



**Boston University** College of Engineering  
Materials Science & Engineering

# **PhD Handbook**

## **2023-2024**

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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.

## PhD Degree Requirements

## **General Guidance**

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

Post-masters PhD students are strongly encouraged to take the four MS core courses before the taking the Qualifying Examinations and take two concentration area courses to help with their research.

Post-masters 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 petition form and have it signed by his/her advisor and Division Associate Head before submitting it to the Graduate Programs Office for processing.

Only grades of P, F, or J will be assigned to research/dissertation credits.

## **Program Completion Schedule**

- Course requirements should be completed as early as possible.
- 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.
- It is highly recommended that the Math Requirement be completed during the first two semesters.
- The MSE Qualifying Examination is administered twice a year, typically in late May (after the Spring semester ends) and late January (before the Spring semester starts). Incoming students are encouraged to take the three core courses (MS 503, MS 505, MS 577) from which the exam is set in their first two semesters at BU and take the Qualifying Examination in May after their first academic year.
- The Prospectus Defense should be presented within two years of passing the Qualifying Examinations.
- PhD students have five years to complete the dissertation after becoming a PhD candidate. Meetings with the dissertation committee must occur at least annually following the Prospectus Defense, and must be documented by submission of the PhD Progress Report form to Division Graduate Programs Manager.

## **[PhD Program Overview](#)**

## **[MSE PhD Program Requirements](#)**

### **Post-bachelors PhD Requirements**

Post-bachelor's PhD students must complete the Masters requirements and declare the masters degree on completion of the Prospectus Defense. [Click here for the Masters Requirements.](#)

Postbachelor's PhD students [are required to take a minimum of 64 credits during their program of study.](#)

## **Post-master's PhD Requirements**

There are no structured course requirements for Post-masters PhD students, but such students are required to complete 32 credits applicable to the degree. However, Post-masters PhD students are strongly encouraged to take the MSE core courses before the taking the Qualifying Examinations and take two concentration area courses to help with their research.

## **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.

## **Policies and Deadlines**

### **College of Engineering Deadlines**

- Registration Deadlines: 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.
- [Graduate Program Deadlines.](#)

### **[Registration and Attendance](#)**

## [Course, Grade, and Degree Policies](#)

### **Childbirth and Adoption Accommodation for Full-time PhD Students**

[Click to view the policy in full.](#) Please submit the Childbirth and Adoption Accommodation for Full-Time PhD Students Notification Form to the the [Graduate Programs Manager](#).

## [Intellectual Property Policy Agreement](#)

## [Student Bereavement](#)

## [Student Records](#)

### **Satisfactory Academic Progress for PhD Students**

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.

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 Doctoral Research Fellowship 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.

## **University Academic Standards and Graduate Policies**

Boston University's [Academic Conduct Code](#) is designed to assist in the development of a supportive and productive learning environment. It is both a description of the University's ethical expectations of a student as well as a guarantee of the student's rights and responsibilities as a member of a learning community. The Code provides clarity related to policy and procedure regarding academic conduct.

The policies listed below represent variations or additional stipulations affecting certain general [University policies](https://www.bu.edu/academics/eng/policies/graduate-policies/) (<https://www.bu.edu/academics/eng/policies/graduate-policies/>).

## **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 programs, please visit the individual faculty member webpages via the MSE website.

### **Research 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.

### **Academic Advisor**

Each new student is assigned an academic advisor when entering the program. The Graduate Programs Manager will notify incoming PhD students about their advisor prior to registration. The student's academic advisor can provide general information/guidance and help the student to complete his/her course registration for the first year. The student must transition to a research advisor by the end of their second semester at BU.

### **Research Rotations**

PhD students can engage in laboratory rotations (enroll in MS 900 Research) during the first academic year. This provides the students an opportunity to gain exposure to materials research areas and to help in identifying a good match with a research advisor. After finding a lab, 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. PhD students are expected to choose a research advisor no later than the end of the second semester of matriculation (April 30 deadline). When a student chooses his/her research advisor, that person 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.

