Graduate Program Guide

Department of Electrical and Computer Engineering

Northeastern University

Academic Year 2023–2024

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Acronyms

CCSP: Communications, Control, and Signal Processing

CMPE: Computer Engineering

CNWS: Computer Networks and Security

COE: College of Engineering

CSYS: Computer Systems and Software

CVLA: Computer Vision, Machine Learning, and Algorithms

ECE: Electrical and Computer Engineering

ECEF: ECE Fellowship

ELPO: Electromagnetics, Plasma, and Optics

FT: Full-time

GAC: Graduate Affairs Committee

GSE: Graduate School of Engineering

HSMI: Hardware and Software for Machine Intelligence

IIRR: Individual Instruction Registration Request

IP: In Progress

MGEN: Multidisciplinary Graduate Engineering

MSC: MSECE, course-only track

MSECE: Master of Science in Electrical and Computer Engineering

MSECEL: Master of Science in Electrical and Computer Engineering Leadership

MSECE+LC: MSECE and Leadership Certificate

MSIOT: Master of Science in Internet of Things

MSMD: Microsystems, materials, and devices

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)

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 refer to this guide when they have questions.

1.1 Graduate Programs and Degrees

The ECE Department offers three main graduate programs: Master of Science in Electrical and Computer Engineering (MSECE), PhD in Electrical Engineering (PhDEE), and PhD in Computer Engineering (PhDCE). We also offer some joint MS programs: the Master of Science in Data Science (MSDS) with Khoury College; the Master of Science in Robotics (MSROB) with Khoury College and with the Mechanical and Industrial Engineering Department (MIE); the Master of Science in Applied Physics and Engineering (MSAPE) with the College of Science; the Master of Science in Internet of Things (IoT) with Khoury College and with the Institute of Wireless Internet of Things(WIoT); the Master of Science of Wireless and Network Engineering (WINE) with the Institute of Wireless Internet of Things(WIoT). We also offer two programs in cooperation with the Gordon Institute of Engineering Leadership. These programs are Master of Science in Electrical and Computer Engineering Leadership (MSECEL) and MSECE with leadership certificate (MSECE+LC). MSECE with leadership certificate has the same requirements of MSECE plus additional course and projects as determined by the Gordon Institute of Engineering Leadership. The requirements of MSECEL can be found at MSECEL. Our MSECE programs can be taken in one of the eight concentrations.

All programs can be pursued full-time (FT) or part-time (PT). Applicants with a BS or MS degree in electrical engineering, or a closely related field, can apply either to the MSECE or one of the PhD programs. In other words, to apply to the PhD programs it is not required to hold an MS degree.

MS graduates, through 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) will acquire the necessary analytical and technical knowledge, tools, and skills to address engineering problems of advanced nature in their field of study. 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.

PhD graduates will acquire the necessary analytical and technical knowledge, tools, and skills to address engineering problems of advanced nature and conduct independent research in their area of specialization through taking courses in the fields of Electrical Engineering or Computer Engineering, proposing a research topic accomplishing their formulated research goals, and defending their dissertation. They will be able to analyze problems and formulate and design appropriate solutions, propose research ideas and topics, conduct research, and produce new knowledge in their field of study. They will possess skills and knowledge that make them capable of using analytical, numerical, and experimental techniques to achieve these goals.

1.2 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 17 for details, conditions, and requirements.

1.3 MSECE Concentrations

MSECE applicants select one of the eight concentrations listed below while applying for admission. These concentrations are:

1. Communications, Control, and Signal Processing (CCSP)
2. Computer Networks and Security (CNWS)
3. Computer Systems and Software (CSYS)
4. Computer Vision, Machine Learning, and Algorithms (CVLA)
5. Electromagnetics, Plasma, and Optics (ELPO)
6. Hardware and Software for Machine Intelligence (HSMI)
7. Microsystems, Materials, and Devices (MSMD)
8. Power Systems, Power Electronics, and Motion Control (POWR)

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.

1.4 Description of ECE Concentrations

Communication, Control, and Signal Processing (CCSP) This concentration focuses on development of deterministic and stochastic methodologies and algorithms for modeling, analysis, and design of communications, control, and signal processing applications. The main areas of research strength in this concentration include communications, signal processing and robotics techniques for underwater deployment and related applications; wireless communication, coding and information theory, biomedical signal processing, statistical and adaptive signal processing, brain-computer interface, pattern recognition, robust, adaptive, and distributed control, image and video processing, mobile and assistive robotics, detection, estimation, localization and object tracking. Students in this concentration are trained for careers in wireless and mobile communications industry, applications of modern signal and image processing techniques to communications, control, imaging, radar, and sonar and design and analysis of robust and adaptive control systems.

Computer Networks and Security (CNWS) The Computer Networks and Security concentration prepares students for careers in a wide range of areas including wired/wireless network analysis and protocol design, sensor network design, software and hardware security, and Internet of Things (IoT). Coursework includes network fundamentals, wireless communications, mobile and wireless networks, and computer hardware and software security. Students will learn the proper design and evaluation of wired/wireless networks, TCP/IP, Internet and OSI models, popular Internet applications (HTTP, SMPT, etc.), defensive and offensive approaches to cybersecurity, malware/attack analysis and remediation, side-channel leakage, and hardware/software hardening.

Computer Systems and Software (CSYS) The Computer Systems and Software concentration prepares students for careers in a wide range of areas including microprocessor design and verification, embedded hardware and software development, performance analysis and modeling, advanced computer system design, and operating system design. Coursework includes computer architecture, simulation and performance evaluation, VLSI design, fault tolerant computing, operating systems, and embedded design. Students will learn the proper design and implementation of both hardware and software systems, including microprocessors and graphics processors, high performance computing, computer-aided design tools, CMOS design rules, compilers, computer arithmetic, resilient computation, advanced logic design, operating systems, power/performance analysis, and hardware/software co-design.

Computer Vision, Machine Learning, and Algorithms (CVLA) The Computer Vision, Machine Learning, and Algorithms concentration prepares students for careers in a wide range of areas including vision systems, big data analytics and mining, vision/image processing, visualization systems and software, and general algorithmic approaches to problem solving. Coursework includes computer vision, algorithmic approaches, machine learning, pattern recognition, big data analytics and visualization. Students will study image motion and tracking; algorithmic foundations of robotics; applications of parallel and high-performance algorithms; the human visual system and visual cognition; localization, mapping and navigation, and clustering and regression analysis.

