Reference Materials for Incoming EECS Graduate Students

MIT Department of Electrical Engineering and Computer Science
Graduate Reference Guide

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Getting Started

Welcome to new students joining the EECS Department for the first time this fall. This document summarizes the graduate program, but you can also find information on the EECS website by topic.

Orientation for new SM and PhD students will be held on Thursday, August 29th. This will be part of a full orientation schedule organized by the departmental Graduate Students Association (GSA), and the Institute-wide Graduate Student Council (GSC). The departmental orientation is administered jointly by the EECS GSA and the EECS Graduate Office. We hope to provide all the information that new students will need to become engaged in their graduate programs during the first term. Being present at this Orientation event is highly recommended.

Graduate Counselors are faculty members or EECS-affiliated research staff assigned to advise graduate students on their academic programs and departmental requirements. For students starting in the fall, the Graduate Counselors are typically assigned during the prior summer. The assignment process of a Graduate Counselor seeks to select a person to complement the advice from the Research Supervisor. If it turns out that the same person is assigned to both roles, we will make every effort to assign a new Graduate Counselor. Graduate Counselors make themselves available to meet with their advisees in person during (or prior to) the two-week registration period in the fall and spring terms, or by appointment as needed.

Special seminars are held in the fall term, as an enrichment option for incoming students. These seminars provide an opportunity to connect with faculty members, in order to discuss the EECS graduate program and/or graduate life in general. Incoming students can sign up for the seminars at the departmental orientation. The special seminars being offered in the fall semester include:

New Women in EECS Seminar (6.962)	Prof. Leslie Kolodziejski & Janet Fischer
Networking Seminar (6.962)	Prof. Leslie Kolodziejski & Janet Fischer
Intro to Research Seminar (6.961)	TBD

Registration is a process of signing up for classes (subjects), seminars, and thesis units. A two-week long period is reserved for this activity at the beginning of the fall and spring terms. While the registration process is online, students are still expected to meet with their Graduate Counselors to discuss their class selections, and to seek guidance on any of their questions or concerns. Graduate students can opt to take subjects for credit, pass/fail, or as listener. EECS graduate students can take no more than **two** subjects per term (exclusive of thesis units and seminars). Changes can be made to registration, by way of add/drop using the registration website. The Registrar has deadlines for adding and dropping in each term, and actions made after this date will require an Institute petition (to be approved by the Office of Graduate Education - OGE) and will incur a petition fee.

Pre-Registration is a process that informs the departments about enrollment projections for subjects. The Registrar has deadlines for pre-registration, generally:

Month of May for summer and fall Registrations
Month of December for spring Registration

Summer Registration is expected for students who are at MIT carrying out research over the summer, and is required for students who receive summer funding of any kind. Summer tuition is subsidized by MIT for students taking thesis units only.

Students who are taking time off over the summer should negotiate this with their research supervisor and inform the EECS Graduate Office. International students carrying out summer internships need to arrange the appropriate visa status (Curricular Practical Training) with the International Students Office (ISO).

Research Supervisors are faculty members, or research staff, who supervise a graduate thesis, provide funding, lab space, and access to equipment. Generally students arrive at MIT EECS with a research advising relationship in place, which should be documented by turning in a Research Supervision Agreement (purple form) to the EECS Graduate Office.

If students have not secured a research supervisor by the time they arrive at MIT, they are expected to take the Intro to Research in EECS Seminar (6.961) in the first semester and work diligently toward finding a supervisor before the start of the second term. Once a research advising relationship is in place, this should be documented by turning in a Research Supervision Agreement (included in your welcome bag) to the EECS Graduate Office.

Who can supervise a Master's Degree? Who can supervise a PhD degree?
The EECS Department permits any faculty member at MIT to supervise research that will be used for a Master's thesis or for the PhD thesis. For the Master's thesis, only the research supervisor approves the thesis and assigns a grade. However, for the PhD degree, the thesis committee must include two faculty members from the EECS Department. The PhD thesis supervisor can be outside of the EECS Department and may reside in any other MIT department or division. Occasionally, a thesis supervisor will not be on the faculty of MIT, such as research staff at MIT Lincoln Laboratory or Charles Stark Draper Laboratory. Occasionally, a research supervisor may be a faculty member at a collaborating academic institution. In such cases, special approval of the Committee on Graduate Students (CGS) is required. Also, non-faculty members may be allowed to supervise thesis research; special approval is required from the CGS. Requests of such approval should be made to the Graduate Officer Professor Leslie Kolodziejski prior to beginning the thesis research.