### **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.

### **Finding a Research Advisor and Project**

Sometimes 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 incoming 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 must complete at least one more rotation by the end of the first academic year. Doctoral Research Fellowship positions should begin May 1.

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:





Base	39,780	\$13,260	\$765.00	N/A	\$780.00	N/A	\$736.67	N/A
Post-Candidacy	41,769	\$13,923	\$803.25	\$38.25	\$819.00	\$39.00	\$773.50	\$36.83
Post-Prospectus	43,758	\$14,586	\$841.50	\$76.50	\$858.00	\$78.00	\$810.33	\$73.67

### **Intellectual Property Policy (IPP) Agreement**

Students who receive support from sponsored research programs or who make significant use of BU funds and facilities are required to sign the BU Intellectual Property Policy Agreement. Seek counsel with your faculty advisor about this policy pertaining to intellectual property. A signed form is required before a student can be paid. [Intellectual Property Agreement](#).

### **Service and Non-Service Stipends**

Service Stipends (DRFs, GTFs) are paid weekly.

Non-Service Stipends (DFs and Materials Distinguished Fellows) are paid monthly on the 4th Friday of the month.

### **Tax Information for Non-Service Stipend Recipients**

You will not receive a W-2 for your non-service stipend, which includes the Dean's Fellowship, Clare Boothe Luce Fellowship, or Non-Service Division Fellowships. This will apply to your Fall and Spring earnings, so 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**

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**

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.

### **Doctoral Research Fellowships**

Students with one-academic-year BU fellowships (Dean's, MSE, Photonics, etc.) should secure a funded Doctoral Research Fellowship no later than the end of their first academic year (April 30).

DRFs are offered by individual faculty members with sponsored research grants. A DRF is a member of a research group in a laboratory or center. The position offers close association with members of the faculty and is a very effective arrangement for graduate study. Work on the

dissertation project is normally part of a DRF's assignments. DRFs are expected to work fulltime, with time allowed for courses during the academic year.

DRF and academic obligations constitute a fulltime commitment. In exchange for a per-semester support stipend, students agree to work a minimum of 20 hours/week if the semester falls within the academic year, and 39 hours/week if it falls within the summer term. Students must have prior written approval from their research advisor and the Associate Division Chair before undertaking any other employment, either inside or outside the University. Because this appointment requires service to the University, students should be aware that taxes may be deducted from the stipend portion of their award. Students also agree to sign the University's standard patent agreement form. Students further understand that as a DRF, they will receive a tuition scholarship for credits leading toward their degree during the period of employment. Students will obtain written approval from their advisor if they wish to register for coursework in excess of 10 credit hours per semester. Students understand they must register for each semester in a timely manner and complete required payroll forms as requested. Students also understand that they may only work under one DRF at a time.

Doctoral Research Fellows are paid weekly over 17 weeks in the Fall and Spring and over 18 weeks in the Summer. Fall semester paychecks are issued from September through December; Spring semester paychecks are issued from January through April; Summer semester paychecks are issued from May through August.

### **Semester Payroll 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 by August 31 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. (PhD students graduating in September must register for 2 credits of research in SUM1.) First Year Students must have a research advisor and funding secured by April 30.

### **Semester Payroll Set Up**

The Division Graduate Programs Manager will coordinate with other department managers and Payroll Coordinators to make sure that student funding is set up each semester prior to the account settlement date. In order to be set up on Payroll, students must register according to the Student Payroll-Related Deadlines listed above.

First Year PhD students must notify the Graduate Programs Manager when a research advisor and summer funding is confirmed. If the information is not communicated, the student will not be set up on Student Payroll.

- Students must register according to the Student Payroll-Related Deadlines listed above.

- Setting-up the student on payroll; Coordinated by the MSE Graduate Programs Manager in conjunction with the Department Grant Administrator overseeing the grant that funds the student's stipend, based on information provided by the student and Research Advisor.
- Settling the student's tuition account by the Graduate Programs Office.
- Settling the student's health insurance payment by the Graduate Programs Office.

