Graduate Program Guide

Department of Electrical and Computer Engineering

Northeastern University

Academic Year 2026–2027

Oakland Campus

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List of Acronyms

Acronym	Meaning
CCSP	Communications, Control, and Signal Processing
COE	College of Engineering
CSYS	Computer Systems and Software
CVLA	Computer Vision, Machine Learning, and Algorithms
ECE	Electrical and Computer Engineering
ELPO	Electromagnetics, Plasma, and Optics
FT	Full-time
GAC	Graduate Affairs Committee
GL	Gordon Leadership
GSE	Graduate School of Engineering
HSMI	Hardware and Software for Machine Intelligence
IIRR	Individual Instruction Registration Request
INSI	Intelligent Networked Systems Institute
IP	In Progress
MGEN	Multidisciplinary Graduate Engineering
MSC	MSECE, course-only track
MSECE	Master of Science in Electrical and Computer Engineering
MSECE+LC	MSECE with Leadership Certificate
MSAI	Master of Science in Artificial Intelligence
MSIoT	Master of Science in Internet of Things
MSMD	Microsystems, materials, and devices
MSSCEN	Master of Science in Semiconductor Engineering
MST	MSECE, course-thesis track
MSWiNE	Master of Science in Wireless and Network Engineering
NU	Northeastern University
NUID	Northeastern University Identification Number
OGS	Office of Global Services
PhD-BE	PhD, BS Entry
PhD-AE	PhD, Advanced Entry
PhDCE	PhD in Computer Engineering
PhDEE	PhD in Electrical Engineering
POWR	Power Systems, Power Electronics, and Motion Control
PT	Part-time
QE	Qualifying Exam
RA	Research Assistant(ship)
ROR	Registration Override Request
SH	Semester Hour

S/U	Satisfactory or Unsatisfactory
TA	Teaching Assistant(ship)

1. General Information

This document provides information about ECE graduate programs at Northeastern University. Graduate students are expected to read this document, be familiar with the rules and procedures, follow them, and consult it when they have questions.

1.1. Graduate Programs and Degrees

The ECE Department offers three graduate programs:

- Master of Science in Electrical and Computer Engineering (MSECE)
- PhD in Electrical Engineering (PhDEE)
- PhD in Computer Engineering (PhDCE)

In partnership with the Gordon Institute of Engineering Leadership, we also offer:

- MSECE with leadership certificate (MSECE+LC).

With the Intelligent Networked Systems Institute (INSI), we co-offer two MS programs:

- Master of Science in Wireless and Network Engineering (WiNE) with (INSI)
- Master of Science in Internet of Things (IoT) with (INSI) and the Khoury College of Computer Sciences (Khoury)

We also participate in joint MS programs led by other departments:

- Master of Science in Artificial Intelligence (MSAI) with Khoury College
- Master of Science in Data Science (MSDS) with the Khoury College
- Master of Science in Robotics (MSROB) with the Mechanical and Industrial Engineering Department (MIE) in the College of Engineering (COE), Khoury and the Institute for Experiential Robotics (IER)
- Master of Science in Semiconductor Engineering (MSSCEN) with (MIE)
- Master of Science in Extended Reality (MSXR) with Khoury College, D'Amore-McKim, Bouve College, College of Social Sciences and Humanities, and College of Art, Media and Design

All MS programs can be pursued full-time (FT) or part-time (PT). Applicants with a BS or MS degree in electrical and computer engineering or a closely related field can apply to one of the MS programs or either of the PhD programs - an MS degree is not required for PhD admission. Both PhD Programs are full-time programs and students must register in the Fall, Spring, and Summer Full semesters.

1.2. Graduate Advising

PhD students are advised by their research advisor. For advice on rules and regulations, COE PhD Grad Advising (coe-phd-gradadvising@northeastern.edu)

MSC and MST students who do not yet have a research advisor are advised by Graduate Student Services; contact COE ECE Grad Advising at coe-seattle-gradadvising@northeastern.edu. MST students with a research advisor will be academically advised by their research advisor. The MST research advisor can be any tenured, tenure-track, teaching, or research faculty member in ECE. MST students can change their track to MSC after completing one semester in the ECE Department. MST students who, after two semesters, do not yet have a thesis advisor need to change their track to MSC.

A PhD advisor (or lead advisor in cases of joint advising) can be any tenured, tenure-track, or affiliated ECE faculty member. All PhD students have a research advisor when they begin the program.

2. The MSECE Program

MS graduates will acquire the necessary analytical and technical knowledge, tools, and skills to address engineering problems of an advanced nature in their field of study by taking core fundamental courses as well as concentration courses in their chosen concentration and by completing a project or thesis if they have selected the thesis track. They will be able to analyze problems and formulate and design appropriate solutions in their specific concentration. These skills shall make them capable of using analytical, numerical, and experimental techniques to achieve these goals.

2.1. MSECE Tracks

MSECE applicants select one of the two tracks, the course-thesis track (MST) or the course-only track (MSC), when they apply for admission. Changing track is possible after finishing one semester in the original track. Please refer to Section 14 for details, conditions, and requirements.

2.2. MSECE Concentrations

MSECE applicants select one of the concentrations listed below at admission:

1. Hardware and Software for Machine Intelligence (HSMI)
2. Microsystems, Materials, and Devices (MSMD)

A change of concentration is only possible at the end of the first or second semester of study in the ECE Department. This is done by filing a petition. Only a fraction of petitions for change of concentration are approved. Details can be found in Sections 17 and 13.

2.3. Description of MSECE Concentrations

Hardware and Software for Machine Intelligence (HSMI)

This concentration prepares multifaceted systems engineers who bridge theory, software, and hardware. As AI solutions become more prevalent, practitioners must be fluent not only in the theoretical and software aspects of technology but also in the real-world hardware considerations that any solution must address. Graduates are skilled in developing machine-intelligence (MI) systems through hardware–software co-design of efficient, real-time, high-performance, distributed MI implementations that meet security and safety requirements

Microsystems, Materials, and Devices (MSMD)

This concentration covers the fundamental theories, design approaches, fabrication methods, and measurement techniques behind high-performance, miniaturized sensing platforms, wireless devices, biochips, energy-harvesting devices, biosensors, and other emerging electronic products. Students gain experience with industry-standard simulation software and equipment, and may pursue research in magnetic, ferroelectric, and magnetoelectric materials; the design and fabrication of micro/nano-electromechanical systems (MEMS/NEMS); analog, RF, digital, and mixed-signal integrated circuit design; and low-power very-large-scale integration (VLSI).

2.4. The MSECE Graduate Curriculum

MSECE students, and PhD-BE students completing their MSECE requirements, must understand three course categories:

1. Fundamental Courses

Each concentration has four essential courses that provide fundamental, concentration-specific knowledge. Students must complete at least two of these four.

2. Concentration Courses

These courses provide depth of knowledge in one of the MSECE concentrations. Concentration courses for each concentration are listed starting in section 18. Some courses are listed as concentration for multiple concentrations. Concentration courses can be found in the Northeastern Catalog as well. Note that fundamental courses are a subset of concentration courses and some courses belong to multiple concentrations.

Which courses count depends on matriculation year: a course listed as a concentration course in the GPG for a student's matriculation year, or any later year, counts as a concentration course. Concentration courses may be offered by ECE or a different department. No petition is required to register for a listed concentration course, ECE or non-ECE.

A non-ECE course that is not on the list may still count as a concentration course if its subject matter is closely related to the student's concentration — but only after a petition is filed and approved before registration (Section 13).

3. Excluded Courses

These courses cannot be used toward the MSECE degree and cannot be petitioned; they are generally non-ECE courses. Please see Section 18.4 for the list of excluded courses.

