

# Boston University

## Robotics and Autonomous Systems

# Student Handbook

## 2024-2025 Academic Year

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## **COURSE REQUIREMENTS**

Students should always refer to the Robotics & Autonomous Systems website for detailed program information. General requirements are listed below:

### **MS in Robotics & Autonomous Systems (non-thesis option)**

The 32 credits must be fulfilled as follows:

- One course (4 credits) must be “Introduction to Robotics & Autonomous Systems” (core course)
- Four courses (16 credits) must be Robotics Core Requirement courses one in each of the four areas of Control (C), Perception (P), Design (D), and Machine Learning (ML).
- Three courses (12 credits) must be a Technical Elective, meaning where the “breath” course supplements or aids in widening the focus area
- Students must also complete a Practicum requirement that is usually satisfied over the summer term.

### **MS in Robotics & Autonomous Systems (thesis option)**

Students interested in pursuing a Master’s thesis must identify a research advisor and a suitable thesis project (in consultation with the research advisor) and then defend the thesis before a committee of faculty upon completion of the thesis prior to completing the program. Students are encouraged to begin the process of identifying a research advisor and thesis topic prior to matriculating in the program, even as early as during the time of preparing the application for the MS program. However, students are not required to have secured a research advisor or thesis topic prior to matriculating.

It is recommended that any student interested in pursuing a thesis should speak with their academic adviser about the “pros and cons” about devoting part of their MS academic work to pursuing a thesis versus taking a full 32 credits of graduate courses. For some students with a keen interest in a specific thesis topic, then the thesis option may be the optimal course of action; for other students, more course work in place of an MS thesis, may be preferable. If a student is planning to obtain a job in industry after completing their MS degree, then they should plan on graduate courses and possible research that will be attractive to the interested industry. An academic advisor should be helpful here when planning an academic direction to fulfill these goals.

If a student is interested in pursuing a thesis, they must notify the RAS Program Administrator at least three months before their first semester of registered thesis credit. The deadlines for thesis students can be [found here](#) under the “Thesis & Independent Study” dropdown.

Note that in line with the above comments, most students fulfill their MS requirements entirely with graduate coursework. To pursue the coursework plus thesis direction, a thesis-interested student will need to find a professor to work with on project/research of interest.

The 32 credits must be selected as follows:

- One course (4 credits) must be “Introduction to Robotics & Autonomous Systems” (core course)
- Four courses (16 credits) must be Robotics Core Requirement courses one in each of the four areas of Control (C), Perception (P), Design (D), and Machine Learning (ML).
- One course (4 credits) must be a Technical Elective, meaning where the “breath” course supplements or aids in widening the focus area
- Two courses (8 credits) must be MS thesis courses guided by a research advisor (XX 954)
- Students must also complete a Practicum requirement that is usually satisfied over the summer term.

## THESIS PROCEDURES

### *Thesis Timeline*

It is up to the student and academic advisors to complete the project in a reasonable amount of time for a MS thesis. Most students graduate from the MS with thesis program in 1.5 to 2 years after entering, which usually includes at least one year of full-time work on the research project. It is important to keep track of the numerous deadlines that have been established to ensure that students planning to participate in graduation ceremonies are not disappointed by being prevented from participating due to missed deadlines. A list of deadlines for the MS Program (with thesis) is located online at

Domestic students have a maximum of five (5) years and international students have a maximum of two (2) years from the time of matriculation to complete the requirements for the MS degree. If a student has still not finished the required courses and research thesis in this time, the student must let the Director of MS Programs and the MechE Academic Programs know to determine the next steps.

Important departmental dates and deadlines for Thesis Proposal, Defense, and Submission are [found here](#) under the “Thesis & Independent Study” dropdown.

### *MS Thesis Proposal*

A brief written proposal (3-5 pages) of the MS research project must be submitted and approved no later than *before* the first semester that the student is registered for thesis credit. The proposal should touch on the following points: (1) relevant background, (2) any work already completed, (3) a plan of research with sufficient technical details to evaluate the scope and technical depth of the work, and (4) a timeline for completion. It is the student’s responsibility to schedule a formal meeting with their Thesis Committee members for discussion and approval of the proposal document. The student must present the *MS Proposal* and *Thesis Committee Approval Form* to their thesis committee during this meeting. If the proposal is approved, the members of the thesis committee must sign the form, thereby indicating their willingness to participate on the thesis committee. The student must submit the signed approval form and the proposal document to the MechE Academic Programs. It is required that the student’s thesis committee meet with the student regularly throughout the remainder of their thesis research.

