meet certain conditions, those conditions should be listed on a separate sheet and attached to the form. Those conditions should also contain time frames for completion. The chair then signs the form and forwards it to the Division Graduate Programs Manager (who will be responsible for submitting to the Associate Chair for Graduate Studies for final approval).

Before the Prospectus Defense ends, the committee must indicate on the PhD Prospectus Defense form the date for the next committee meeting (at least once in the next 12 months) and indicate expected milestones for the next post-prospectus thesis committee meeting. Required revisions to the proposal should be completed satisfactorily before a final "Pass" grade is given.

Petition to Extend Candidacy

By the end of the sixth semester following matriculation, PhD candidates are required to form a Prospectus Committee and defend a dissertation prospectus. Students may submit a petition to extend Candidacy and it should include the following material:

- Major reason(s) for delay
- How those delays have been resolved
- Evidence of research progress

- Detailed timeline and evidence that timeline can be adhered to
- Letter of support from advisor that addresses these issues

The College of Engineering Graduate Committee will determine whether or not a candidate may extend his/her participation in the PhD program. More than one petition to extend the completion date of degree requirements is rarely approved, so the student should be very sure that they would finish their dissertation by the date they propose on the extension.

PhD Annual Progress Report

Dissertation committee meetings are to be held on a regular basis in order for the student to report progress and the committee to provide feedback. As a minimum, committee meetings will be held annually. The student will submit a PhD Annual Progress Report annually, detailing progress towards milestones and the next planned steps and this will be sent to the Advisor for review. It is the responsibility of the student to contact the committee members and schedule the committee meetings.

Post-Prospectus Credits, Timeline

After passing the Prospectus Defense, students will enroll for eight credits of ENGMS 991 each semester until the total credit requirement is met (64 credits for Post-BS, 32 credits for Post-MS). Once the student has fulfilled the total minimum credits requirement, he/she will register for two MS 900 or MS 991 credits each semester until they graduate.

A PhD candidate has a maximum of five (5) years after passing the qualifying exam to complete all degree requirements. If the program requirements are not completed within five years, the student must petition the College of Engineering Graduate Committee for an extension using the College of Engineering Graduate Petition Form.

Dissertation, Requirements

Written Dissertation

Candidates shall demonstrate their abilities for independent research and scholarship by completing a doctoral dissertation in their field of study. The dissertation will be primarily guided by the first reader (advisor), with the advice of the other members of the Dissertation Defense Committee. The dissertation should represent original scientific/engineering contributions that are appropriate for publication in a recognized peer-reviewed journal. The dissertation is defended at a presentation open to the entire BU community.

Refer to the Guide for Writers of Theses & Dissertations while preparing the dissertation and its abstract. These must conform to the requirements of the University Microfilms International.

Although students will have an opportunity to make final revisions to the dissertation and abstract after their Final Oral Examination (Dissertation Defense), they should not regard their Final Oral Examination version as a "rough draft".

Dissertation Defense, Final Oral Examination

The Dissertation Defense is a public presentation of the candidate's dissertation. The presentation should clearly define the problem, describe the method(s) used to solve the problem, report results and establish significance of the results. The purpose of the Final Oral Examination is to ensure that the dissertation constitutes a worthy contribution to knowledge in the candidate's field and that the candidate has attained an expertise in his/her field of research specialization.

Dissertation Defense, Committee

In preparation for the Dissertation Defense, it is the candidate's responsibility, in conjunction with that of his/her research advisor, to appoint a Dissertation Defense Committee. This committee usually consists of the faculty members who participated in the Prospectus Defense, and have followed the student's progress and annual progress meetings. The committee consists of five (5), including 4 readers and a Chair. The Chair may not also serve as a reader. The Division Graduate

Programs Manager will appoint the chair for the Dissertation Defense, in consultation with student and advisor.

Special Service Appointment

If a researcher from outside the University serves on Dissertation Defense Committee, a Special Service Appointment Form (see Forms section) must be completed. The completed form and a copy of the person's curriculum vitae, with the Associate Chairman for Graduate Studies' signature will be submitted to the Graduate Programs Office after receiving departmental approval. This form does not have to be re-submitted if it was approved for the Prospectus Defense.