3. Checklist for MSECE Course-only Track (MSC) Students

Use this checklist to track your progress toward the MSECE course-only track:

1. Read this document thoroughly. If in doubt, contact your academic advisor in GSE. You need 32 SH of graduate-level coursework to graduate; details below.
2. **Fundamental Course Requirements:** Take at least two (8SH) of the four fundamental courses listed from your concentration in Section 12.
3. **Concentration Requirements:** Take and successfully complete at least six concentration courses for your concentration (24 SH) — see Section 12 or the NU Catalog for your matriculation year. Any fundamental course you take also counts as a concentration course.
4. For MSMD students, the total number of non-ECE courses cannot exceed two courses (8 SH). HSMI students can take up to three non-ECE courses (12 SH). If you cannot register for a planned non-ECE course, contact the corresponding department directly.
5. MSECE students may register once in EECE 6400 (Special Problems in ECE, 1–4 SH) in their MSECE program. Registration in this course requires the approval of a faculty

member. If no section of EECE 6400 is available under the name of the approving faculty member, the student should fill out a Registration Override Request (ROR) to request the creation of a section. The ROR to request the creation of a section can be found here. If there is a section in the schedule, the student can register after submitting and receiving the approval of an override form (see Section 13).

6. Course-only track students may register once in 4 SH of EECE 7945 (Master's Project) as part of their concentration courses. Registration in this course requires the approval of a faculty member. Any tenured, tenure-track, affiliated, research, or teaching ECE faculty can serve as your project advisor (see the ECE faculty directory) If no section of this course exists under the name of the approving faculty member, the student should complete an ROR to request the creation of a section. If a section already exists in the schedule, the student can register after submitting and receiving the approval of an override for (see Section 7).
7. Up to 9 SH of graduate-level coursework can be transferred from other institutions, subject to approval of the Graduate Affairs Committee (GAC) and requires filing a petition (see Section 7 on how to file a petition). Transfer courses require a grade of at least B and must not have counted towards a previous degree. For more details, see Section 15.

4. Checklist for MSECE Thesis Track (MST) Students

Use this checklist to track your progress toward the MSECE thesis-course track:

1. If you do not have a research advisor, contact your GSE advisor. To graduate, you must complete 24 SH of graduate-level coursework plus 8 SH of thesis. The details are given below.
2. Find a thesis advisor - any tenured, tenure-track, teaching, research and affiliated ECE faculty member whose interests match yours and who agrees to serve as your thesis advisor. A list of ECE faculty can be found in the ECE directory. After finding a research advisor, they will be your faculty advisor. The deadline for finding a research advisor is one year after your matriculation at NU. If you cannot find a research advisor, you need to file a petition to change to MSECE course-only track (MSC). For details see Section 13.
3. **Fundamental Course Requirements:** Refer to the list of "fundamental courses" for your concentration. You will need to take at least two fundamental courses (8SH).
4. **Concentration Requirements:** Take and successfully complete at least six concentration courses (24 SH) for your concentration. see Section 22 or the NU Catalog for your matriculation year. Any fundamental course that you take, and your 8 SH of thesis work (EECE 7945 and EECE 7990), also count as concentration courses.
5. Non-ECE courses are capped at three (12 SH) for all concentrations. If you cannot register for a planned non-ECE course, contact that department directly.
6. Students may register once in EECE 6400 (Special Problems in ECE, 1–4 SH) in their MSECE program with the approval of a faculty member. If no section of EECE 6400 exists under the name of the approving faculty member, the student should fill out a Registration Override Request (ROR) to request the creation of a section. If there is a section in the schedule, the student can register after

submitting and receiving the approval of an override form (see Section 7. Petition and Registration Override Procedures).

7. A maximum of 9 SH of graduate-level coursework can be transferred from other institutions. Transfer credit is subject to approval of the Graduate Affairs Committee (GAC) and requires filing a petition (see Section 7. Petition and Registration Override Procedures on how to file a petition). You need to have a grade of at least B in transfer courses. Courses previously counted towards obtaining a degree cannot be transferred. For more details, see Section 17.
8. **Thesis Requirements:** First, you must register for EECE 7945 (MS Project), then EECE 7990 (MS Thesis) in a subsequent semester, with the same advisor. Both require the approval of a faculty member. If there is no section of EECE 7945 or EECE 7990 available under the name of the approving faculty member, the student should fill out an ROR to request the creation of a section. If there is a section in the schedule, the student can register after submitting and receiving the approval of an override form (see Section 17).

   Note 1: If you have not successfully defended your thesis after completing EECE 7945 and EECE 7990, register for EECE 7996 (MS Thesis Continuation, 0 SH). If no section exists under your advisor's name, file an ROR; otherwise submit an override request (Section 17). A signature page is required upon completing the MS thesis.

   Note 2: Before defending, form a Thesis Committee with your advisor with at least three members, at least two of whom are ECE faculty. A letter grade is assigned to EECE 7945 on successful completion, and to EECE 7990 upon a successful defense. Announce your defense date and location at least one week in advance, using this form.

   Note 3: LATEX templates for writing MS thesis can be downloaded from here. Microsoft Word templates are also available on the COE website. Ask your graduate advisor if you need assistance.

   Note 4: If a student is unable to continue working with their original faculty member, they may transition to course-only track an either enroll in a remaining content courses to satisfy program requirements, or – if they have not already done so, register for EECE 6400 – Special Problems counting it toward their Concentration requirement. EECE 6400 may only be taken once.

5. The MS in Semiconductor Engineering (MSSCEN)

The MSSCEN bridges cutting-edge research and practical application. It is anchored by NanoSI, a world-leading institute for semiconductor research, education, and entrepreneurship at the forefront of next-generation chip-scale electronics, sensors, RF/mmWave devices and systems, photonics, MEMS, packaging, heterogeneous integration, and micro/nano manufacturing — all of which feed a program built to sharpen students' knowledge, research skills, and practical ability.

MSSCEN Concentrations:

MS SCEN students apply to one of two concentrations. Students in the Devices and NanoSystem Concentration, follow the requirements below. Students in the Materials and Manufacturing Concentration, follow the link provided and connect with your Program Contacts for program requirements and expectations. Students who wish to change concentrations must reapply here. Once accepted, refer to Section 17 for details, conditions and requirements.

Checklist for successful progress toward the MSSCEN — complete 32 SH of coursework, choosing one of three options:

a. Coursework Option (32 SH of Core, Concentration, and Restricted Elective courses): - At least 12 SH of Core Requirements from the approved list (the Innovation requirement cannot be met solely with Directed Study coursework) - At least 8 SH of Concentration courses from the approved list - At least 12 SH from the Restricted Elective list.

b. Master's Project Option (at least 28 SH of Core, Concentration, and Restricted Elective courses, plus 4 SH of MS Project): - At least 12 SH of Core Requirements from the approved list (Innovation requirement cannot be met solely with Directed Study) - At least 8 SH of Concentration courses from the approved list- At least 8 SH from the Restricted Elective list - 4 SH of MS Project (EECE 7945) completed in one semester with a faculty member's approval, ending in a written report and presentation. If no section exists under the approving faculty member's name, file an ROR; otherwise submit an override request.

c. Master's Thesis Option (at least 24 SH of Core, Concentration, and Restricted Elective courses, plus 4 SH of MS Project and 4 SH of MS Thesis): - At least 12 SH of Core Requirements from the approved list (Innovation requirement cannot be met solely with Directed Study) - At least 8 SH of Concentration courses from the approved list- At least 4 SH from the Restricted Elective list- 4 SH of MS Project (EECE 7945), completed in one semester with a written report and presentation, followed by 4 SH of MS Thesis (EECE 7990) with the same advisor in a subsequent semester. Registration requires a faculty member's approval; if no section exists under their name, file an ROR, otherwise submit an override request (Section 17). For Thesis Committee and process requirements, see Section 4, item 8. Announce your defense at least one week in advance here; a signature page is required upon completion. - If you are unable to continue with your original faculty member, you may move to the course-only track and either enroll in a remaining content course, or — if you have not already done so — register for EECE 6400 with a different faculty member, counting it toward your Concentration requirement. EECE 6400 may only be taken once.