### *MS Thesis Committee Membership*

After identifying a research advisor and project, each student forms a thesis committee. **The MS Thesis Committee must have a minimum of three (3) members:**

- At least two of the members must be from the primary MechE faculty
- One member may be from outside the department (MechE Affiliated faculty, Research faculty and Research Associates with a PhD and sufficient experience may count as the “outside” member)

### *Final Semester of Thesis*

An MS thesis must be written and defended successfully for completion of the MS degree. Note that in order for a student to make full use of the critiques of the proposal from their committee, students are not permitted to defend the final thesis the same semester in which the proposal was submitted.

It is the student's responsibility to confirm a date and time of the presentation with their Committee members and to contact MechE Academic Programs to book a room. The *MS Thesis Defense Approval Form* must be completed up to item #4 (see *Thesis Approval Form*). This form should include title, abstract, names of all committee members and their signatures. Once a date has been confirmed and room booked, the time and location, along with a copy of the abstract, must be submitted to the MechE Academic Programs at least 10 business days prior to the defense date. The abstract must have the names of the student and research advisor listed together with the project title. The MechE Academic Programs will process announcement of the MS Thesis Defense to the MechE faculty and graduate students via email and add the event to the MechE calendar.

There are requirements for formatting of the written document and signature pages on the library's website (<http://library.bu.edu/theses>). The "Guide for Writers of Theses & Dissertations" can also be found at this link. Student should refer to this guide before defending their thesis document. If the thesis does not adhere to these required University guidelines, the student will need to reformat and rewrite it to be considered complete and acceptable by the library. When completed, students will submit their written thesis to the online thesis database.

The format of the actual defense is not rigid and is decided on by the chair of the MS thesis committee. The student can expect to give a 30-to-40-minute seminar presenting the results of the completed project. There may be questions during the presentation or after the student has completed the presentation, depending on the decision of the defense committee.

Following a reasonable question period, the audience is dismissed, so that the committee may ask questions of the student privately; then the student is dismissed, and the committee remains to complete its assessment of the thesis defense. The thesis committee must vote unanimously to pass the student. The results are noted on the *Thesis Defense Form* and submitted to the MechE Academic Programs, who will be responsible for obtaining the signature of the Director of Master's Programs.

Important departmental dates and deadlines for Thesis Proposal, Defense, and Submission are [found here](#) under the "Thesis & Independent Study" dropdown.

### *Thesis Submission*

The final thesis document must be submitted to Mugar Library. The information on how to do this is listed at <https://library.bu.edu/theses>. Please note that the student will need to create a minimum of three signed signature pages and one blank signature page (for upload with your final document), all correctly formatted. Copy of title page and one original signature page needs to be turned into the Master's Programs Manager upon successful submission to Mugar Library.

## **INDEPENDENT STUDY**

If a student is interested in pursuing an independent study, they must notify the RAS Program Administrator. The deadlines for independent study students can be [found here](#) under the "Thesis & Independent Study" dropdown.

### **Requirements**

1. The students should write a research-like proposal for what they will accomplish in the class that includes:

- a. Background: what problem are they trying to solve and why? What has been done previously?
  - b. Approach: how will you solve the problem?
  - c. Deliverables: clearly state what the end result/product/knowledge gained will be. This is important as it will provide a “grading template” for faculty and set expectations for what will be accomplished.
2. ENG ME 951 is a graded course (not pass/fail) – the grade is reflective of student’s performance with respect to the proposal.

Note: Due to the often nonlinear nature of research, the grading does not need to strictly follow the deliverables. It should, however, account for how changes in the research plan were handled.

3. At the end of the semester, the student should submit a written research document, which includes formulating the topic/problem to be studied, hypothesis, approach to take and expected milestones, etc. of the independent study. The written document should be a minimum of 5 pages and should be submitted no later than the date provided by the RAS Program Administrator at the beginning of the semester.