Hardware and Software for Machine Intelligence (HSMI) This concentration will prepare students to become multifaceted systems engineers who can bridge the gap between theory, software, and hardware. As artificial intelligence solutions become more prevalent and widely embraced by society, it will be important that expert practitioners creating these solutions are not only fluent in theoretical and software generation aspects of this technology, but also be knowledgeable about real-world hardware implementation considerations that must be part of the solution/system design and development process. Consequently, graduates of this program will be skilled in developing MI systems that solve problems of importance through hardware-software co-design of efficient real-time, high performance, and distributed MI implementations with security and safety considerations.

Electromagnetics, Plasma, and Optics (ELPO) This area is concerned with the theory and applications associated with the launching, propagation, confinement, and control of electromagnetic, acoustic, and optical wave fields, and the study and applications of the interaction of such waves with matter. This concentration prepares students for careers in RF and microwave engineering, antenna engineering, radar, sonar, wavefield imaging, remote sensing, optics, photonics, acoustics, magnetics, sensors, and their applications in biomedical electronics, optical fiber and wireless communications, geophysical exploration, radioastronomy, and nanotechnology which rely on the analysis, design, and utilization of wave-based systems and components. Students specializing in this area take courses covering theory and applications of electromagnetics, acoustics, optics, magnetism, modern imaging, photonic devices, biomedical optics, and microwave circuit design.

Microsystems, Materials, and Devices (MSMD) Students in the Microsystems, Materials, and Devices concentration will learn fundamental theories, design approaches, fabrication methods, and measurement techniques for applications in high performance and miniaturized sensing platforms, wireless devices, biochips, energy harvesting devices, bio sensors, and a variety of other emerging products with electronic components. Students interested in careers in the industry can use standard simulation software tools and equipment. They can also participate in research focused on magnetic, ferroelectric and magnetoelectric materials; design and fabrication of micro/nano electromechanical systems (MEMS/NEMS) devices; design of analog, radio frequency, digital and mixed-signal integrated circuits; and low-power very-large-scale integration (VLSI).

Power Systems, Power Electronics, and Motion Control (POWR) This concentration covers areas related to secure and efficient operation of electric transmission and distribution systems as well as design, modeling, and control of power converters and renewable energy systems. Coursework includes power system analysis, unbalanced operation, power electronics, sustainable energy, electric drives, advanced power electronics, and electric machines. Students will learn how to model and analyze large scale power grids during normal operation and under faults, they will also learn about the principles of the operation of dc-dc converters, inverters, rectifiers, and ac-ac converters, as well as modulation techniques used in power electronics.

1.5 PhD Concentrations

PhD students can enter the PhD program either with a BS degree (PhD-BE) or with a Master's with a relevant major (PhD-AE).

1) Applicants with a BS degree (PhD-BE, or PhD, BS entry): PhDCE students need to first complete degree requirements in one of the four concentrations of CNWS, CSYS, CVLA, or HSMI. PhDEE students will complete their Master's program requirements in one of the four concentrations of CCSP, ELPO, MSMD, or POWR.

After finishing Master's requirements, the rest of their PhD program will follow the requirements of PhD-AE students as described below.

2) Applicants with a Master's degree (PhD-AE or PhD, Advanced entry): The notion of concentration does not directly apply to PhD-AE students.

Change of concentration and program (from PhDCE to PhDEE or vice versa, and from PhD programs to MSECE) is possible *after completing one semester in the original program/concentration*. For details see Section 17.

1.6 Graduate Advising

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

All MSC students and MST students who do not yet have a research advisor, will be advised on rules and regulations by Graduate Student Services.
COE ECE Grad Advising: (coe-ece-gradadvising@northeastern.edu)

A PhD advisor (or lead advisor in cases of joint advising) can be any ECE tenured, tenure-track, emeritus, affiliated, and adjunct faculty. All PhD students have a research advisor when they begin the program. In the case of a change in advisor, the should complete a PhD Research Advisor Form and upload it here.

MST students who have a research advisor will be academically advised by their research advisor. The MST research advisor can be any ECE tenured, tenure-track, emeritus, affiliated, and adjunct faculty. 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.

2. The ECE Graduate Curriculum

It is essential to know the meaning of **FUNDAMENTAL**, **CONCENTRATION**, and **EXCLUDED** courses in the graduate curriculum. These notions are only relevant to MSECE students and to the PhD-BE students while they are completing their MSECE requirements.

2.1 Fundamental Courses

In each concentration, there are four essential courses that offer fundamental knowledge directly related to that concentration. It is required for students to enroll in a minimum of two of these courses.

2.2 Concentration Courses

These courses provide depth of knowledge in one of the eight MSECE concentrations. Concentration courses for each concentration are listed starting on page 27. Some courses are listed as concentration for multiple concentrations. Concentration courses can be found in the Northeastern Catalog as well. Note: Fundamental courses are a subset of concentration courses.

Concentration courses can vary slightly based on the year of matriculation for the students. If a course is listed as a concentration course in the Graduate Program Guide (GPG) of the student's year of matriculation or in subsequent years, it is considered a concentration course. Concentration courses can be ECE or non-ECE courses (for instance, several CS and MATH courses are listed as concentration for some concentrations).

To register in a concentration course, *no petition is required*; this applies to both ECE and non-ECE concentration courses.

In some cases, non-ECE courses which are not listed as concentration course can be taken as concentration if the subject matter of the course is close to the concentration of the student. For these cases a petition needs to be filed and approved **before registration in the course** as explained in Section 13.

2.3 Excluded Courses

These courses *cannot* be selected as part of the MSECE program and, therefore, **cannot be petitioned**. These are generally non-ECE courses. Please see Section 18.10 for the list of excluded courses.

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

Please use the following checklist for successful progress towards MSECE (course-only track):

1   Make sure that you read this document thoroughly and understand all of it. When in doubt, contact your academic advisor in GSE. You need to complete **32 SH of graduate-level course work** to graduate. The details are given below.

2   **Fundamental Course Requirements**: Refer to the list of "fundamental courses" for your concentration. You need to take at least two fundamental courses (8SH)

3 **Concentration Requirements:** Refer to the list of "Concentration Courses" for *your concentration* in the NU catalog for the year of your matriculation or on page 27). You need to take and successfully complete *at least six* "Concentration Courses" (24 SH). Any fundamental course that you take counts as a concentration course.

4 For CCSP, ELPO, MSMD, and POWR students, the total number of non-ECE courses cannot exceed two courses (8 SH). CNWS, CSYS, CVLA, and HSMI students can take up to three non-ECE courses (12 SH).