6. The PhD Program

6.1. Program Goals

PhD graduates gain analytical and technical knowledge, tools, and skills to address advanced engineering problems and conduct independent research in their specialization — by taking courses in Electrical or Computer Engineering, proposing and pursuing a research topic, and defending a dissertation. Graduates can analyze problems, formulate and design solutions, propose research ideas, conduct research, and produce new knowledge, using analytical, numerical, and experimental techniques.

6.2. PhD Concentrations

Students enter the PhD program either with a BS (PhD-BE) or a relevant master's degree (PhD-AE).

Applicants with a BS degree (PhD-BE): PhDCE students first complete master's requirements in one of the three concentrations CSYS, CVLA, or HSMI. PhDEE students first complete master's requirements in one of the four concentrations CCSP, ELPO, MSMD, or POWR. After finishing the master's requirements, the remainder of the PhD program follows the PhD-AE requirements below.

Applicants with a master's degree (PhD-AE): The notion of concentration does not directly apply.

A change of concentration or program (PhDCE ↔ PhDEE, or from a PhD program to MSECE) is possible after completing one semester in the original program/concentration

7. Checklist for PhD Students with MS Degree (PhD, Advanced Entry)

1. You are advised on academic matters by GSE advisors.

2. You are assigned a research advisor upon matriculation. After registration, complete the PhD Research Advisor Form, have your assigned advisor sign it here, and upload it here. If you change your research advisor, you need to complete and upload the same form.

3. **Course Requirements:** You need to complete at least 16 SH of graduate level course work beyond your MS degree.

- Note 1: Choose courses in consultation with your research advisor.
- Note 2: At least 8 SH must be graduate-level ECE courses.
- Note 3: A non-ECE course not on the approved Concentration lists requires a petition, filed and approved before registration (Section 17).
- Note 4: You may register once for EECE 7400 (Special Problems in ECE, 1–4 SH) with a faculty member's approval. If no section exists under the approving faculty member's name, file an ROR; if a section exists, register after submitting and receiving an approved override.
- Note 5: Up to 4 SH of graduate-level coursework may transfer from other institutions, subject to GAC approval and a petition. Transfer courses require a grade of at least B and must not have counted toward a previous degree.

4. **Qualifying Exam:** You have two chances to pass the QE. The details of the exam can be found in the section *The Qualifying Exam and Candidacy Achievement*. After passing the qualifying exam, your status changes from "Predoctoral Student" to "PhD Candidate". This stage is usually marked by "Candidacy Achieved." If you want to do research before achieving PhD candidacy (i.e., before becoming a PhD candidate as explained above), you need to register in EECE 9986 (Research, 0 SH) under your advisor's name. Registration in this course requires approval of a faculty member. If there is no section of EECE 9986 available under the name of the approving faculty member, the student should fill out a Registration Override Form (ROR), to request the creation of a section. The ROR form can be found here, to request creation of a section. If there is a section in the schedule, then the student will be able to register after submitting and approval of an override form (see Section 13).

5. Register for EECE 9990 and EECE 9991 (Dissertation Term 1 and Dissertation Term 2, 0 SH) for two consecutive semesters immediately after achieving PhD candidacy. If a section of this course under the name your research advisor does not exist, please contact your academic advisor at GSE.

    - **Note:** If after taking EECE 9990 and EECE 9991 you have not yet defended your dissertation (this is very common), you must register in EECE 9996 (Dissertation Continuation, 0SH) in each fall, spring, and summer semesters until you successfully defend your dissertation. During the Summer Full semester, you are required to register for a dissertation course. If you plan to take the summer off, you must take a Leave of Absence. Reach out to coe-phd-gradadvising@northeastern.edu for assistance.

6. **PhD Committee**: Form your committee with your advisor not later than the completion of your second year after starting the PhD program. It must have at least three members, at least two of them tenured or tenure-track ECE faculty. At least three members of the PhD committee must hold doctoral degrees, and at least one member must have no more than 50% appointment in the ECE Department. This, for example, can be from outside NU, from

another department, or a joint member in ECE and another department whose appointment in ECE is not more than 50%. After forming the Committee, complete the PhD Committee Form and upload it here. For details, see Section 9.

7. **Dissertation Proposal Review** (also called the "Comprehensive Exam" or "Proposal Defense"): Consists of a written research proposal and presentation, open to faculty and students, followed by a closed Q&A with your PhD Committee. The date is set by your advisor and committee, after you have achieved candidacy, completed EECE 9990 and EECE 9991, and formed your committee; and must be within the first three years after starting the PhD program at NU. Submit the Proposal Review Announcement Form to announce it at least one week before the review date. After successful defense of the proposal, you complete the Dissertation , have it signed by your advisor and the PhD committee members and upload it here. If unsuccessful, the Committee provides recommendations on the direction of the research and arranges a date for future review. For details, see Section 9.4.

8. **Dissertation Defense:** Dissertation defense is the last stage in PhD requirements. The dissertation defense consists of a presentation of your research results followed by a question/answer session by your PhD Committee. The presentation part of this exam is open to faculty and students. Prior to scheduling, it is the responsibility of the student to ensure all Dissertation and Dissertation Continuation courses are graded by their PhD Advisor. If any courses are left ungraded, the student cannot Defend or proceed to graduate. The dissertation defense must be scheduled not sooner than six months after the date of the dissertation proposal review. This is a very important scheduling restriction, please make sure to schedule your dissertation proposal review on time in order to meet this requirement. To announce your PhD defense, please complete and submit the Dissertation Defense Announcement Form. For details, see Section 9.

9. **Residency Requirement:** Register full-time at NU for at least two semesters after candidacy. The two summer half-semesters count as one full semester.

10. **Time Limitation:** You have five years to complete degree requirements. This time limit applies to all PhD students, PhD-BE and PhD-AE.

11. You graduate when you have successfully defended your dissertation and fulfilled your course and residency requirements.

    For more details on stages and deadlines for PhD students see Section 9.

8. Checklist for PhD Students with no MS Degree (PhD, BS Entry)

1. You are advised on academic matters by GSE advisors.

2. **Course Requirements:** Satisfy the MSC or MST requirements, plus the course requirements for PhD students with an MS (PhD, Advanced Entry); see the corresponding sections of this guide.

- Note 1: Your research advisor helps decide whether you follow MST or MSC requirements.
  – Note 2: PhD students may pursue an MS degree other than MSECE concurrently, by petitioning to add an ECE MS program to their enrollment (MSIoT, MSWiNE, MSROB, MSXR, MSDS, MSAI, MSSCEN, or MSSTATS).
  – Note 3: After completing MSC or MST requirements, you may petition to receive an MSECE degree, attaching a list of courses that satisfy your concentration's degree requirements. Your research advisor's approval is required

3. **Qualifying Exam, Dissertation Proposal Review, Dissertation Defense:** Follow the same requirements as the Checklist for PhD Students with an MS Degree

4. **Deadlines**: For BS entry students the deadline for forming their PhD Committee is three years after starting the PhD program, the deadline for PhD proposal review is four years after starting the PhD program and for Dissertation Defense is seven years after starting the PhD program. Note that the Dissertation Defense must be scheduled at least six months after the Proposal Review.
5. **Residency Requirement:** Register full-time at NU for at least two semesters after candidacy.

6. **Time Limitation:** You have seven years after starting your PhD program to graduate.