Funding for EECS graduate students can be categorized in three different ways:

Fellowships can be from internal or external sources, and generally pay for a student's tuition, medical insurance, and a monthly stipend. Depending on the amount paid by the fellowship, supplementation by a research assistantship (RA) or teaching assistantship (TA) may be necessary.

Research Assistantships are provided to students performing research under a particular grant, and cover tuition, medical insurance, and a monthly salary (paid two times each month).

Teaching Assistantships are provided to students who assist with departmental teaching activities, and cover tuition, medical insurance, and a monthly salary (paid two times each month). Advanced teaching assistantships are known as Instructor G's.

The appointment periods for RA/TA are:
<u>Fall</u> (9/1 to 1/15)   <u>Spring</u> (1/16 to 5/31)   <u>Summer</u> (6/1 to 8/31)

A **Master of Science Degree (SM)** is a necessary first degree in the EECS graduate program. Students who have a Master's Degree from MIT (MEng or SM) or another institution do not need to earn another Master's Degree at MIT, and can proceed directly into the doctoral program.

The EECS Master's Degree has three components:
*   Coursework
*   Thesis Proposal
*   SM Thesis
*   Professional Perspective (see description on page 8)

The coursework requirement for the SM degree in EECS is 66 units, of which 42 must be from subjects designated as graduate level. This typically means that students take four EECS subjects totaling 48 units. The remaining 18 units can be satisfied by the units taken in the first year as subject 6.960 (Introduction to Research in EECS).

An SM thesis proposal should be submitted by the end of your first summer, laying out the scope of research and its timeline, and providing appropriate references. A sample title page for the SM thesis proposal can be found on the EECS website. The research supervisor approves the SM thesis proposal.

Students should join the most appropriate degree list (via WEBSIS) in order to let the Registrar know of their intention to complete a degree. MIT awards degrees in June, September, and February of each year. Once on the degree list, the EECS Graduate Office will communicate with degree candidates about precise departmental

deadlines and expectations. Please note that students must be registered in a term when their name appears on an MIT degree list.

The final SM thesis (2 copies on archival bond paper) should be submitted to the EECS Graduate Office by the end of the fourth term of graduate study. The SM thesis is certified by the research supervisor(s) and accepted by the EECS Graduate Officer. A sample title page for the SM thesis can be found on the EECS website.

A letter grade, assigned by the research supervisor, for the SM thesis will be provided to the Registrar, and will appear on the MIT transcript, replacing the thesis grades previously submitted for the student. After completing all requirements for the SM degree, students will be paid at the doctoral rate for the next appointment period.

An **Engineers Degree (EE or ECS)** is an additional degree that students can pursue beyond the Masters, with a heavy component of coursework. Everything above also applies to the Engineers Degree, but the coursework requirement is 162 units, of which 90 units must be graduate level, which corresponds to 8 graduate subjects.

Students who have earned a MEng (or SM) degree at MIT can sometimes use the thesis to satisfy the Engineers thesis, provided their research supervisor certifies that the thesis is of superior quality. Students will still need to satisfy the coursework requirements noted above.

Qualifying for the Doctoral Program

Qualification is the process of approving a student to be in the doctoral program. In EECS, qualification consists of two parts. The written portion of the qualifying process is accomplished via the successful mastery of the selected coursework, whereas the oral exam focuses on a discussion of a body of research. To be qualified, a student must pass both the technical qualifying evaluation and the research qualifying examination.

Technical Qualifying Evaluation (TQE)
The TQE consists of completing 4 graduate level subjects, from an approved list of appropriate subjects. The TQE grid (see EECS website) has been designed to provide a degree of both depth and breadth.

Students submit a TQE plan by February 1st of their first year, laying out the subjects that they will use to satisfy the TQE by the end of the fourth term in residence. The TQE plan should be developed in consultation with the Graduate Counselor and Research Supervisor. If a student needs additional time to finish the TQE, they should file a departmental petition requesting a reasonable extension (see EECS website).

Passing the TQE is accomplished by obtaining A's in at least three of the four TQE subjects. Passage of the TQE is noted in the EECS departmental database. If a student

does not pass the TQE, by obtaining two or more B's in the proposed subjects, an oral exam committee will be formed to examine the student in the areas in which there may be deficiencies. Alternatively, a fifth TQE subject may be taken with a grade of A earned to pass the TQE.