Dissertation, Scheduling

It is the student's responsibility for scheduling a date, location and time, and a Defense chair in addition to the four Dissertation Defense Committee members for the examination. When permitted, conference room reservations can be requested via the SE website

Before registering the final defense, the candidate must have provided a copy of the dissertation document to all members of the Final Oral Examination committee. When they sign the electronic abstract and defense forms noted below, they are certifying that 1) that they have been provided a copy of the dissertation and 2) agree that it is ready to be defended.

Scheduling the Prospectus Defense

2. Register the Dissertation Defense Online at least 3 weeks prior to defense date.
3. **Forms.** The Graduate Programs Manager will create and distribute the appropriate form(s) to the student and/or committee members using AdobeSign. The committee's electronic signatures indicate that they have read the Dissertation document and approve that the examination be scheduled.
    a. **Abstract Form:** Completed by the Student and Advisor, reviewed by Associate Division Head.
    b. **Final Defense Form:** Completed by the Student, Committee, Graduate Programs Manager, Chair, and Associate Division Head.

4. **Publicity & Catering:** The Division Graduate Programs Manager and Communications Manager will be responsible for providing publicity and ordering the catering (coffee service, other refreshments).

Dissertation, Defense

Conduct and Length of the Final Oral Exam

The faculty research advisor or chair should introduce the candidate and include a brief academic background description. The candidate should restrict the length of the examination to approximately one-hour. During this period, either the Dissertation Defense Committee members or audience may ask questions of clarification. The chair should guard against digression and inappropriate questioning during the presentation. After the presentation, a reasonable period of questioning will follow, and then the audience will be dismissed. The Dissertation Defense Committee may wish at this time to ask additional questions of the candidate. Following this additional questioning, the candidate should be excused and the committee should complete its assessment of the examination.

Assessment

The Dissertation Defense Committee is charged with assessing completeness of the research, contribution to knowledge, and the candidate's mastery of his/her research area, based on the written dissertation and the oral presentation. Vote may be ballot or voice. A unanimous vote is required for a candidate to pass.
It is the Chair's responsibility to call the candidate back after the Dissertation Defense Committee has reached a decision. The chair will advise the student of the committee's decision. At this time the candidate will be advised of any changes that must be made to the final title, abstract or dissertation document, with a deadline provided by the Dissertation Defense Committee.

Reporting

The College's PhD Final Oral Examination Form must be completed at the examination, with specific indication of whether the title, abstract and dissertation are acceptable as they stand.

If ALL requirements are acceptable, the committee members may sign the signature pages of the dissertation. If there is some rework to be done, this is to be noted on

the Final Oral Exam form or by email to the Division Graduate Programs Manager. Dissertation Defense Committee members should sign off on the form but will refrain from signing the signatures page of the dissertation until all conditions have been met. Engineering PhD students may use DocuSign to electronically collect signatures (see below, Library Submission).

Dissertation, Library Submission

Boston University students completing a doctoral dissertation as a requirement for their degree must submit a PDF copy of their manuscript to the Boston University Libraries so as to preserve a record of their scholarly achievement and to share the benefits of their research with other scholars. The dissertation will be deposited into both ProQuest Dissertations & Theses Global™ and OpenBU Boston University's open-access database.

- Prepare the manuscript for library submission following the guidelines in this Research Guide.
- Review the final draft of your thesis/dissertation with theses@bu.edu as early as possible. DO NOT wait until the published submission deadline.
- Submit your thesis/dissertation electronically via the ProQuest ETD Administrator only after your draft has been approved by theses@bu.edu.
- College of Engineering Doctoral candidates can now have their readers e-sign the dissertation approval page using DocuSign.
- Complete the BU Doctoral Exit Survey and the NSF Survey of Earned Doctorates (SED). Upon completion of the BU Exit Survey, there will be link to redirect you to the NSF SED. You must send enggrad@bu.edu a copy of the SED completion certificate you receive. NOTE: Both surveys must be received to officially award your degree.