## **PRACTICUM/INTERNSHIP**

The practicum must be satisfied (usually during the summer term) through one of the following mechanisms:

1. An industrial internship with a placement through the MS in Robotics and Autonomous Systems program
2. An independently arranged industrial internship with prior approval of the program
3. A research internship in the lab of a participating faculty member

Regardless of the mechanism, the internship must consist of at least 360 hours of effort.

The primary method of satisfying the practicum requirements is through an industrial internship. While the program provides support for students in finding an internship, the responsibility is ultimately on the student to find a placement. It is important to note that the timeline for companies to hire summer interns varies widely, ranging from early fall through to late spring and thus students are encouraged to begin their search at the beginning of the fall term. The [Career Development Office](#) (CDO) in the College of Engineering provides many resources for students for both internship and job searches.

The program does have relationships with several robotics companies in the greater Boston area and engages with them directly to help place students. The timeline for this is as follows:

1. Deposit date: Send most recent resume to RAS Program Administrator
2. Beginning of fall term: CDO workshops and resume review
3. Mid fall: Students indicate which participating companies to send resumes to
4. Mid-to-late fall: Resumes sent. Companies will directly contact students to arrange interviews and make offers.
5. Early-to-mid spring: Process repeats

Upon accepting an internship offer, students must submit the following to RAS Program Administrator at [mechems@bu.edu](mailto:mechems@bu.edu):

1. Signed offer letter - should include a brief description of the role the student will fulfill
2. RAS Internship Form, signed by student’s supervisor

3. CPT Form (international students only)
4. I94 (international students only)

From there the RAS Program Administrator, will send the documentation to the RAS Director for review and approval.

At the conclusion of the internship, each student must complete a brief survey sent out by the RAS Program Administrator . Failure to submit this survey may result in graduation delays.

## ACADEMIC ADVISING AND REGISTRATION

Every student in a Master's program is assigned a faculty academic advisor upon matriculation. The faculty academic advisor plays a central role in guiding student's academic program, assisting in course selection, and providing guidance and counseling in all academic matters. Note that ***final responsibility for meeting all degree deadlines and requirements rests solely with students.*** To register each semester, the process is straightforward:

1. Meet with advisor to discuss class and research schedules. An advisor will be the best source of information regarding what classes to take.
2. Register for classes using [MyBU](#).

Students are strongly advised to register as soon as the registration period is open, since many classes have enrollment limits. Registration dates and times can be [found here](#) on the Registrar's website.

If a student experiences difficulty in obtaining academic advising from their designated advisor, they are strongly urged to contact the RAS Program Administrator at [mechems@bu.edu](mailto:mechems@bu.edu).

## PROGRAM COMMUNICATION

### Slack

The program administrators use Slack as the primary avenue for official communication. It is also a helpful tool for communication and interaction among the students. The RAS Program Administrator will provide details for signing up for the slack workspace.

### Email

The program administrator also utilizes electronic mail as a medium for official communication. **Please be sure to check your BU email account on a daily basis** for important information, and make sure that your account is not filled up. All communication is through your BU email account, not private accounts.

## STANDARD ACADEMIC POLICIES

### Academic Standards

The academic progress of every graduate student is reviewed at the end of each semester. Failure to make satisfactory progress and remain in *Good Standing* can result in *Academic Probation*, *Suspension* for a stated time or until stated conditions are met, or *Dismissal*, as detailed below. Grades of C- or lower are not applicable to satisfying the MS degree requirements. Every student is required to adhere to [Boston University's Academic Conduct Code](#) in all aspects of their research, coursework, and teaching. This code stipulates the university's standards for academic honesty and integrity.

### *Notice of Nondiscrimination*

Boston University prohibits discrimination and harassment on the basis of race, color, natural or protective hairstyle, religion, sex or gender, age, national origin, ethnicity, shared ancestry and ethnic characteristics, physical or mental disability, sexual orientation, gender identity and/or expression, genetic information, pregnancy or pregnancy-related condition, military service, marital, parental, veteran status, or any other legally protected status in any and all educational programs or activities operated by Boston University. Retaliation is also prohibited. Please refer questions or concerns about Title IX, discrimination based on any other status protected by law or BU policy, or retaliation to Boston University's Executive Director of Equal Opportunity/Title IX Coordinator, at [titleix@bu.edu](mailto:titleix@bu.edu) or (617) 358-1796. Boston University's full Notice of Nondiscrimination is available at <https://www.bu.edu/policies/boston-university-notice-of-nondiscrimination/>.