5 If MSECE students decide to register in a non-ECE course and for some reason they cannot, they need to reach out to the corresponding department.

6 MSECE students may register once in EECE7400 (Special Problems in ECE, 1–4 SH) in their MSECE program. Registration in this course requires approval of a faculty member. If there is no section of EECE 7400 available under the name of the approving faculty member, the student should fill out an Individual Instruction Registration Request (IIRR) to request the creation of a section. The IIRR 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).

7 MSECE students in the course-only track may register once in 4 SH of EECE 7674, Master's project, as part of their concentration courses. Registration in this course requires approval of a faculty member. If a section of this course under the name the approving faculty member does not exist, the student should complete a Registration Override Form (ROR), 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).

8 A maximum of 9 SH of graduate level course work 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 13 on how to file a petition). You need to have a grade of at least B in transfer courses. Courses that have been previously counted towards obtaining a degree cannot be transferred. For more details see Section 1 6 .

4 Checklist for MSECE Thesis-Course Track (MST) Students

Please use the following checklist for successful progress towards MSECE (thesis-course track):

1 If you do not yet have a research advisor, please contact your GSE advisors for academic advising. You need to complete **24 SH of graduate-level course work** plus **8 SH of thesis** to graduate. The details are given below.

2 Talk to the ECE faculty about their research interests and find a research advisor whose research matches your interests and background and is willing to serve as your thesis advisor. Your research advisor can be any tenured, tenure-track, emeritus, affiliated, or adjunct ECE faculty. A list of ECE faculty can be found on 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 17.

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:** Refer to the list of "Concentration Courses" for *your concentration* in the NU catalog for the year of your matriculation or on page 27. You need to take and successfully complete **at least six** concentration courses (24 SH). Any fundamental course that you take, and your 8 SH of thesis work, counts as concentration courses.

5 The total number of non-ECE courses that you can take cannot be more than three courses (12 SH). This applies to all concentrations.

6 If you want to register in a non-ECE course and for some reason you cannot, please reach out to the corresponding department.

7 MSECE students may register once in EECE7400 (Special Problems in ECE, 1–4 SH) in their MSECE program. Registration in this course requires approval of a faculty member. If a section of this course under the name the approving faculty member does not exist, the student should complete an Individual Instruction Registration Request (IIRR), found here, to request generation 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).

8 A maximum of 9 SH of graduate level course work 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 13 on how to file a petition). You need to have a grade of at least B in transfer courses. Courses that have been previously counted towards obtaining a degree cannot be transferred. For more details see Section 16.

9   Courses that are listed under "Excluded Courses" cannot be taken towards the MSECEL degree. Please do not file petition to take these courses. Such petitions are automatically rejected. See Section 18.10 for the list of Excluded Courses.

10   **Thesis Requirements:** You need to register for 8 SH in EECE 7990 (Master's Thesis). This is done in two semesters, each semester 4 SH. Registration in this course requires approval of a faculty member. If there is no section of EECE 7990 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).

11   Thesis track students cannot register in EECE 7674, EECE 7440, and EECE 7442.

     Note 1   If after taking 8 SH of EECE 7990 (Master's Thesis), you have not yet successfully defended your thesis, you need to register for one semester in EECE 7996 (Master's Thesis Continuation, 0 SH) to complete your thesis work. If after taking one semester of EECE 7996 your thesis work is until incomplete, you need to take EECE 8986 (Master's Research) until you successfully defend your thesis. If a section for EECE 7996 or EECE 8986 under the name the faculty advisor does not exist, the student should complete 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 a student will be able to register, unless there is a restriction, then the student must submit an override form (see Section 13).

     Note 2   When you are ready to defend your thesis, you need to form a "Thesis Committee" in consultation with your advisor. The Committee must have at least three members, with at least two tenured or tenure-track ECE faculty on the committee. After successful defense of your thesis a letter grade will be assigned to EECE 7990 (Master's Thesis). Your MS thesis defense date and location must be announced at least one week before the date of defense. The MS thesis announcement form can be found here.

     Note 3   LATEX templates for writing MS thesis can be downloaded from here. Microsoft Word templates are also available on the COE website, please ask your Graduate Advisor for assistance.

5 Checklist for MSECEL Students

Please use the following checklist for successful progress towards MSECEL:

1 Make sure that you read this document thoroughly. In consultation with your GL advisor, plan a program of study for your degree based on concentration requirements as explained below. When in doubt, contact your Gordon Leadership (GL) advisor or your academic advisor in GSE. Make sure that in your plan of study all prerequisites are taken before you register in a course. To graduate, you need to complete **16 SH of graduate-level course work** plus 16 SH of GL courses, as advised by your GL advisor. The details for the ECE courses are given below. For GL courses and requirements, please consult your GL advisor.

2 **Concentration Requirements:** You must select, in consultation with your GL advisor, one of the eight ECE concentrations. Refer to the list of "Concentration Courses" for *your concentration* in the NU catalog for the year of your matriculation or on page 27. You need to take and successfully complete *at least four* "Concentration Courses" (16 SH).

> **Note 1** If you plan to take a non-ECE course that is not listed as a concentration course for any ECE concentration, you need to file a petition *before registration in the course*. See Section 13 on how to file a petition.

> **Note 2** Courses that are listed under "Excluded Courses" **cannot** be taken towards the MSECE degree. Please do not file petition to take these courses. Such petitions are automatically rejected. See Section 18.10 for the list of excluded courses.

3 MSECEL students cannot register in EECE 7647, EECE 7400, EECE 7990, and EECE 7399.

4 Regardless of your concentration, from the 16 SH non-GL courses that you must take, at least 12 SH must be ECE courses.

5 If you want to register in a non-ECE course and for some reason you cannot, please reach out to the corresponding department.

6 Checklist for MSECE+LC Students

MSECE+LC students need to complete 40 SH of coursework, of which 8SH are ENLR courses listed here. The remaining 32 SH follow the same rules as MST degree except that these students take EECE 7440 and EECE 7442 instead of EECE 7990.

7   Checklist for MSIoT Students

This program is aimed at preparing highly qualified researchers and a specialized workforce that will lead the development of a globally interconnected continuum of untethered devices and objects interacting with the physical environment, people, and each other. The program will provide students with the necessary knowledge and skills to understand, design and implement autonomous wireless networked systems of tomorrow operating in uncertain, challenging, extreme environments, through a combination of coursework, master project research and/or industry experience.