For more details on stages and deadlines for PhD students see Section 9.

9. Stages and Deadlines in the PhD Program

Beyond the course requirements, four milestones lead to the ECE PhD degree:

1. Passing the Qualifying exam
2. Forming the PhD committee and filing the PhD Committee Form found here
3. Completing the "Dissertation Proposal Review" stage and filing the Dissertation Proposal Review Form found here
4. Defending the dissertation and filing it with the GSE. Defense cannot be scheduled less than six months after the dissertation proposal review.

9.1. The Qualifying Exam and Candidacy Achievement

The QE is a critical PhD milestone. Students have two attempts: the first miss requires retaking it at the next deadline; a second miss requires leaving the program. Students are responsible for following the process and meeting the deadlines below.

1. **Deadlines:** There are two deadlines: one for submission of the QE proposal form and one for reporting the result of the exam. These deadlines depend on your semester of entry to the PhD program. Missing either of these deadlines is equivalent to failing the exam.

    a. **The deadline for submission of the proposal form**: For students who entered the program in Fall 2026, the deadline is September 30, 2027. For students who entered the PhD program in Spring 2027, the deadline is March 31, 2028.

    b. **The deadline for reporting the result:** For students who entered the PhD program in Fall 2026, the deadline is December 31, 2027. For students who entered the PhD program in Spring 2027, the deadline is June 30, 2028.

2. Process
    a. You and your advisor form a QE committee (at least three members, at least two of them tenured or tenure-track ECE faculty).
    b. Complete the QE Proposal Form, which can be found here. This must be completed by the deadline for submission outlined above. Submit QE Proposal Form here.
    c. Download the QE Result Report form from HERE. Complete the form before the exam, except for the "result" field and signatures; print it and bring it along to the exam.
    d. Take the exam. The exam consists of A) a written report on the subject that was stated in our proposal. The report is submitted to your committee before the date of the exam, a presentation of the subject to your committee with a length of up to 20 minutes, a Q&A session by the committee, which should be 40 to 50 minutes. The questions can be about your report or can test your general knowledge.
    e. The After exam, give the QE Result Report Form to the committee to enter the result and sign the form. Upload the completed form here.

3. **Recommendations:** Schedule the proposal and exam well before the deadlines - the deadlines are during busy times for faculty. Advanced planning will allow a time buffer in the case of unforeseen circumstances. After the exam, please ask your advisor to report the results as soon as possible, ideally the day of the exam.

9.2. Forming the PhD Committee

The committee must have at least three members: at least two tenured or tenure-track ECE faculty, and at least three members holding doctorate degrees. Co-advisors together count as one committee member. At least one member must be from outside NU, from another department, or an ECE faculty member who has an appointment of at least 50% outside the ECE department.

Once formed, complete the PhD Committee Form, have it signed, and file it as described above. The deadline is one year after the QE result-reporting deadline. File a new form whenever the committee's composition changes.

9.3. Dissertation Proposal Review

The student prepares a written research proposal and presents it orally; the presentation is open to faculty and students, followed by a closed Q&A with the PhD committee. Announce the presentation at least one week ahead using the form here. The committee weighs:

1. The merit of the proposed research as a PhD dissertation
2. Substantial evidence of progress in research
3. Knowledge of general area of research and related work
4. Ability of oral presentation of the results and answering questions related to the proposal.

The advisor and committee set the review date, which must follow candidacy, completion of EECE 9990 and EECE 9991, and formation of the committee. The deadline is three years, for PhD-AE students, and four years, for PhD-BE students, after starting their PhD program. It is strongly recommended that the proposal review be arranged as early as feasible: because the defense cannot be scheduled less than six months after the review, scheduling it early protects your defense timeline.

After successful review complete the Dissertation Proposal Review Form, have it signed by your advisor and the PhD committee and uploaded here. If the proposal review is not successful, the PhD committee submits written recommendations to the student on the direction of the research and arranges a date for a future review.

9.4. Dissertation Defense

Schedule your dissertation defense no sooner than six months after your proposal review. Before scheduling, ensure your advisor has graded all Dissertation and Dissertation Continuation courses; you cannot defend or graduate with ungraded courses outstanding. Announce your defense using the form here. at least one week before the defense date. LATEX templates for preparing PhD dissertation can be

found here. Microsoft Word templates are also available on the COE website, please ask your advisor for assistance if needed.

9.5. Residency Requirement

Register full-time at NU for at least two semesters after achieving candidacy (the two summer half-semesters count as one full semester).

9.6. Time Limitation

PhD-AE and PhD-BE students have five or seven years, respectively, to complete all requirements of their degree.

9.7. PhD Annual Review

Your performance and progress toward your degree is reviewed annually. This process is administered by GSE (see the GSE website for details).

- An **Unsatisfactory** grade places you on probation; you meet with your advisor for feedback and are reviewed again after six months. If you have not improved by October 15, you are removed from the program.
- A **Needs Improvement** grade is a prompt to meet with your advisor and adjust your approach. You cannot receive this grade twice in a row. A second consecutive "Needs Improvement" becomes "Unsatisfactory."
- Two consecutive years of **Unsatisfactory** grades result in termination from the PhD program

9.8. PhD Program Deadlines

The following deadlines apply to PhD-AE and PhD-BE programs

Milestone	Bachelor's-entry	Master's-entry
Coursework substantially complete	Year 2	Year 2
Qualifying / comprehensive exam(s) passed	Year 2	Year 2
Dissertation committee formed	Year 3	Year 2
Dissertation proposal / prospectus approved	Year 4	Year 3
Annual progress review	Every year	Every year
Dissertation defense (target)	Year 7	Year 5

10. PhD Program Policies

10.1. PhD Research Advisor Form Requirement

At the start of any advisor–advisee relationship, both parties must complete and sign a PhD Research Advisor Form (links provided throughout this guide). The form formalizes the advisor's academic and financial commitment and documents the student's academic and research commitments.

10.2. PhD Advisor Relationship Requirement

Once a student and faculty member agree to work together, they submit a signed PhD Advisor Form, establishing a minimum four-semester commitment from the date of submission. Graduation is not possible without an official advisor. A student who cannot secure a new advisor within or beyond the three-semester transition window (Section 10.4), must withdraw from the PhD program or move to a master's program.

10.3. PhD Advisee/Advisor Separation

If **the advisor initiates separation** due to unsatisfactory performance, they must first issue a written warning starting a "performance probation" period of at least four months. The warning must (i) explain the deficiency and (ii) define a four-month action plan for the student to demonstrate acceptable progress. The action plan takes effect once approved by the Associate Chair of Graduate Studies. During probation, the advisor remains the student's advisor of record and continues to mentor and support them, the probation and transition periods do not overlap.

If the student does not sufficiently address the deficiencies within the probation period, they lose their advisor and enter the transition period (Section 10.4). A student may also elect to leave the lab during probation, which likewise starts the transition period; they must notify both the advisor and the ECE Program Contact in writing by the end of the first month of probation.

If **the student initiates separation**, they must first speak with the ECE Program Contact, then send formal written notice to both their advisor and the Program Contact. If this happens mid-semester, the transition cannot begin until the semester ends; the student continues working on the advisor's projects, and the faculty member continues to support them, through the end of the term. At the same time, the student must apply for a TA position or secure a new advisor before the next semester begins.

Notification deadlines for a departmental transition are October 31 (Fall), March 1 (Spring), and June 30 (Summer). Notifying after these dates means a TA position cannot be guaranteed; the department will try to accommodate late requests, but availability may require the student to take a Leave of Absence (LOA) for that term.

Once in the transition period, the student has three semesters to secure a new PhD advisor and may be supported as a TA for at most two semesters during that time. Once an advisor is identified, the student must submit a PhD Advisor Form.