### [College of Engineering Academic Standing](#)

### [Academic Probation](#)

### [Academic Suspension or Dismissal](#)

### [Reinstatement after Academic Suspension](#)

### *GPA Requirement for Graduation*

MS students must complete all degree program requirements and earn a cumulative grade point average of at least 3.00 to be awarded a degree. The cumulative grade point average includes all coursework taken after matriculation and all courses completed prior to matriculation submitted in fulfillment of degree requirements. Successful completion of a 3-credit course in either the College of Arts and Sciences or the Questrom School of Business does not obviate the need to complete 32 credits. Students are permitted to take a single course multiple times to achieve the GPA requirement, but will only receive 4 credits if used against the degree requirements.

Credit cannot be given for two or more courses having significant overlap (including overlap with courses that had been taken to fulfill the candidate's undergraduate degree requirements).

## **GRADUATION**

Students must submit a graduation application in order to apply for graduation. **Graduation does not occur automatically.**

### [Application for Graduation](#)

In addition to the application, prospective graduates must also:

- Be registered for either a course or at least 2 credits of ME 954 in the semester or summer session in which they complete degree requirements and the semester prior.
- Submit a complete and signed Program Planning Sheet to be uploaded with the graduation application.

MS thesis students should visit the [Graduate Program Deadlines](#) section for more information on the timeline for defending and submitting their thesis.

Students should consult with the RAS Program Administrator for any further requirements, procedures, and deadlines which may affect their graduation eligibility.

## **COMMENCEMENT**



There is one College of Engineering Commencement ceremony per academic year; it takes place in May. All graduating students are invited and encouraged to participate in our commencement ceremony as a way to celebrate your hard work and achievements. If students wish to “walk” in the May commencement ceremony (meaning to physically take part in the ceremony), they should contact the College of Engineering’s Graduate Programs Office at [enggrad@bu.edu](mailto:enggrad@bu.edu).

## **GRADUATE STUDENT RESOURCES**

### **Student Association of Graduate Engineers (SAGE)**

SAGE addresses the issues and concerns of graduate students in the College of Engineering, including hosting biweekly socials and other activities throughout the year. For more information, please visit [www.bu.edu/sage](http://www.bu.edu/sage). To contact SAGE directly, email [sage@bu.edu](mailto:sage@bu.edu).

### **EPIC**

EPIC is a 15,000 square foot living classroom dedicated to teaching students the fundamentals of product development from invention through manufacture. The center is used by students in all of our engineering programs, from undergraduate through PhD. The center also serves as a “maker space” for the BU community. To use EPIC, merely take the on-line safety test and then visit the center with a drawing of your proposed project. The staff will help you with your design and then train you to use the appropriate tools in the shop. There is no charge to BU students unless unusual material costs arise.

### **Singh Imagineering Lab (Tinker)**

The Binoy K. Singh Imagineering Laboratory, also known as “The Tinker Lab,” gives students the resources to take on extracurricular engineering initiatives and think about new ways to address society’s challenges. The Singh Imagineering Lab provides easy access to entrepreneurially minded College of Engineering students, and other BU students working with them, without limiting the topic or timeframe of use. Using the lab’s tools and machinery—and guidance from faculty, graduate students and undergraduate peers—students are encouraged to pursue their ideas and designs. Where applicable, they can take projects to the prototype stage and enter them in design competitions—[here are examples](#) of some projects students have worked on in the Imagineering Lab. And where feasible, they will be encouraged to take on partners from BU’s Questrom School of Business, work on plans to potentially commercialize their products and enter them in business competitions.

#### **Eligible Students**

- BU College of Engineering students
- BU students working with at least one BU College of Engineering student
- Note: Completion of a 30-minute safety course is required.

Many Master’s classes also use the facility for class projects and related work.