### **Tax Information for International Students**

International students earning income through a position on-campus must settle the following tax requirements. Failure to do so can jeopardize the student's status in the U.S., not just their employment. Students from countries that have tax treaties with the United States may be eligible to exempt a portion of their earnings from taxes. If you are an international student working on campus, whether you are a new student employee or have worked in the university before, please take the time to follow our International Taxation Set-Up Procedure to ensure that you are being taxed appropriately on your income.

### **Tuition**

DRFs supported full-time by a faculty's sponsored research grant typically receive tuition coverage. Eligible DRF's receive 8 credits of tuition, applicable to their degree, each semester they serve as an DRF during the academic year.

### **Summer Stipends and 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 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.](#)

### **Laboratory Injuries – Coverage for PhD Students**

It is important to seek treatment promptly for any laboratory injury or exposure. If the injury or exposure does not require immediate transport for emergency care, PhD students should contact the University's Research Occupational Health Program at 617-414-ROHP (7647), or report to 72 E. Concord St., Evans 825, which is staffed by specially trained nurse practitioners. ROHP provides medical attention and coordinates aftercare at ROHP for laboratory injuries and exposures without any cost to PhD students.

If you have questions about costs related to laboratory injuries and exposures, please contact ROPH by phone (617-358-7647) or email ([rohph@bu.edu](mailto:rohph@bu.edu)) ROHP. Complete information and procedures for reporting can be found [here](#).

## **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 their PhD qualifying exam is eligible for a Student Travel Award. You can request an award before the travel event occurs by contacting your advisor, who can then nominate you 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-firstserved basis during the year. If more requests are received than our 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.

## **PhD Candidacy (Qual Exam + Math Requirement)**

Upon successful completion of the MSE PhD Qualifying Exam and the Math Requirement, a student becomes formally accepted to PhD candidacy.

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

### **Petition to Extend Candidacy**

The petition to extend Candidacy 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.

## **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 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**.

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 2022 Exam](#)
- [January 2022 Exam](#)
- [May 2021 Exam](#)

### 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. It is strongly suggested that approval of such a petition is sought before taking the course.

### Post-MS Students:

- Post BS requirement or

- Submit evidence of successful completion B+ or better of equivalent course as determined by the MSE Graduate Committee.

## **Prospectus Requirements**

### **Advanced Responsible Conduct of Research Requirement**

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 RCR course. [Information about the modules and a registration link are posted here](#). PhD candidates are required to complete the Responsible Conduct of Research (RCR) requirement before they can receive the post-prospectus stipend rate increase. (Effective Fall 2024, the 5% post-prospectus increase will be eliminated and replaced by a 10% increase on attaining candidacy.)

### **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.

### **Prospectus Committee**

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.

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).

If a researcher from outside the University serves on a PhD student's committee, a Special Service Appointment Form (available in the 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.

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.

## 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).

[Register Your Prospectus](#) two weeks prior to the defense date. 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 Prospectus document and approve that the examination be scheduled.

## Scheduling

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.

**Conduct and Length of the Oral Examination for the Prospectus Defense** 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.

### **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.

### **Course Registration After Prospectus**

After passing the Prospectus Defense, students will enroll for eight credits of MS 900 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.

### **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 abstract. They both 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.”

Previous PhD dissertations are available for review in the Division. Please see the Division Graduate Programs Manager for access.

## **Final Oral Examination (Dissertation Defense)**

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.

## **Final Oral Examination (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.

If a researcher from outside the University serves on Dissertation Defense Committee, a Special Service Appointment Form (available below in the 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.

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

### **Scheduling the Final Oral Examination (Dissertation Defense)**

It is the student's responsibility for scheduling a date, location (currently virtual), and time with all the Dissertation Defense Committee members for the examination. Conference room reservations can be requested via the MSE website.