Additional notes:

- A student cannot elect to leave their advisor during a PhD Annual Review: if graded Unsatisfactory, the student must remain with their advisor through the next Annual Review, and may not go on internship during that period — they must continue as an RA under the advisor's supervision so their progress can be fairly assessed by the deadline of October 30.
- First-year PhD students may not leave their advisor/group; they must remain through their first Fall, Spring, and Summer semesters. If, at the end of the first year, the relationship proves unsustainable, the advisor and advisee may separate under the rules above.
- Students who are unadvised are not in Good Standing with their PhD program (Section 14.9). Once a student secures an advisor, they return to Good Standing as long as they meet all other requirements.

10.4. Transition Period

A PhD student's transition period is the time they are unadvised. It begins at the start of the semester following departmental notification and separation from the previous advisor — or, if both parties simply announce an upcoming separation, at the start of the following semester. The transition period ncannot exceed three semesters.

- If the department funds the student during Summer, that term counts as one of the two supported transition semesters (Summer 1 and Summer 2 each count as 0.5 TA, together equaling one full-time TA position). If another source funds the student's Summer, a grant or internship, that term does not count toward the two semesters.

- A student who takes an LOA during transition is still supported for at most two semesters as TA; while on LOA, they are otherwise unsupported. The LOA counts toward the three semester period that the student is given to secure a new advisor, except when the LOA is a medical, maternity, or paternity leave.

10.5. Departmental Support

Students have a maximum of three semesters to secure a new advisor. The department funds unadvised students for a maximum of two semesters, covering enrollment in content courses and/or research credits so students can secure a permanent advisor without losing progress.

Students in transition should discuss funding options with the ECE Program Contact, and the Director of Administration and Finance. The student is responsible for finding a new advisor or applying for TA positions. To begin a transition the following semester, the department must be notified no later than October 31 (Fall), March 1 (Spring), or June 30 (Summer)

While unadvised, a student may register for EECE 6400 or EECE 7400 (Special Problems in ECE) to earn credit while researching under a consenting faculty member, exploring potential advisory relationships. If no tentative advisor is yet identified, register for the PhD research course (EECE 9986, 0 SH) under the Associate Chair for Graduate Studies until one is found.

If that collaboration succeeds, the student can advance to formal doctoral research by registering for EECE 9986, 9990, 9991, or 9996 — at which point both parties complete and submit a PhD Advisor Form, formalizing the relationship and its mutual commitments.

10.6. TA Policy for Transfer Students

Students transferring into the NEU PhD ECE program are generally treated as first-years and are not eligible for TA positions. An exception applies to transfer students who continue working with their previous advisor: they remain eligible for available TA positions, subject to advisor support and position availability.

10.7. TA/HCA Polices, Expectations, Support and Training

TA/HCA Onboarding and Training

Initial Onboarding: Faculty should meet with TAs and HCAs at the beginning of the semester to clearly define responsibilities, followed by an email outlining expected tasks and timelines.

Training Materials: Faculty provide lab assignments for review in advance, supply additional materials as needed (e.g., code templates, solutions, grading rubrics), involve lab technicians in training to ensure proper equipment handling, and when delegating grading furnish TAs/HCAs with complete solutions and rubrics

Ongoing Training: Regular TA/HCA meetings (1-2 times per week) to prepare for upcoming lab sessions. TAs and HCAs complete lab assignments in advance (approximately 2 hours per week) and should attend weekly office hours.

Professional Standards: Faculty maintain patience, courtesy, reasonable flexibility on deadlines, and clear, professional communication in all interactions with TAs and HCAs.

TA/HCA Role Expectations

Eligibility and Compensation

- **Teaching Assistants (TAs):** PhD students only, support course instruction and assessment
- **Hourly Course Assistants (HCAs):** MS or undergraduate students only, not on Co-op, Paid hourly: 10, 15, or 20 hours per week (competitive positions), valuable work experience for CV/resume building and developing public speaking and professional skills

Core Responsibilities (Both TA and HCA's)

Office Hours

- Hold regular office hours at specified times and locations
- Provide 1:1 or group academic support to students
- Serve as a more approachable resource for students

Course Material Preparation

- Prepare course materials in advance
- Build projects and examples for class demonstrations
- Assist with laboratory setup and instructional materials

Student Support

- Act as a buffer between students and professors
- Respond to student questions in a timely manner
- Provide opportunities for student engagement

Attend course lectures

- If required by the course instructor

TAs Specifically: may lead labs or discussion sections, administer exams and quizzes, hold full grading responsibility, and monitor student progress throughout the semester.

HCAs Specifically: focus on peer support and course-material development, with limited grading responsibility. (Undergraduate HCAs are discouraged from grading other undergraduates' work.) The emphasis is on building teaching and mentoring experience.

Expected Learning Outcomes

Accountability and self-management: strong organization and time management; consistent office hours; ongoing communication with the supervisor about workload; effective multitasking and prioritization; prompt responses to requests (grading, meetings, Canvas updates); ownership of assigned work; proactively seeking and offering help; adherence to the course outline and schedule; punctuality and reliability.

Oral and written communication: effective communication across diverse audiences; accurate, enthusiastic delivery of course content; active listening; courtesy and patience; clear communication calibrated to the audience; constructive feedback to colleagues on request; composure under stress.

Quality of work: thorough, accurate, well-organized work; consistent deadlines; prompt responses; high, consistent performance; openness to constructive criticism; FERPA-compliant confidentiality; respect for academic integrity and university policy; clear assignment instructions; preparedness for each session.

Subject knowledge and learning ability: quick uptake of new course content; interest in teaching pedagogy; timely, accurate answers to student questions; comfort with relevant technologies (Canvas, PowerPoint, Excel, lab hardware/software); staying current in the field.

Teaching and presentation ability: effective monitoring and evaluation of student progress; appropriate use of approved materials; competent exam/lab administration; creating opportunities for engagement; a team-oriented attitude; attendance at required sessions; strong working relationships across diverse groups; responsiveness to student perspectives.

Professional development benefits: both TAs and HCAs gain practical teaching and mentoring experience, professional communication skills, public-speaking opportunities, time-management expertise, experience with diverse student populations, and credentials for future academic or professional positions.

10.8 Proposed Policy: ECE PhD Student Internship Return

For ECE PhD Students: Students who return from their internships prior to the end of the academic term shall receive continued advisor support through the conclusion of that term. Advisors must maintain funding through the official end date of the term, regardless of when the student returns within that term. This obligation ensures financial stability for students who complete their internships early.

Note: If a student voluntarily ends their internship prior to the official end date, the advisor is not required to provide financial support for the remainder of that term.

Note: If the employer cancels or terminates the internship early through no fault of the student, the advisor is required to provide financial support through the official end of the term.

Note: Payment Start Date: Students who return between pay periods must wait until the next pay period begins to receive funding. No prorated payments will be issued for partial pay periods.

10.9 Good Standing

PhD students must maintain Good Standing status throughout their entire doctoral program. A student falls out of Good Standing if any of the following apply:

1. Allow their cumulative GPA to drop below the minimum 3.0 cumulative requirement
2. Receive an Unsatisfactory grade in any dissertation course
3. Receive an Unsatisfactory evaluation in their Annual Review
4. Become and remain Unadvised without securing a new advisor within the allotted 2 semester time-period or calendar year.

Students who fail to reestablish Good Standing within the departmental timeframe and meet all program requirements risk dismissal from the PhD program and immediate termination of all departmental and Research Assistantship funding.

The department monitors Good Standing criteria to ensure all doctoral candidates maintain appropriate academic progress and research productivity.

10.10 PhD Annual Review

If a student is graded as Unsatisfactory, they remain with their current advisor through the next review cycle, six months later, and are not in Good Standing in the interim. That next review occurs October 15, when the advisor determines whether sufficient progress has been made; the advisor remains financially responsible through the end of the Fall semester. The outcome of the second review is either Satisfactory or Unsatisfactory.