MSIoT students are required to complete 32 SH of coursework. Students must choose one of the follow tracks:

7.1 Course-Only Track: requires students to complete at least 28 SH of fundamental courses following the checklist below and at least 4 SH of concentration courses.

1. Take EECE 5155 – Wireless Senor Networks and the Internet of Things
2. One wireless communication/networking course
3. One Algorithms course
4. One data analysis/machine learning course
5. One Embedding systems or sensor course
6. 4 SH of entrepreneurship, policy, and business courses
7. One course in security
8. Concentration course from list of COE/Khoury colleges: see page 36

7.2 Master's Project Track: requires students to complete at least 28 SH of fundamental courses following the checklist below and at least 4 SH in the form of the MS Project. Students are required to register for EECE 7674 and complete the Masters project in one semester which ends with a written report and presentation of research.

1. Take EECE 5155 – Wireless Senor Networks and the Internet of Things
2. One wireless communication/networking course
3. One Algorithms course
4. One data analysis/machine learning course
5. One Embedding systems or sensor course
6. 4 SH of entrepreneurship, policy, and business courses
7. One course in security
8. Master's Project

8   Checklist for MSWiNE Students

This program is aimed at preparing highly qualified researchers and a specialized workforce that will lead the future of our hyperconnected society. The program will provide students with the necessary knowledge and skills to understand, design and implement present and future wireless and wired communication networks, through a combination of coursework, master thesis research and/or industry experience.

MSWiNE students are required to complete 32 SH of coursework. Students must choose one of the following tracks:

8.1 MSWiNE students on the Course-Only Track:
1. Take at least 8 SH of fundamental courses from the following: EECE 7374, EECE 5576, EECE 7364
2. Take at least 24 SH of concentration courses from the approved list: see page 37.

8.2 MSWiNE students on the Thesis Track:
1. Take at least 8 SH of fundamental courses from the following: EECE 7374, EECE 5576, EECE 7364
2. Take at least 16 SH of concentration courses from the approved list: see page 37.
3. Take at least 8 SH of MS Thesis course – EECE 7990

Thesis Requirements: You need to register for 8 SH in EECE 7990 (Master's Thesis). This is done in two semesters, each semester 4 SH. Registration in this course requires approval of a faculty member. If there is no section of EECE 7990 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).

9   Checklist for PhD Students with MS Degree (PhD, Advanced entry)

1   On academic matter, you will advised by the GSE advisors.

2   You are assigned a research advisor upon matriculation. If you change your research advisor, please complete the research advisor form found here, have it signed by your new research advisor, and upload it here.

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

   Note 1   Courses are selected in consultation with your research advisor.

   Note 2   At least 8 SH of your courses must be graduate-level ECE courses.

   Note 3   If you plan to register in a non-ECE course that is *not* on the approved list of Concentration courses, you need to file a petition *before registration in the course*. Please see Section 13 on how to file a petition.

Note 4   PhD students may register once in EECE7400 (Special Problems in ECE, 1–4 SH) for *at most* 4 SH in their PhD program. Registration in this course requires approval of a faculty member. If there is no section of EECE 7400 available under the name of the approving faculty member, the student should fill out an Individual Instruction Registration Request (IIRR) to request the creation of a section. The IIRR 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).

Note 5   A maximum of 4 SH of graduate level course work 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 13). You need to have a grade of at least B in transfer courses. Transfer courses should not have been previously counted towards obtaining a degree.

4   **Qualifying Exam:** You have two chances to pass the QE. The details of the exam can be found in section 11.1.

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   You must register in 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 and spring semester until you successfully defend your dissertation. During the summer semester you are not required to register in EECE 9996, unless you are graduating at the end of that summer (August graduation). **If you are graduating in August, you must be registered in EECE 9996** *for the entire summer semester.*

6   **PhD Committee:** You should form your "PhD Committee" in consultation with your advisor within one year of passing the QE. For part-time students the deadline is two years after passing the QE. Note that you can form your PhD committee before passing the qualifying exam. It is highly recommended that you form your committee early in your PhD program. The PhD Committee must have at least three members, of which at least two must be tenured or tenure-track ECE faculty, and at least three members must hold doctorate degrees. At least one member of your PhD committee must not have primary assignment in the ECE department. After forming the Committee you complete in the PhD Committee Form and upload it here. For details, see Section 11.2.

7   **Dissertation Proposal Review** (sometimes referred to as the "Comprehensive Exam" or "Proposal Defense"): The Dissertation Proposal Review consists of a written research proposal and a presentation of it followed by a question/answer session by the PhD Committee. The presentation part of this exam is open to faculty and students. The date of the Dissertation Proposal Review is determined by your research advisor and PhD Committee. This date is after you have achieved PhD candidacy, have passed the 16 SH course requirements after MS, have taken EECE 9990 and EECE 9991, and have formed your PhD Committee. It is recommended that the Dissertation Proposal Review be scheduled within two years after passing the qualifying exam (four years for part-time students). To announce your PhD proposal, review please complete and submit the proposal review announcement form. After successful defense of the proposal, you complete the Dissertation Proposal Review Form. This form is signed by your advisor and the PhD committee members and upload it here. If the proposal review is not successful, the Committee provides recommendations on the direction of the research and arranges a date for future review. For details, see Section 11.3.

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. **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 11.4.

9   **Residency Requirement:** You need to be registered full-time at NU for at least two semesters after candidacy to be eligible for your degree. The two summer half-semesters count as one full semester. For part-time PhD students, four semesters of part-time registration fulfill the residency requirement.

10   **Time Limitation:** After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of the degree requirements. This time limit applies to all PhD students, PhD-BE, PhD-AE, and both PT and FT PhD students. Under extenuating circumstances, a student may request an extension of this time frame.

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 11.

10   Checklist for PhD Students with no MS Degree (PhD, BS entry)

1   On academic matters, you will be advised by the GSE advisors.

2   **Course Requirements:** You need to satisfy the requirements of MSC or MST, plus the course requirements for PhD students with MS. Please refer to the corresponding sections in this document for details.

     Note 1   The decision on whether you should follow the requirements of MST or MSC is made in consultation with your research advisor.

     Note 2   PhDCE students must complete the MSECE requirements for one of the four concentrations CNWS, CSYS, CVLA, and HSMI. PhDEE students must complete MSECE requirements in one of the four concentrations CCSP, ELPO, MSMD, and POWR.