### **PhD Final Oral Abstract Form and Final Oral Exam Form**

At least three weeks prior to the Dissertation Defense date, the candidate must [Register the Final Defense](#). 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.

The candidate will be notified of the abstract approval or if revisions are required.

The candidate must have provided a copy of the dissertation document to all members of the Final Oral Examination committee; the committee member's electronic signature on this form indicates 1) that they have been provided a copy of the dissertation and 2) agree that it is ready to be defended. The Final Oral Form will also contain the date, time, and location.

### **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 their presentation to be around 45 minutes. 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 should 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. 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 UNLESS faculty will be traveling at the time of library submission in which case all but one (usually the advisor) Committee member may sign the signature pages. The last signature will be added when all revisions are completed.

### **Dissertation Approval and Library Submission**

The signatures of the Dissertation Defense Committee members on the dissertation signatures page, if not given at the Final Oral Examination itself, will indicate final approval of the title, abstract and dissertation. Once signatures have been obtained, the student must submit the following (minimum) unbound dissertation copies to the Division Graduate Programs Manager for binding: one copy for the MSE Department and one personal copy for the advisor. Copies for the Dissertation Committee are optional and to be submitted for binding at the candidate's discretion. All copies must have original signatures pages.

The Associate Chair for Graduate Studies gives final approval on the Final Oral Examination form. The student will then follow the electronic submission guidelines provided by Mugar Library. 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.

The Division Graduate Programs Manager will 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.

### **Forms**

- [PhD Annual Progress Report Form](#)
- [Prospectus or Final Defense Registration Form](#)
- [College of Engineering Resources and Forms](#)
- [Application to Graduate](#)
- [MSE PhD Internship Experience Approval Form](#)

### **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** = 15 hours per week for at least 12 weeks (min. 180 hours). Students register for 2 credits of 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 810.

### **Approval Procedure:**

1. Student must submit an [MSE PhD Internship Experience Approval Form](#) and attach a cover letter summarizing internship goals and relevance to career path, and the offer letter to the Graduate Programs Manager. The Associate Division Head will review the submission and once approved, the Graduate Programs Manager register the student to the proper course.

### **Guidance for International Students: Curricular Practical Training (CPT)**

In addition to the above, international students must complete the Curricular Practical Training (CPT) Form to receive authorization to work from the BU International Students & Scholars Office (ISSO):

CPT Approval Procedure:

1. Complete CPT Form; under item #4, check  Option “A: Required for Course Credit.”
2. The Senior Associate Dean of Graduate Programs will review and sign with approval
3. GPO will officially notify the student of approval, at which point the documents can be submitted to the ISSO for final authorization.
  - o **PLEASE NOTE:** Students cannot begin working until after they’ve been granted CPT authorization. If students begin work prior to authorization, their SEVIS record will be terminated by ISSO.

### **Career & Professional Development**

Many PhD students engage in summer internships in the post-prospectus dissertation phase of their program of study. Students find internships in a variety of ways, most often through their research advisor’s professional network, including alumni and industry connections. Students may also work with the College of Engineering Career Development Office to find other opportunities. Handshake is the Career Development Office’s online system for job and internship listings, which is exclusively for BU undergraduate students, graduate students, and alumni.

Please refer to the Student Resources page and the [Career & Professional Development Resources @ BU](#) tab for further detail on College and University resources available to students and alumni at every stage of their career. This includes PhD Professional Development Workshops sponsored by the Office of the Provost each semester.

## **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 Masters (on completion of PhD Prospectus Defense) or PhD degree. For additional details on requirements and submission dates, you can refer to the [Deadlines for applying to graduate](#).

### **Masters Application to Graduate**

1. Download and complete a Program Planning Sheet (Forms tab, above).
2. Obtain an electronic signature on the Program Planning Sheet from your advisor.
3. Complete the [Online Application to Graduate](#) and upload your signed Program Planning Sheet.

### **PhD Application to Graduate**

- Complete the [Online Application to Graduate](#).