Helpful Links

- Thesis prep videos: Several videos cover the ETD administrator process and formatting.
- Microsoft Word template: Dissertations template or Thesis template prepared by the library.
- Sample formats: A set of samples illustrates proper submission formats.

- Open access: BU policy is that scholarship, including BU theses and dissertations, should be made openly accessible so that the benefits of research can be widely shared.
- This FAQ discusses factors to think about if you are considering an embargo.

The Division Graduate Programs Manager will:

- provide departmental electronic approval of the ETD submission upon collection of the 1) signature page and 2) title page, and
- order bound copies of the dissertation for the division and the advisor. Students are advised to order a bound copy directly from ProQuest if desired.

PhD Internship Experience

PhD students who wish to engage in a paid, professional development internship, that is directly related to the student's field of study, must have completed two semesters in their current program, must submit an MSE PhD Internship Experience Approval Form and register for MS 810 PhD Internship.

- Graded Pass/Fail
- End of semester report of activities required
- Maximum number of internship semesters will be set by the Division
- **Part-time** = 20 hours (or fewer) per week for at least 12 weeks (min. 180 hours). Students register for 2 credits of ENGMS 810 plus additional coursework/research.
  Full-time = minimum 30 hours per week for at least 12 weeks (min. 360 hours) must register for 4 credits of ENGMS 810.

Process

- Please submit all required documents to the Division Graduate Programs Manager at se@bu.edu for Division Review.
- **International students:**
  - Need confirmation from the Graduate Programs Office, at enggrad@bu.edu, before requesting CPT approval on the ISSO Portal.
  - Must have CPT authorized BEFORE beginning work or placement.

    - See College of Engineering Internship Guidance (Engineering Practice and CPT) for further detail.
- The Division Programs Manager will register students for ENGMS 810 for the appropriate credits.

Required Documents

- Offer Letter
- SE PhD Internship Experience Approval Form
- Your offer letter from the organization must include:
    - Internship position, compensation, and outline of responsibilities
    - Name and contact information of internship supervisor
    - Start and end dates of the internship
    - Location of internship (in-person, remote or hybrid).
    - Work hours (full-time or part-time).
    - Your internship proposal must include:
    - Work to be accomplished during the internship.
    - Why this work is relevant to your program of study.

Forms

Division Forms & Other Links

- Career & Professional Development Resources
- Division Annual Progress Report Form
- Division Business and Travel Expense Report
- Division Defense Registration Form
- Division PhD External Funding Bonus Award
- MSE Masters Handbook
- MSE PhD Handbook
- MSE PhD Internship Experience Approval Form
- See also, MSE Student Resources for Finance & Operations, Course Offerings, Poster Printing and Business Cards

College of Engineering Links and Forms

- Graduation Deadlines
- Graduation Application portal for Masters and PhD Students
- College of Engineering Resources and Forms
  Childbirth and Adoption Accommodation Form
  Graduate Petition Form
  Directed Study/Independent Coursework Petition Form
  Special Service Appointment Form
  Transfer Credit
  Graduate Application
  Program Change Form
  Withdrawal and Leave of Absence Forms
  Add/Drop Form
  Registration From
  PhD Readers' Approval Form (Dissertation Signature Page)

Apply to Graduate

The College of Engineering Application to Graduate can be completed in one to three steps, depending on whether you are applying to graduate with your post-Bachelor Masters (on completion of PhD Prospectus Defense) or PhD degree.

For additional details on requirements and submission dates, you can refer to the Graduation Deadlines.

Masters Application to Graduate

- Download and fill out a Program Planning Sheet from the Masters Handbook: Forms tab
- Email your Program Planning Sheet to your advisor for review and electronic signature (see Forms, above, for link).
- Complete the Graduation Application portal for Masters and PhD Students, upload your signed Program Planning Sheet.

PhD Application to Graduate

- Complete the Graduation Application portal for Masters and PhD Students, upload your signed Program Planning Sheet.