     Note 3   After completing the requirements for MST or MSC, students have the opportunity to file a petition to receive an MSECE degree. The students have to produce a list of the courses that they want to count towards their MS degree and attach the list to their petition, these courses must satisfy the degree requirements in the concentration of the student. Approval of their research advisor is necessary to receive the MSECE degree.

3   Qualifying Exam, Dissertation Proposal Review, Dissertation Defense: These requirements are similar to those on "Checklist for PhD Students with MS Degree". Please refer to pages 16-19.

4   Residency Requirement: Students need to be registered full-time at NU for at least two semesters after candidacy to be eligible for your degree. The two summer half-semesters count as one full semester. For part-time PhD students, four semesters of part-time registration fulfill the residency requirement.

5   Time Limitation: After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of the degree requirements. This time limit applies to all PhD students, PhD-BE, PhD-AE, and both PT and FT PhD students. Under extenuating circumstances, a student may request an extension of this time frame.

For more details on stages and deadlines for PhD students see Section 11.

11 Stages and Deadlines in the PhD Program

The purpose of this section is to present procedures and deadlines, beyond the course requirements, needed to complete the ECE PhD degrees. These requirements are:

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.

11.1 The Qualifying Exam and Candidacy Achievement

Taking the QE is an important stage in the completion of requirements for the PhD program. Students have two chances to take the QE exam. Students who do not successfully complete the exam the first time must take it at the next deadline. Students who do not successfully complete the exam the second time must leave the PhD program. The process and deadlines for the QE are explained below. Students are responsible for ensuring the process is followed and the deadlines are met.

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 2023, the deadline is September 30, 2024. For students who entered the PhD program in Spring 2024, the deadline is March 31, 2025. For part-time students these dates are September 30, 2025, and March 31, 2026, respectively.

      b. **The deadline for reporting the result:** For students who entered the PhD program in Fall 2023, the deadline is December 31, 2024. For students who entered the PhD program in Spring 2024, the deadline is June 30, 2025. For part-time students, these dates are December 31, 2025, and June 30, 2026, respectively.

2 **Process**

      a. You and your advisor form the QE committee, which can also serve as your PhD committee, or can be different. The committee must have at least three members. At least two members must be tenured or tenure-track ECE faculty. Your advisor will be one of the committee members.

      b. Complete the QE Proposal form, which can be found here. **This must be completed by the deadline for submission outlined above.** Complete and submit QE Proposal Form through the above link as well.

      c. 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, B) a presentation of the subject to your committee with a length of 20 minutes, at most, C) 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.

      d. Your advisor will send the results of the exam via email to Professor Masoud Salehi, m.salehi@northeastern.edu. The committee members, the student, as well as ece-studentservices@ece.neu.edu should be cc'd. **This must be completed by the deadline for reporting the results outlined above.**

3 **Recommendations:** Please schedule submission of the proposal and exam well before the deadlines to ensure the deadline will be met. 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, preferably the day of the exam.

11.2 Forming the PhD Committee

The PhD committee must have at least three members, of which at least two must be tenured or tenure-track ECE faculty and at least three members must hold doctorate degrees. If a student has co-advisors, the entire advisory team will collectively count as one committee member. At least one member of your PhD committee must not have primary assignment in the ECE department. After forming this committee, the PhD Committee Form is completed, signed by the advisor, the Committee members, and the student, and filed as explained in the preceding sections. This form can be found here. The deadline for filing this form is one year after the deadline for reporting the QE result (see 11.1).
If the composition of the P.D. committee changes, a new PhD Committee Form should be filed.

11.3 Dissertation Proposal Review

For the dissertation proposal review, the student prepares a written research proposal and presents it orally. The presentation is open to the faculty and the students and is followed by a closed question/answer session by the PhD committee. The form to announce the presentation can be found here and the announcement must be made at least one week before the date of the event. The main factors considered by the committee in reviewing the proposal are:

1. 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 date of the Dissertation Proposal Review is determined by the research advisor and the PhD committee. This date is after the student has achieved PhD candidacy, has passed the 16 SH course requirements after MS, has taken EECE 9990 and EECE 9991, and has formed his/her PhD Committee. It is highly recommended that the Dissertation Proposal Review be scheduled within two years after passing the qualifying exam. **Since the dissertation defense cannot be scheduled less than six months after proposal review, it is important that students schedule their proposal review well ahead of their defense**.

After successful defense of the proposal, the student completes the Dissertation Proposal Review From found here. This form is signed by the advisor and the PhD committee and uploaded as explained in the preceding sections. 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.

11.4 Dissertation Defense

Dissertation defense must be scheduled **not sooner than six months after the date of the dissertation proposal review**. The form to announce dissertation defense can be found here. 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.

11.5 Residency Requirement

PhD students need to be registered full-time at NU for at least two semesters after achieving candidacy to be eligible for degree. The two summer half-semesters count as one full semester. For part-time PhD students, four semesters of part-time registration fulfill the residency requirement.

11.6 Time Limitation

After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of the degree requirements. This time limit applies to all PhD students, PhD-BE, PhD-AE, and both PT and FT PhD students. Under extenuating circumstances, a student may request an extension of this time frame.

12   PhD Annual Review

All PhD students are reviewed annually by their advisor. The annual review is administered by the GSE, and the details of the process can be found on the GSE website.

Students who receive unsatisfactory grade will be put on probation and are scheduled to meet with their advisor and the department Chair to receive the necessary feedback. In this meeting goals are set for next year. Students who receive "needs Improvement" grade are encouraged to meet with their advisor and make necessary adjustments to improve their performance.

Students who receive "unsatisfactory" grades in two consecutive years are terminated from the PhD program.

13   Petition and Registration Override Procedures

Please note the following:

- Petitions/overrides for taking courses must be filed and approved **BEFORE** registration in the course.

- Filing a petition/override **does not mean that it will be approved**, you need to receive the approval to go ahead.

- Please 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 and click on the relevant link 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 uses DocuSign Powerforms for all forms. Students should complete the form and submit it to be emailed to the Assistant Director of Graduate Programs (ece-studentservices@ece.neu.edu). Note that PhD students and MS-Thesis students also need to send the form to their research advisor (if applicable). If approved, the form will be sent to the Graduate School for review. When the form is complete, a copy will be emailed to the student for their records and a copy will be placed in their student e-folder. If you have any questions or concerns regarding the form or the process, please feel free to 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 more information on CPT-internship, see the Graduate Coop page.