Research Qualifying Exam (RQE)
The RQE is primarily an oral exam, with a small written component, to be completed after passing the TQE, and by the end of the sixth graduate term. Graduate students apply for the RQE utilizing the following website: http:www.eecs.mit.edu/EECSgradrequirements. Students may designate three EECS faculty members who would be good choices for the student's RQE committee. Ultimately, the Area Chair will assign an RQE committee taking into account the student's preferences, but also balancing faculty loads and responsibilities.

The RQE committee consists of two faculty members, one of whom is the chair and the other is the committee member. The RQE committee solicits input from the student's research supervisor(s), and arranges a time to meet with the student, having reviewed a paper by the student that has been submitted in advance. The student gives a 30 minute presentation on their work (often the SM/MEng thesis work carried out at MIT). The faculty committee then asks the student about the work they have presented.

Following the meeting, the committee chair prepares a report qualifying the student, asking for continued work, or not qualifying a student. The results are recommended to the EECS Graduate Office, and if qualified, this is noted in the departmental database and forwarded to the Registrar's Office.

Doctoral Program

The Institute's **residence requirement** for the doctorate is four regular academic terms (not including summer sessions) of graduate work or equivalent. Residence credit for the SM or MEng counts toward the doctoral requirement as well. The average length of time spent by doctoral candidates at present is about 12 regular terms (including SM terms).

A **doctoral thesis proposal** is a requirement for the doctoral program, to be completed by the end of the eighth term as a graduate student. The document should be turned in to the EECS Graduate Office, along with research supervisor and reader agreements from the thesis committee (see below). The document should consist of a cover page, signed by the author (see example of a cover page that could be used for a SM, EE, or PhD thesis on the EECS website), some description of the proposed content of the thesis, timeline to completion, and references. Upon submission, the proposal is routed to the Graduate Officer, for approval. Upon approval, the proposal is filed in the student file. The thesis proposal is not a publicly circulated document.

An EECS **thesis committee** must consist of at least three members, two of whom must be EECS faculty members. At the time that the proposal is submitted, research supervisor and reader agreements must be turned in, signifying that the faculty members agree to be part of the thesis committee. The agreements can be found in hard copy in the Graduate Office or also found on the EECS website.

The EECS Department believes that annual thesis **committee meetings** are helpful in directing the research, and speeding along the time to degree. Students are encouraged to have an initial thesis committee meeting at the time of the thesis proposal submission, and every year after that, leading up to the thesis defense. A form for documenting thesis committee meetings exists (see EECS website), and additional copies can be found in the Graduate Office. The meeting dates and reports will be logged in the EECS database, and filed in the student file.

Each student in the EECS doctoral program must complete a **minor program**, approved by the EECS Graduate Officer or the student's Area Chair, consisting of two MIT subjects. The intent of the minor is to provide a broadening experience, and therefore the minor program field must not be directly related to a student's area of research. In fact, the subject matter may fall well outside of Electrical Engineering or Computer Science.

The subjects in the minor program should constitute a coherent study within a single discipline, and provide at least 18 credit units. One of the subjects may be introductory level. At least one of the subjects must involve study at an advanced level (typically graduate-level). The minor is proposed in advance of taking the subjects. Once approved, the minor program is logged in the EECS database, and will be checked for completion at the time that the student applies for a doctoral degree.

Each doctoral student is expected to take part in the department's teaching program. In order to satisfy this **teaching requirement**, the student must complete a one-term teaching assignment, usually as a compensated Teaching Assistant. The assignment may involve direct teaching or course development. If a student applies twice for a teaching assignment and no suitable position is available, then the requirement is waived. In some cases, students can petition to use teaching service outside of EECS subjects to satisfy the teaching requirement (examples, service as a TA for the summer Women's Technology Program, or as a TA in another department). In such cases, a departmental petition should be filed to document the teaching activity, and is approved by the EECS Graduate Officer.

Effective June 2019, all graduate students entering the EECS graduate program must complete the **Professional Perspective** degree requirement. Those students pursuing a master's degree (SM or MEng) will need to complete one unit and register for 6.994, whereas those students pursuing the PhD degree (and have earned a master's degree previously) will need to complete two units (register for 6.994 and 6.995). Students continuing in the doctoral degree program, after completing the

SM/MEng degree at MIT, will need one additional unit and should register for 6.995. The Professional Perspective requirement can be completed in a variety of manners specific to the interests and career goals of the student. The document EECS_Professional_Perspective_Requirement_Instructions found on the EECS website provides details on the many flexible ways to complete this graduate degree requirement.