### **Innovate@BU**

Innovate@BU is a University-wide initiative to give all students and alumni opportunities to learn innovation and entrepreneurial skills, and use those skills to transform ideas into meaningful impact. Its mission is built on three pillars: build (programs, resources, workshops), study (curriculum development and enhancement), and research. The BUild Lab IDG Capital Student Innovation Center, the home of Innovate@BU, offers a co-working space for any BU community member working on a new venture (business, tech, arts and culture, social). The space includes a large open work-space, kitchen, private meeting rooms, and event space. Programs and workshops range from mentoring sessions, innovation skill-building workshops, pitch competitions, venture development workshops, and community collaboration events.

### *RASTIC*

RASTIC is a robotics hub, providing an innovation space, a thriving community, and a forum for intimate tech talks, industry days, career fairs, research exchange, and networking, among companies, students, faculty, investors, and other industry stakeholders.

In RASTIC, students can design, build, and test all kinds of robots, from simple consumer ‘bots to GPU-fueled, AI-powered cutting-edge marvels. Aerial and ground-based robots can navigate dynamic landscapes, assisted by Hollywood-grade motion-capture technology. Students can custom-mold silicon to create the flexible robots that are rapidly emerging in medicine, Industry 4.0, and beyond.

Whether applying knowledge gained in a course or pursuing a passion project outside the curriculum, RASTIC resources are open to all College of Engineering students, and staff are available to provide guidance and mentoring.

### *BUILD Lab*

The IDG Capital Student Innovation Center is home to people, programs, and collaboration space that helps all BU students and recent alumni transform their ideas into something real and develop innovation skills, an entrepreneurial mindset, and a strong community along the way.

We welcome BU undergraduate and graduate students from all disciplines and offer a wide range of programs to support students who:

- have a start-up or project idea
- are seeking inspiration for an innovative idea
- are not working on a new idea, but are eager to build innovation skills that can be used to create impact in any career and in their communities

### **Seminar Series and Distinguished Lectures**

All department hosts a variety of seminars throughout the year and many have a robotics theme. Students are encouraged to seek out each department’s schedule and seminar lists in order to take advantage of these events throughout both semesters.

### **Graduate Programs Office (GPO)**

This office provides resources and support to help you succeed as a student. If you are dealing with a complex issue, considering taking a leave of absence or just don’t know your options, please visit the GPO.

The GPO is located in room 114 in the Engineering Research Building (ERB), 44 Cummington Mall. The office is open from 9:00am-5:00pm, Monday through Friday.

Phone: (617) 353-9760

Email: [enggrad@bu.edu](mailto:enggrad@bu.edu)

Contact Information: <https://www.bu.edu/eng/current-students/grad/contact-eng-graduate-programs/>

### **Career Development Office**

The Career Development Office (CDO) connects College of Engineering undergraduate and graduate students with employers for internships and full-time employment.

They work with students to help them identify career options and develop the resources they need to move forward along their career paths, whether that’s with industry or with graduate studies. Their services range from one-on-one counseling to career fairs and professional development workshops. They encourage

students to get to know us as soon as they arrive on campus, rely on them throughout their BU education and continue using our services as alumni—as both job seekers and employers.

They help employers gain access to the top talent they seek. They welcome employer participation in our Fall and Spring Career Fairs and through resume books and on-campus interviews. They can also help you engage with our undergraduate and graduate engineering students through a range of design projects, including junior and senior design projects and the graduate-level practicum. Employers can also explore broader engagement opportunities through access to their Corporate Leaders Circle.

The Career Development Office is located in room 112 at 44 Cummington Mall. The office is open from 9:00am-5:00pm Monday through Friday.

Phone: 617-353-5731

Email: [engcareers@bu.edu](mailto:engcareers@bu.edu)

<http://www.bu.edu/eng/careers/>

## **POLICIES AND RESOURCES**

[Boston University Diversity Statement](#)

[Withdrawal, Leave of Absence, and Reinstatement Policy](#)

[Auditing Courses](#)

[Transfer Credit](#)

### **Equal Opportunity and Nondiscrimination**

[Complaint Procedures in Cases of Alleged Unlawful Discrimination or Harassment](#)

[Disability Accommodation](#)

[Equal Opportunity/Affirmative Action Policy](#)

[Sexual Misconduct/Title IX Policy](#)

[Student Grievance Procedure in Cases of Alleged Disability Discrimination](#)

[Graduate Student Academic Conduct Code](#)

## **DIRECTORY**

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