• If progress is satisfactory, advisor and advisee decide together whether to continue; the student is considered in Good Standing as long as all other requirements are met.

• If they decide to separate despite satisfactory progress, the student enters the Transition period (Section 10.4) and, being unadvised, is not in Good Standing during that time.

• If progress remains Unsatisfactory a second time, the student is dismissed from the PhD program; the ECE Program Contact must be notified of the outcome.

• A student slated for an October 15 review due to unsatisfactory progress will still be reviewed even if they take an LOA, except in cases where LOA is medical, maternity, or paternity

Annual Review Grades:

- **Outstanding Progress**: exceeding expectations across all areas; these students are typically nominated by their advisor for COE/ECE awards.
- **Satisfactory Progress**: meeting program expectations and requirements.
- **Needs Improvement**: some progress shown, but greater effort is needed in other areas. This grade cannot be received two years in a row — a second consecutive "Needs Improvement" becomes "Unsatisfactory," which is not Good Standing.
- **Unsatisfactory Progress**: not meeting program expectations or requirements; not in Good Standing with the program or department.

10.11 PhD Registration Requirement

PhD students must register every term — Fall, Spring, and Summer. While advisors guide course selection, students are responsible for maintaining full-time status by registering for one of:

1. Two content courses (8 SH), or
2. An appropriate dissertation course (EECE 9986, 9990, 9991, or 9996), or
3. An appropriate internship course (ENGR 9700 — FT Internship, or ENGR 9702 — PT Internship)

Registration must be continuous. To pause temporarily, request a Leave of Absence (LOA) from coe-phd-gradadvising@northeastern.edu. Failing to register properly, or to secure an approved LOA, can jeopardize academic standing, visa status, and continued funding.

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11. PhD Program: Financial Support from Advisor

When a student accepts a PhD offer, the faculty advisor commits to funding that student's year-round registration (Fall, Spring, Summer) — a mutual commitment intended to span up to five years. During the first four semesters, both parties are expected to sustain the relationship unless the Department Chair approves a formal separation. The advisor provides academic guidance and mentorship; the advisee engages fully in research and academic responsibilities. At the end of the fourth semester, either party may elect to separate if a different arrangement would serve them better; the advisee then enters a supported transition period at the end of the semester while identifying new advisory opportunities (Section 14.4).

Note: Funding depends on the student maintaining Good Standing (Section 14.9). Students in Good Standing can expect continued support; those who fall out of Good Standing may see funding interrupted.

12. PhD Program: Financial Support

PhD student funding may come from several sources. Faculty advisors typically provide Research Assistantship (RA) funding throughout the program, giving students financial stability to focus on their studies.

When other funding opportunities arise — scholarships, internships, grants, or external employment — advisors share this information with the department to help coordinate support and keep the department informed of available opportunities.

Teaching Assistant (TA) positions offer valuable professional development. The department provides up to four TA appointments over a student's program, awarded through merit-based selection that weighs academic excellence, subject expertise, and relevant experience — positions are not guaranteed and depend on departmental need. Extending TA support beyond four semesters requires approval from the TA/HCA committee and position availability.

Teaching assistantships build classroom and pedagogical skills alongside research training; advisors remain primarily responsible for consistent research funding, stepping in when external funding does not materialize as expected, so students can keep making progress without funding interruptions.

13. Petition and Registration Override Procedures

- Petitions/overrides for taking courses must be filed and approved **before** registering for the course.
- Filing a petition/override does not guarantee approval.
- File your petitions/overrides well in advance. Processing a petition/override takes at least 5 business days.

To file a petition or overrides form go to the Graduate Forms page to file a petition or override request. Make sure that you attach your transcripts to your petitions. Petitions without a transcript will not be processed.

The Graduate school use Adobe Signature for all forms. Submit the completed form Assistant Director of Academic Programs. PhD and MS-Thesis students also need to send the form to their research advisor (if applicable). Approved forms go to the Graduate School for review. When the form is complete, a copy will be emailed to the student, and a copy will be placed in their student e-folder. If you have any questions contact the Graduate School at coe-ece-gradadvising@northeastern.edu

14. Probation Policies and Procedures

For details, please refer to the College of Engineering web site at Probation Policies.

15. Coop and Internship Policies and Procedures

Coop and internship are forms of CPT (Curricular Practical Training) that allow full-time students to integrate a practical learning experience into their graduate program. For details, see the Graduate Coop page.

16. Policies and Procedures for Course Transfer

MS Programs (MSECE, MSSCEN), PhD-BE, and PhD-AE students can transfer up tp 9 SH, 14SH, and 4SH (or equivalent) respectively, from other institutions, respectively. (4 SH of course work is defined as 45 hours of lecture). Credit transfer requires:

- a grade of at least B (or equivalent) in the course.

- The course was not part of the requirements of a degree received by the student in the past.
- The course will be reviewed by the Graduate Affairs Committee as a valid graduate-level course.
- The credit was earned within five academic years of matriculation.

The process for transfer credit requires filing a petition (see Section 14). The petition should be accompanied by the transcript of the student indicating the grade and term, the detailed syllabus of the course, and evidence that the course was not counted towards a previous degree (noted on the transcript).

17. Policies and Procedures for Requesting Change in the Graduate Program

Changes to your graduate program generally require completing at least one semester at Northeastern, giving you time to make an informed decision. The one exception — a change from full-time to part-time, or vice versa — can be requested during the first semester but does not apply to F-1 visa holders.

- **Change from FT to PT or PT to FT**. a Standard Petition (Section 13). This is the only change that can be requested in the first semester.
- **Change of concentration for MS students (MSC and MST**): Requires a minimum 3.00 cumulative GPA. Students cannot apply if they have passed more than 16 SH (Introduction to Cooperative Education does not count toward this 16 SH limit). Students must have completed 4 SH with grade A, or 8 SH with an average grade of 3.5 or better in the target concentration. To request a change in your concentration, complete the Change of Concentration form here. After approval, file a petition for the change (Section 13).
- **Change from MST to MSC**: File a petition (see Section 7) after finishing at least one semester at NU.

- **Change from MSC to MST:** In addition to filing a petition (see Section 7) the student needs the approval of an ECE faculty (tenured/tenure track, emeritus, or affiliated) to be their thesis advisor. Either the signature of the advisor must be on the petition or a letter from the advisor must be attached to the form.

For International Students Only: An approved change of program requires that a new I-20 be issued. It is the student's responsibility to initiate the I-20 process. Instructions are provided on the official admission acceptance letter. Direct questions to OGS.

Plus-One Students: may request a change in their concentration through their PlusOne advisor.

18. Fundamental, Concentration and Excluded Courses

Each subsection below lists the four fundamental courses and the full set of concentration courses for one of the seven MSECE concentrations. Fundamental courses are a subset of concentration courses; a course may appear under more than one concentration.