When the thesis is substantially completed and the student has prepared a document of preliminary character that summarizes the work to the satisfaction of the thesis supervisor and committee, a **thesis defense** can be scheduled. The candidate defends the thesis orally before the research supervisor and thesis readers, together with other guests whom the thesis committee may choose to invite. The thesis presentation is usually a publicly announced one-hour talk. If the defense is satisfactory, the student is instructed to proceed with the final write-up of the thesis, incorporating suggestions made during the thesis examination.

If all other requirements have been satisfied, the doctoral program is completed when the research supervisor signs the thesis, reports a grade of Satisfactory (SA), and when the student submits two copies of the thesis document to the EECS Graduate Office. Doctoral theses are due approximately two weeks before the end of any regular term, and the last Friday before Labor Day during the summer term.

Degrees are awarded three times each year, according to degree lists that are closely monitored by the EECS Graduate Office, and which are then approved by the MIT Corporation. The degree dates are:

September   (for theses submitted in the summer term)
February   (for theses submitted in fall term or IAP)
June   (for theses submitted in spring term)

Since MIT has one central Commencement each year, students on the September and February degree lists can elect to receive their thesis at Commencement. Students who are not interested in participating in Commencement may receive their diploma (and doctoral hood) earlier, or immediately after Commencement by contacting the Registrar's Office. Upon request, the EECS Graduate Office can produce a letter for employers noting that the degree requirements have been completed in advance of a diploma being awarded.

Miscellaneous

On the topic of **additional employment**, the MIT Office of Graduate Education (OGE) Policies and Procedures state that a graduate student may not interrupt an academic program to accept employment on academic, administrative, or research staff, or as an hourly employee at MIT, Lincoln Laboratory, or the Charles Stark Draper Laboratory. This rule applies during the academic year or during the summer, unless

the approval of the department head and of the appropriate academic dean has been obtained, and provided the work as an employee is not related to the student's thesis research. A thesis release form indicating such approval must be submitted to the Human Resources Department to effect such employment. A graduate student may not include as part of the thesis any material based upon work done while holding an academic or research staff appointment.

Graduate students who hold full time research or teaching assistantships, or who receive full support on a fellowship or traineeship, are not usually eligible for such employment. A full time (100 percent) teaching assistant or research assistant is defined as 20 hours of work per week. A student who is a US citizen or permanent resident who applies to work, in addition to his or her RA or TA appointment, may be permitted additional compensated employment at MIT for no more than 10 hours per week during the academic year, especially to support student life and learning activities (e.g., staffing the front desk of a residence hall). Consult the EECS Graduate Office for approval before undertaking such employment. Regulations for international students are stricter, due to US immigration laws. For more information on this, please see the Graduate Policies and Procedures at the website: https://oge.mit.edu/gpp/.

It is generally expected that EECS graduate students **register during the summer**, for thesis units only. If registered for thesis (or the introductory subject 6.960) the **summer tuition subsidy** will cover the cost of tuition. It is not unusual for students to take a summer internship to enhance their research experience. In such cases, students should not pre-register for summer, and should notify Janet Fischer of the EECS Graduate Office so that the registration is not processed. International students taking summer internships need to take the additional step of securing work permission and immigration clearance, known as **curricular practical training (CPT)** or **optional practical training (OPT).** CPT/OPT begins with a conversation with the International Students Office, where certain documentation will be needed.

The EECS Department suggests and monitors a graduate program **timeline** that can be found in the box on page 11, which is designed to keep students progressing through the program. While the deadlines are serious and meant to be in the student's best interest, we do try to be reasonable, and exercise flexibility. If meeting a particular deadline is problematic, please seek the advice of the EECS Graduate Office as soon as possible.

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<u style="color:red;">Timeline and Deadlines</u>

1st Term: Submit Research Supervision Agreement (purple) form

2nd Term:
- Submit TQE plan by February 1st
- Submit SM proposal by end of term, or August 31st at the latest

End of 4th Term: TQE completed; Master's Degree completed

5th Term:
-Register or apply for the RQE
-Students who have not completed the TQE can continue in the program only with permission of the Committee on Graduate Students (CGS).
-Students who have not submitted the Master's thesis by the beginning of the term can continue in the program only with the permission of the CGS.