Hardware, Software, for Machine Intelligence (HSMI)

Fundamental Courses:

Course	SH
EECE 5644 Introduction to Machine Learning and Pattern Recognition	4 SH
EECE 7205 Fundamentals of Computer Engineering	4 SH
EECE 7352 Computer Architecture	4 SH
EECE 7353 VLSI Design	4 SH

Concentration Courses:

Course	SH
EECE 5512 Networked XR System	4 SH
EECE 5550 Mobile Robotics	4 SH
EECE 5552 Assistive Robotics	4 SH
EECE 5554 Robotics Sensing and Navigation	4 SH
EECE 5555 Formal Methods for Robotics and Control	4 SH
EECE 5612 Statistical Inference: An Introduction for Engineers and Data Analysts	4 SH
EECE 5614 Reinforcement Learning and Decision Making under Uncertainty	4 SH
EECE 5639 Computer Vision	4 SH
EECE 5640 High-Performance Computing	4 SH

EECE 5641 Introduction to Software Security (Students taking EECE 5641 can't receive credit for CY 5770)	4 SH
EECE 5642 Data Visualization	4 SH
EECE 5643 Simulation and Performance Evaluation	4 SH
EECE 5644 Introduction to Machine Learning and Pattern Recognition	4 SH
EECE 5645 Parallel Processing for Data Analytics	4 SH
EECE 5668 Large Language Models	4 SH
EECE 5698 Special Topics: Autonomous AI Agent Systems: Design and Engineering	4 SH
EECE 5698 Special Topics: Cyber-Physical Security of IoT Systems in the Age of AI	4 SH
EECE 5698 Special Topics: Field Programmable Gate Arrays in the Cloud	4 SH
EECE 5698 Special Topics: Formal Methods for Dynamical Systems	4 SH
EECE 5698 Special Topics: Robot System Server	4 SH
EECE 5698 Special Topics: Visual Sensing & Computing Co-Design Edge Machine Perception	4 SH
EECE 5699 Computer Hardware and System	4 SH
EECE 7150 Autonomous Field Robotics	4 SH
EECE 7204 Applied Probability and Stochastic Processes	4 SH
EECE 7205 Fundamentals of Computer Engineering	4 SH
EECE 7215 Introduction to Distributed Intelligence	4 SH
EECE 7268 Verifiable Machine Learning	4 SH
EECE 7323 Numerical Optimization Methods	4 SH
EECE 7337 Information Theory	4 SH
EECE 7345 Big Data and Sparsity in Control, Machine Learning, and Optimization	4 SH
EECE 7346 Probabilistic System Modeling and Analysis	4 SH
EECE 7352 Computer Architecture	4 SH
EECE 7353 VSLI Design	4 SH
EECE 7368 High-Level Design of Hardware-Software Systems	4 SH
EECE 7370 Advanced Computer Vision	4 SH
EECE 7373 Machine Learning with Small Data	4 SH
EECE 7390 Computer Hardware Security	4 SH
EECE 7393 Analysis and Design of Data Networks	4 SH
EECE 7397 Advanced Machine Learning	4 SH
EECE 7398 Special Topics: Advances in Deep Learning	4 SH
EECE 7398 Special Topics: Bayesian Filtering and Tracking	4 SH
EECE 7398 Special Topics: Deep Learning Embedded Systems	4 SH
EECE 7398 Special Topics: Flexible Robotics	4 SH
EECE 7398 Special Topics: Human Centered Computing	4 SH
EECE 7398 Special Topics: Legged Robotics	4 SH
EECE 7398 Special Topics: Model-Based Deep Learning for Signal and Image Processing	4 SH
IE 5360 Digital Manufacturing	4 SH
CS 5180 Reinforcement Learning and Sequential Decision Making	4 SH

CS 5335 Robotic Science and Systems	4 SH
CS 7340 Theory and Methods in Human Computer Interaction	4 SH
MATH 7233 Graph Theory	4 SH

Only MSECE+LC students can take EECE 7440 and EECE 7442. They should coordinate with the Gordon Institute of Engineering Leadership.

Microsystems, Materials, and Devices (MSMD)

Fundamental Courses:

Course	SH
EECE 5606 Micro- and Nanofabrication	4 SH
EECE 7201 Solid State Devices	4 SH
EECE 7244 Introduction to Microelectromechanical Systems (MEMS)	4 SH
EECE 7353 VLSI Design	4 SH

Concentration Courses:

Course	SH
EECE 5161 Thin Film Technologies	4
EECE 5606 Micro- and Nanofabrication	4
EECE 5608 Magnetic Materials for Future Electronics	4
EECE 5647 Nanophotonics	4
EECE 5649 Design Analog Integrated Circuits Comp. Metal-Oxide-Semiconductor Tech	4
EECE 5651 Introduction to Photonic Devices	4
EECE 5652 Microwave Circuits and Networks	4
EECE 5653 Introduction to Quantum Engineering	4
EECE 5698 Special Topics: Biomedical Microsystems	4
EECE 5698 Special Topics: Flexible and Printed Electronics	4
EECE 5698 Special Topics: Introduction to Organic and Printed Electronics	4
EECE 5698 Special Topics: Magnetic Materials and Devices for Microwave Engineering	4
EECE 5698 Special Topics: Photonic Devices for Communication Systems	4
EECE 5698 Special Topics: Quantum Hardware Platforms	4
EECE 5698 Special Topics: Semiconductor Packaging	4
EECE 5698 Special Topics: Silicon Photonics	4
EECE 5698 Special Topics: Superconducting Quantum Devices	4
EECE 5698 Special Topics: Tapeout a CMOS Chip	4
EECE 5698 Special Topics: Visual Sensing & Computing Co-Design Edge Machine Perception	4
EECE 6400 Special Problems in ECE (For MSECE and PhD-BS students only)	1-4
EECE 7201 Solid State Devices	4
EECE 7240 Analog Integrated Circuit Design	4
EECE 7248 Lab section for EECE 7240	0
EECE 7242 Integrated Circuits for Mixed Signals and Data Communication	4
EECE 7244 Introduction to Microelectromechanical Systems (MEMS)	4

EECE 7245 Microwave Circuit Design for Wireless Communication	4
EECE 7247 Radio Frequency Integrated Circuit Design	4
EECE 7250 Power Management Integrated Circuits	4
EECE 7284 Optical Properties of Matter	4
EECE 7296 Electronic Materials	4
EECE 7353 VLSI Design	4
EECE 7398 Special Topics: Advanced Radio Frequency Passive Technologies	4
EECE 7398 Special Topics: Advances in Communication Electronics	4
EECE 7398 Special Topics: Low Power Integrated Circuits Design	4
EECE 7398 Special Topics: Multiphysics Sim. for Elec, Acoustic, Photonic, & Magnet Devices	4
EECE 7398 Special Topics: Photonic Circuit Design for Information Processing	4
EECE 7399 Effective Communication for Broad Audiences (only for PhD students)	4
EECE 7400 Advanced Special Problems in ECE (For PhD-AE students only)	1-4

Special Courses

EECE 7399 Effective Communication for Broad Audiences	4 SH

MSC students cannot register in this course as part of their degree course requirements. PhD students may take this course as part of their course requirements. This course counts as non-concentration course for PhD-BE students. For PhD-AE students this course counts as one of their 4 course requirements after MS degree.

Only MSECE+LC students can take EECE 7440 and EECE 7442. They should coordinate with the Gordon Institute of Engineering Leadership.

Excluded Courses for All Concentrations

Excluded courses **cannot be used toward the MSECE program** and cannot be petitioned - any petition to take these courses will be automatically rejected. PhD students can register in excluded courses, if their advisor recommends, but if they want to receive an MSECE degree on their way to PhD, they cannot count these courses as part of their MSECE course requirements.

Excluded courses fall into three groups:

1. Courses offered by the Software Engineering and Information Systems (SEIS) program with prefixes INFO, DAMG, CSYE, TELE
2. Courses offered by the engineering leadership programs ALIGN courses in the Khoury College of Computer Sciences.
3. The following CS courses:

Course	Credits
CS 5010 Programming Design Paradigm	4SH
CS 5320 Digital Image Processing	4SH

CS 5330 Pattern Recognition and Computer Vision	4SH
CS 5340 Computer/Human Interaction	4SH
CS 5520 Mobile Application Development	4SH
CS 5610 Web Development	4SH
CS 5700 Computer Networks	4SH
CS 5800 Algorithms	4SH
CS 6140 Machine Learning	4SH
CS 6350 Empirical Research Methods	4SH
CS 6710 Wireless Networks	4SH
EECE 5314 Intro to Linear Algebra and Probability in Data Science 4	4SH

**Excluded Courses do not apply to MSSCEN

19. Master's of Science in Semiconductor Engineering (MSSCEN)

Core Requirements - Analog/Digital Circuits and Nanosystems:

Course	SH
EECE 5649 Design of Analog Integrated Circuits with Complementary Meta-Oxide-Semiconductor Tech	4 SH
EECE 7240 Analog Integrated Circuit Design	4 SH
EECE 7248 Lab for EECE 7240	4 SH
EECE 7244 Introduction to Microelectromechanical Systems (MEMS)	4 SH
Or ME 6260 Introduction to Microelectromechanical Systems (MEMS)	4 SH
EECE 7353 VLSI Design	4 SH

Core Requirements - Materials, Devices, and Manufacturing:

Course	SH
EECE 5161 Thin Film Technology	4 SH
EECE 5606 Micro- and Nanofabrication	4 SH
EECE 5606 Micro- and Nanofabrication	4 SH
MATL 7365 Properties and Processing of Electronic Material	4 SH
ME 5630 Nano- and Microscale Manufacturing	4 SH

Core Requirements - Innovation:

Course	SH
EECE 6400 Special Problems in ECE	1-4 SH
CHME 5976 Directed Study	1-4 SH
GE 5010 Customer-Driven Technical Innovation for Engineers	4 SH
GE 5100 Product Development for Engineers	4 SH
INNO 6200 Enterprise Growth and Innovation	4 SH
ME 5976 Directed Study	1-4 SH

Concentration Courses:

Course	SH
EECE 5161 Thin Film Technologies	**4 SH**
EECE 5606 Micro- and Nanofabrication	4 SH
EECE 5651 Introduction to Photonic Devices	4 SH
EECE 5649 Design of Analog Integrated Circuits with Complementary Meta-Oxide-Semiconductor Tech	4 SH
EECE 7201 Solid State Devices	4 SH
EECE 7240 Analog Integrated Circuit Design	4 SH
EECE 7248 Lab for EECE 7240	0 SH
EECE 7244 Introduction to Microelectromechanical Systems (MEMS)	4 SH
Or ME 6260 Introduction to Microelectromechanical Systems (MEMS)	4 SH
EECE 7250 Power Management Integrated Circuits	4 SH
EECE 7353 VLSI Design	4 SH
MATL 7365 Properties and Processing of Electronic Materials	4 SH

Restricted Elective List: Available in the Northeastern Catalog here:, and includes EECE 7242 Integrated Circuits for Mixed Signals and Data Communication

20. Grading Guide for Special Graduate Courses

These courses require registration override signed by the instructor/advisor

Course #	Course Title	Credits	Grading	Comments
EECE 6400*	Special Problems ECE	4 SH	A to C- or F	Can be taken once as a MSECE or PhD-BE student.
EECE 7400*	Special Problems ECE	4 SH	A to C– or F	Can only be taken once as a PhD-AE student.
EECE 7945*	Master's Project	4 SH	A to C– or F	Can only be taken once in MSECE program or as the first part of MST.
EECE 7990*	Master's Thesis	4 SH	A to C– or F	Can only be taken once. Second part of MST track.

EECE 7996* (can only be taken once)	Master's Thesis Continuation	0 SH	S/U (satisfactory or unsatisfactory)	For students who, after completion of EECE 7945 and EECE 7990, have not yet defended their MS thesis. Does NOT maintain FT status – PT* status
EECE 9986**	(PhD) Research	0 SH	S/U	For PhD students who have not passed the qualifying exam but want to do research. Also, PhD students who commence the program in summer semester. Maintains FT** status
EECE 9990** EECE 9991**	Dissertation Term 1 Dissertation Term 2	0 SH	S/U	Taken in two consecutive semesters after passing the Qualifying Exam. Maintains FT** status
EECE 9996**	Dissertation Continuation	0 SH	S/U	For PhD students that after completion of EECE 9990 and EECE 9991 who have not yet defended their dissertation. This course Maintains FT** status.

Please note the following:

- During internship students must be enrolled in one of the following courses:
  - ENGR 9700 – Full-time Internship, 0 SH, FT** Equivalent or
  - ENGR 9702 – Part-time Internship, 0 SH, PT* Equivalent plus 4 SH course or one of:
    - EECE 9986 – Research – 0 SH, FT** Equivalent
    - EECE 9990 – Dissertation 1 - 0 SH, FT** Equivalent
    - EECE 9991 – Dissertation 2 - 0 SH, FT** Equivalent
    - EECE 9996 – Dissertation Continuation - 0 SH, FT** Equivalent
- To register for an ENGR, the student must connect with coe-phd-gradadvising@northeastern.edu
- Students on Co-op must be enrolled in EECE 6964 – Coop Work Experience (0 SH, FT** Equivalent) or EECE 6954 – Coop Work Experience (0 SH, PT* Equivalent)

- During the summer terms, register for these courses under Full Summer not Summer 1 or 2.

- Continuing PhD students who have passed EECE 9991 (PhD Dissertation Term-2) must register in EECE 9996 (PhD Dissertation Continuation, 0 SH, FT Equivalent) every semester.

(*) For these courses, if a section under advisor's name exists, the student can register by filing an override form and obtaining instructor/advisor's signature. If a section of this course under the name of the advisor/instructor does not exist, the student should complete a Registration

Override Form found here, to request generation of a section or reach out to the program contact. Courses with * taken alone, do not give the student FT status. The course should be taken in combination with another course to achieve 8 SH for the given semester.

(**) Registration in this course is equivalent to full-time registration.

21. Course Registration Frequently Asked Questions

If you run into a registration issue, check here first. For anything else, contact your academic advisor

Q: I received a registration error.
A: Please complete a Registration Override Request. Be sure to include your transcripts to the request.

Q: I received a "College" error when registering for a CS or CY course.
A: Khoury students have priority to these courses, as ECE students are given priority to EECE courses. You will need to fill out the Khoury Elective Form for these courses.

Q: I need to register for a MS Project, MS Thesis, or Research course.
A: Please fill out an Override Request Form. This grants access to register and inform the Program Contact to create a section if needed.

Q: I have questions regarding tuition, financial aid, or financial holds.
A: Please contact Student Financial Services: sfs@northeastern.edu

Q: Can I audit a course?
A: Generally yes, at the instructor's discretion. You can download an audit form from the Registrar's website, have the instructor sign off if they approve, and then you can bring it directly to the Registrar. Please note that auditing courses is permitted in the Fall and Spring semesters, but not in the summer.

22. Useful Links

General Information

- Academic Integrity Policies
- Code of Student Conduct
- COE Coop Eligibility Page
- COE Policies and Procedures
- COE Probation Policies

- Course Descriptions
- ECE Department website
- ECE Graduate Studies website
- Gordon Leadership Program
- Graduate School of Engineering
- NU Graduate Catalog
- NU Graduate Student Government
- Official University Academic Calendars
- Registrar's Office
- University Health and Counseling Services
- Office of Global Services (OGS)

Forms

- Announcement form for MS Thesis Defense, PhD Proposal Review, or Dissertation Defense
- Change in Degree Program/Concentration
- Change in Degree Level
- COE Forms (petition, registration override, ...)
- PhD Dissertation Proposal Review Form
- PhD Proposal Review Approval Form - Submission Link
- Individual Instruction Registration Request
- LATEX templates for MS thesis and PhD Dissertation
- PhD Committee Form
- PhD Committee Form – Submission Link
- PhD Research Advisor Form
- PhD Research Advisor Form- Submission Link
- Qualifying Exam Proposal Form
- Various ECE Forms