*End of 6th Term***:**
-Students who have not qualified by completing the RQE and Master's thesis can continue in the program only with the permission of the CGS.

*End of 8th Term***:**
-Submit doctoral thesis proposal.

9th Term:
-All requirements including minor program and teaching should be completed this term.
-Students who have not submitted a doctoral thesis proposal can continue in the program only with the permission of the CGS.

End of 14th Term: Continuation in doctoral program requires explicit approval of CGS.

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Students may receive reminder or **warning letters** to alert them to an upcoming deadline, or if a deadline has passed. Such warning letters are typically sent as a pdf from the Graduate Officer to the student, copied to the Research Supervisor and Graduate Counselor. It is our preference that students meet the deadline, but if there are extenuating circumstances, students are allowed to **petition the department** (see EECS website) for a reasonable extension.

If a deadline is not met, and there is not an approved petition on file, the student will be contacted by the Graduate Officer.

Similarly, the **Institute has a petition process** for other requests such as:
- Election of a dual degree
- Completion of an incomplete from a prior semester or year
- Choosing a thesis field not currently on the list of departmental thesis fields
- Adding or dropping a subject after the stated deadlines

Institute petitions require departmental and instructor approval, and are then reviewed by the OGE (Room 3-138). A processing fee of $50 is assessed to the student account for each petition that is approved.

Non-Resident Status

MIT allows qualified (post TQE and post RQE) doctoral students who have submitted a doctoral thesis proposal to apply for a reduced tuition status, if they are going to be away from MIT for a term (fall or spring) or academic year, and not using MIT resources. Non-resident status must be approved by the Department and the OGE, at least one month before the term begins. This status is meant for students who are not at MIT using office or lab space, or living in MIT graduate dormitories. Tuition under non-resident status is 5% of regular tuition for the first three terms, and then 15% for a fourth, fifth, or sixth term. Students are generally not allowed to pursue non-resident status beyond six terms. At the point that the thesis is ready to be defended and submitted, a student would need to return to full-time graduate status. It is best to consult with Janet Fischer in the EECS Graduate Office before applying for non-resident status, and map out a plan for the remainder of the graduate program. The request form for non-resident status can be found on the OGE website.

Tuition and Fees

MIT bills tuition in advance of each fall and spring semester. Accompanying each tuition charge is the student medical insurance charge, and the student life fee. Normally, a RA or TA covers the cost of the tuition and insurance, with the student responsible for paying the student life fee. A student could waive the student insurance through the MIT Student Insurance Office if they can prove in a timely manner that they have comparable coverage, typically from a parent or spouse.

The Registrar maintains several current tuition schedules, which are available here: http://web.mit.edu/registrar/reg/costs/graduate/grad_fallspring.html

Of particular interest to graduate students are the following tables and list:
*   Pro-ration tables - shows how tuition is prorated, should a student complete a terminal SM or PhD degree before the end of a fall or spring semester.
*   Graduate thesis tuition rules - illustrates various scenarios for students returning to complete a thesis after being withdrawn or on non-resident status.
*   Miscellaneous fees such as student life fee, late registration fee, thesis processing fee, etc.

Resources for EECS Graduate Students

Student Organizations:
- EECS Graduate Student Association   (http://eecsgsa.mit.edu/about/)
- EECS REFS (peer support)   (http://www.eecs.mit.edu/refs/)
- The Graduate Student Council   (http://gsc.mit.edu)

EECS Faculty and Administration:
- EECS Graduate Office: http://www.eecs.mit.edu/grad/index.html
  - Janet Fischer (academic program)
  - Kathy McCoy (admissions and fellowships)
  - Alicia Duarte (RQE, thesis submission)

- Graduate Counselor

- Research (Thesis) Supervisor

- Area Chairs:
  - Area I (EE): Prof. Gregory Wornell
  - Area II (CS): Prof. Robert Morris
  - EECS Graduate Officer: Prof. Leslie Kolodziejski

- EECS Department Head: Prof. Asu Ozdaglar

- Graduate Student Requirements WEBSITE:
  - http://www.eecs.mit.edu/EECSgradrequirements
  - EECS Communication Lab: http://mitcommlab.mit.edu/eecs/

MIT Office of Graduate Education:
- Dean for Graduate Education: Dean Blanche Staton

- *Graduate Policies and Procedures* http://web.mit.edu/gso/gpp/