16 Policies and Procedures for Course Transfer

MSECE, PhD-BE, and PhD-AE students can transfer a maximum of 9 SH, 14SH, and 4SH (or equivalent) of course work from other institutions, respectively. 4 SH of course work is defined as 45 hours of lecture. For credit transfer from other institutions, the following conditions must be satisfied:

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

- The course must be passed during the past five years.

- The course should not be part of the requirements of a degree received by the student in the past.

- The course will be reviewed by the Graduate Affairs Committee and if recognized as a valid graduate-level course, the credit transfer is approved.

The process for transfer credit requires filing a petition (see Section 13). The petition should be accompanied by the transcript of the student indicating the grade and the time the was passed, the detailed syllabus of the course, as well as sufficient evidence that the course has not been part of the requirements of a degree received by the student. Evidence should be noted on the transcripts confirming credits were not used towards a degree in the former institution.

17 Policies and Procedures for Requesting Change in the Graduate Program

In general, changes to the graduate program are possible after completing at least one semester at Northeastern. This gives the students an opportunity to get accurate information about each program to make an informed decision. The only request for change in the program that can be requested during the first semester is change from full-time to part-time or from part-time to full-time. This change does not apply to those who hold an F-1 student visa.

- Change from FT to PT or PT to FT. This is the only change that can be petitioned during the first semester. To request this change you need to file a petition as explained in Section 13.

- Change of concentration for MS students (MSC and MST): To apply for a change of concentration, a minimum cumulative GPA of 3.00 is required. Students can apply for a change of concentration if they have earned not more than 16 SH. Students must also have taken and successfully completed two courses in the concentration they are attempting to change into. Part-time students can apply for change of concentration if they have taken at least 8 SH, but not more than 16 SH of course work. For both full time and part time students, the "Introduction to Cooperative Education" course is excluded when counting the 16 SH limit. To request a change of concentration, the student needs to file a "Change in Degree Program/Concentration" form and upload it with their transcripts to a portal whose link is communicated to students each semester. The deadline for submission of the change of concentration form is 11:59 PM on the last day of classes in each semester; this is a hard deadline. After approval the student can a petition for change of concentration (see Section 13).

- Change from MST to MSC: This is done by filing a petition (see Section 13) after finishing at least one semester at NU.

- Change from MSC to MST: In addition to filing a petition (see Section 13) the student needs the approval of an ECE faculty (tenured/tenure track, emeritus, affiliated, or adjunct) 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.

- Change from PhDEE to PhDCE or from PhDCE to PhDEE: The student needs to file a petition (see Section 13). In addition to the petition, they also need to complete a new application in Slate by creating a new account. Their application fee will be waived. If at the same time the students is also changing his/her research advisor, they also need to file a new PhD Research Advisor 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. Questions should be directed to the OGS personnel on campus.

- Change from PhD to MS: The student needs to file a petition (see Section 13). Signature of the research advisor is required.

- Change from MS to PhD: The student must file a petition (see Section 13) and complete a new application in Slate by creating a new account, the application fee will be waived.

For International Students Only: An approved change of degree level from an M.S. degree to Ph.D. degree 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. Questions should be directed to the International Student and Scholar Institute on campus.

Plus-One Students: Can change concentration at any time if they have the minimum 3.0 cumulative GPA and have taken at least 2 courses in the desired concentration. Additional Information: Plus-One Information

18 Fundamental, Concentration, and Excluded Courses for ECE Concentrations

18.1 Communication, Control, and Signal Processing (CCSP)

Fundamental Courses:
EECE 5576 Wireless Communication Systems 4 SH
EECE 5666 Digital Signal Processing 4 SH
EECE 7200 Linear Systems Analysis 4 SH
EECE 7204 Applied Probability and Stochastic Processes 4 SH

Concentration Courses:
EECE 5115 Dynamical Systems in Biological Engineering 4 SH
EECE 5550 Mobile Robotics 4 SH
EECE 5552 Principles of Assistive Robotics 4 SH
EECE 5580 Classical Control Systems 4 SH
EECE 5610 Digital Control Systems 4 SH
EECE 5612 Statistical Inference: An Introduction for Engineers and Data Analysts 4 SH
EECE 5626 Image Processing and Pattern Recognition 4 SH
EECE 5664 Biomedical Signal Processing 4 SH
EECE 5665 Signal Processing for Global Navigation Satellite Systems 4SH
EECE 5698 Special Topics: Formal Methods for Dynamical Systems 4 SH
EECE 5698 Special Topics: Terahertz Communication for 6G 4 SH
EECE 5698 Special Topics: Reinforcement Learning 4 SH
EECE 7200 Linear Systems Analysis 4 SH
EECE 7204 Applied Probability and Stochastic Processes 4 SH
EECE 7211 Nonlinear Control 4 SH
EECE 7213 System Identification and Adaptive Control 4 SH
EECE 7214 Optimal and Robust Control 4 SH
EECE 7215 Introduction to Distributed Intelligence 4SH
EECE 7223 Riemannian Optimization 4 SH
EECE 7263 Humanoid Robotics 4 SH
EECE 7310 Modern Signal Processing 4 SH
EECE 7311 Two-Dimensional Signal and Image Processing 4 SH
EECE 7312 Statistical and Adaptive Signal Processing 4 SH
EECE 7323 Numerical Optimization Methods 4 SH
EECE 7332 Making Networks Reliable- Intro to Coding Theory 4 SH
EECE 7336 Digital Communications 4 SH
EECE 7337 Information Theory 4 SH
EECE 7345 Big Data and Sparsity in Control, Machine Learning, and Signal Processing 4 SH
EECE 7346 Probabilistic System Modeling and Analysis 4 SH
EECE 7398 Special Topics: Legged Robots 4 SH
EECE 7398 Special Topics: Current Research in Nonlinear Systems 4 SH
EECE 7398 Special Topics: Terahertz Communications 4 SH
EECE 7398 Special Topics: Wireless Communications Laboratory: An Experimental Approach
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special problems in Electrical Engineering 1–4 SH
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
ME 7247 Advanced Control Engineering 4SH

18.2 Computer Networks and Security (CNWS)

Fundamental Courses:

EECE 5155 Wireless Sensor Networks and the Internet of Things 4 SH
EECE 5641 Introduction to Software Security 4 SH
EECE 7205 Fundamentals of Computer Engineering 4 SH
EECE 7374 Fundamentals of Computer Networks 4 SH

Concentration Courses:

EECE 5155 Wireless Sensor Networks and the Internet of Things 4 SH
EECE 5576 Wireless Communication Systems 4 SH
EECE 5640 High Performance Computing 4 SH
EECE 5641 Introduction to Software Security 4 SH
    (Students taking EECE 5641 can't receive credit for CY 5770)
EECE 5698 Special Topics: Networks: Technology, Economics, Social Interactions 4 SH
EECE 5698 Special Topics: Advanced Network Management 4 SH
EECE 5698 Special Topics: Spectrum Policy Issues for Wireless Communications Innovators 4 SH
EECE 5698 Special Topics: Network Programming 4 SH
EECE 5698 Special Topics: Networked XR Systems 4 SH
EECE 5698 Special Topics: Terahertz Communication for 6G 4 SH
EECE 5699 Computer Hardware and System Security 4 SH
EECE 7204 Applied Probability and Stochastic Processes 4 SH
EECE 7205 Fundamentals of Computer Engineering 4 SH
EECE 7346 Probabilistic System Modeling and Analysis 4 SH
EECE 7364 Mobile and Wireless Networking 4 SH
EECE 7374 Fundamentals of Computer Networks 4 SH
EECE 7390 Computer Hardware Security 4 SH
EECE 7393 Analysis and Design of Data Networks 4 SH
EECE 7398 Special Topics: Terahertz Communications 4 SH
EECE 7398 Special Topics: Wireless Network Systems and Applications 4 SH
EECE 7398 Special Topics: Deep Learning and Edge Computing in Wireless Networks 4 SH
EECE 7398 Special Topics: Wireless Communications Laboratory: An Experimental Approach 4 SH
EECE 7398 Special Topics: Security in Large-Scaled Learning-Enabled Systems 4SH
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special problems in Electrical Engineering 1–4 SH
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)
CS 6760 Privacy, Security, and Usability 4 SH
CY 6740 Network Security 4 SH
CY 6750 Cryptography and Communication Security 4 SH

18.3 Computer Systems and Software (CSYS)

Fundamental Courses:
EECE 5640 High Performance Computing 4 SH
EECE 7205 Fundamentals of Computer Engineering 4 SH
EECE 7352 Computer Architecture 4 SH
EECE 7376 Operating Systems: Interface and Implementation 4 SH

Concentration Courses:
EECE 5364 Advanced Embedded System Design 4 SH
EECE 5365 Advanced Embedded System Design-Lab-1 SH
EECE 5552 Principles of Assistive Robotics 4 SH
EECE 5627 Arithmetic and Circuit Design for Inexact Computing 4 SH
EECE 5638 Compilers for Modern Computer Architectures 4 SH
EECE 5640 High Performance Computing 4 SH
EECE 5643 Simulation and Performance Evaluation 4 SH
EECE 5699: Computer Hardware and System Security 4 SH
EECE 7205 Fundamentals of Computer Engineering 4 SH
EECE 7352 Computer Architecture 4 SH
EECE 7353 VLSI Design 4 SH
EECE 7357 Fault Tolerant Computers 4 SH
EECE 7368 High-Level Design of HW/SW Systems 4 SH
EECE 7376 Operating Systems: Interface and Implementation 4 SH
EECE 7377 Scalable and Sustainable System Design 4 SH
EECE 7390 Computer Hardware Security 4 SH
EECE 7398 Special Topics: Advanced Computer Architecture 4 SH
EECE 7398 Special Topics: Field Programmable Gate Arrays in the Cloud 4 SH
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special problems in Electrical Engineering 1–4 SH
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)
CS 5200 Database Systems Management 4 SH
CS 5600 Computer Systems 4 SH
CS 6410 Compilers 4 SH
CS 6510 Advanced Software Development 4 SH

18.4   Computer Vision, Machine Learning, and Algorithms (CVLA)

Fundamental Courses:

EECE 5554 Robotics Sensing and Navigation 4 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

Concentration Courses:

EECE 5360 Combinatorial Optimization 4 SH

EECE 5550 Mobile Robotics 4 SH

EECE 5554 Robotics Sensing and Navigation 4 SH

EECE 5612 Statistical Inference: An Introduction for Engineers and Data Analysts 4 SH

EECE 5626 Image Processing and Pattern Recognition 4 SH

EECE 5639 Computer Vision 4 SH

EECE 5640 High Performance Computing 4 SH

EECE 5642 Data Visualization 4 SH

EECE 5644 Introduction to Machine Learning and Pattern Recognition 4 SH

EECE 5645 Parallel Processing for Data Analytics 4 SH

EECE 5698 Special Topics: Reinforcement Learning 4SH

EECE 5698 Special Topics: Networked XR Systems 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 7258 Human Sensing and Recognition 4 SH

EECE 7323 Numerical Optimization Methods 4 SH

EECE 7345 Big Data and Sparsity in Control, Machine Learning and Signal Processing 4 SH

EECE 7352 Computer Architecture 4 SH

EECE 7370 Advanced Computer Vision 4 SH

EECE 7397 Advanced Machine Learning 4 SH

EECE 7398 Special Topics: Advances in Deep Learning 4 SH

EECE 7398: Special Topics: Verifiable Machine Learning

EECE 7398 Special Topics: Security in Large-Scaled Learning-Enabled Systems 4 SH

EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)

EECE 7400 Special Problems in Electrical and Computer Engineering 1 4 SH

EECE 7401 Special Problems in ECE 2 4 SH (for PhD-BS entry students only)

EECE 7674 Master's Project 4 SH (MST students cannot take this course)

EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)

CS 5100 Foundations of Artificial Intelligence 4 SH

CS 6110 Knowledge-based System 4 SH

CS 6200 Information Retrieval 4 SH

CS 6220 Data Mining Techniques 4 SH

CS 6310 Computational Imaging 4 SH

CS 6810 Distributed Algorithms 4 SH

CS 7800 Advanced Algorithms 4 SH

MATH 7233 Graph Theory 4 SH

18.5 Electromagnetics, Plasma, and Optics (ELPO)

Fundamental Courses:

EECE 5170 Introduction to Multiferroic Materials and Systems 4 SH
EECE 5693 Electromagnetic Devices for RF and Wireless Communications 4SH
EECE 7202 Electromagnetic Theory 1 4 SH
EECE 7203 Complex Variable Theory and Differential Equations 4 SH

Concentration Courses:

EECE 5608 Magnetic Materials for Future Electronics 4 SH
EECE 5651 Introduction to Photonic Devices 4 SH
EECE 5652 Microwave Circuits and Networks 4 SH
EECE 5654 Design and Prototyping of Optical Systems 4 SH
EECE 5692 Antennas for Wireless Communication and Sensing 4 SH
EECE 5697 Acoustics and Sensing 4 SH
EECE 5693 Electromagnetic Devices for RF and Wireless Communications 4 SH
EECE 5698 Special Topics: Photonic Devices for Communication Systems 4 SH
EECE 5698 Special Topics: Magnetic Materials and Devices for Microwave Engineering 4 SH
EECE 5698 Special Topics: Introduction to Quantum Engineering 4 SH
EECE 5698 Special Topics: Design and Prototyping of Optical Systems for Engineering Applications 4 SH
EECE 7105 Optics for Engineers 4 SH
EECE 7202 Electromagnetic Theory 1 4 SH
EECE 7203 Complex Variable Theory and Differential Equations 4 SH
EECE 7270 Electromagnetic Theory 2 4 SH
EECE 7271 Computational Methods in Electromagnetics 4 SH
EECE 7275 Antennas and Radiation 4 SH
EECE 7284 Optical Properties of Matter 4 SH
EECE 7293 Modern Imaging 4 SH
EECE 7296 Electronic Materials 4 SH
EECE 7398 Special Topics: Advanced Radio Frequency Passive Technologies 4 SH
EECE 7398 Special Topics: Photonic Circuit Design for Information Processing 4SH
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special Problems in Electrical and Computer Engineering 1 4 SH
EECE 7401 Special Problems in ECE 2 4 SH (for PhD-BS entry students only)
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)

18.6 Hardware and Software for Machine Intelligence (HSMI)

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

Concentration Courses:
EECE 5550 Mobile Robotics 4 SH
EECE 5552 Assistive Robotics 4 SH
EECE 5554 Robotics Sensing and Navigation 4 SH
EECE 5612 Statistical Inference: An Introduction for Engineers and Data Analysts 4 SH
EECE 5639 Computer Vision 4 SH
EECE 5640 High-Performance Computing 4 SH
EECE 5641 Introduction to Software Security 4 SH
    (Students taking EECE 5641 can't receive credit for CY 5770)
EECE 5642 Data Visualization 4 SH
EECE 5643 Simulation and Performance Evaluation 4 SH
EECE 5645 Parallel Processing for Data Analytics 4 SH
EECE 5698 Special Topics: Reinforcement Learning 4SH
EECE 5698 Special Topics: Networked XR Systems 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 7263 Humanoid Robotics 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 7368 High-Level Design of Hardware-Software Systems 4 SH
EECE 7370 Advanced Computer Vision 4 SH
EECE 7377 Scalable and Sustainable System Design 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: Legged Robotics 4 SH
EECE 7398 Special Topics: Human Centered Computing 4 SH
EECE 7398 Special Topics: Advances in Deep Learning 4 SH
EECE 7398 Special Topics: Deep Learning Embedded Systems 4 SH
EECE 7398: Special Topics: Verifiable Machine Learning 4 SH
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special Problems in Electrical and Computer Engineering 1 4 SH
EECE 7401 Special Problems in Electrical and Computer Engineering 2 4 SH
    (for PhD-BS entry students only)
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)
IE 5630 Biosensor and Human Behavior Measurement 4 SH
CS 5180 Reinforcement Learning and Sequential Decision Making 4 SH
CS 5335 Robotic Science and Systems 4 SH
CS 6130 Affective Computing 4 SH
CS 7340 Theory and Methods in Human Computer Interaction 4 SH
MATH 7233 Graph Theory 4 SH
PHIL 5010 AI Ethics

18.7   Microsystems, Materials, and Devices (MSMD)

Fundamental Courses:
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:
EECE 5651 - Introduction to Photonic Devices 4 SH
EECE 5161 Thin Film Technologies 4 SH
EECE 5606 Micro- and Nanofabrication 4 SH
EECE 5608: Magnetic Materials for Future Electronics 4 SH
EECE 5647 Nanophotonics 4 SH
EECE 5649 CMOS Analog Integrated Circuits 4 SH
EECE 5651 - Introduction to Photonic Devices 4 SH
EECE 5652 Microwave Circuits and Networks 4 SH
EECE 5698 - Special Topics: Magnetic Materials and Devices for Microwave Engineering 4 SH
EECE 5698 Special Topics: Photonic Devices for Communication Systems 4 SH
EECE 5698 Special Topics: Biomedical Microsystems 4SH
EECE 5698 Special Topics: Intro to Quantum Engineering 4 SH
EECE 5698 Special Topics: Introduction to Organic and Printed Electronics 4SH
EECE 7201 Solid State Devices 4 SH
EECE 7240 Analog Integrated Circuit Design 4 SH
EECE 7242 Integrated Circuits for Communications & Mixed-Signal Processing 4 SH
EECE 7244 Introduction to Microelectromechanical Systems (MEMS) 4 SH
EECE 7245 Microwave Circuit Design for Wireless Communication 4 SH
EECE 7247 Radio Frequency Integrated Circuit Design 4 SH
EECE 7248 Lab section for EECE 7240 0 SH
EECE 7250 Power Management Integrated Circuits 4 SH
EECE 7284 Optical Properties of Matter 4 SH
EECE 7296 Electronic Materials 4 SH
EECE 7353 VLSI Design 4 SH
EECE 7398 Special Topics: Advanced Radio Frequency Passive Technologies 4 SH
EECE 7398 Special Topics: Biomedical Microsystems
EECE 7398 Special Topics: Low Power Integrated Circuits Design 4SH
EECE 7398 Special Topics: Photonic Circuit Design for Information Processing 4SH
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special Problems in Electrical and Computer Engineering 1–4 SH
EECE 7401 Special Problems in ECE 2 4 SH (for PhD-BS entry students only)
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)

18.8 Power Systems, Power Electronics, and Motion Control (POWR)

Fundamental Courses:
EECE 5680 Electric Drives 1 4 SH
EECE 5682 Power Systems Analysis 1 4 SH
EECE 5684 Power Electronics 4 SH
EECE 7200 Linear System Analysis 4 SH

Concentration Courses:
EECE 5580 Classical Control Systems 4 SH
EECE 5610 Digital Control Systems 4 SH
EECE 5670 Sustainable Energy: Materials, Conversion, Storage, and Usage 4 SH
EECE 5680 Electric Drives 1 4 SH
EECE 5681 Lab for EECE 5680 0 SH
EECE 5682 Power Systems Analysis 1 4 SH
EECE 5684 Power Electronics 4 SH
EECE 5685 Lab for EECE 5684 0 SH
EECE 5686 Electrical Machines 4 SH
EECE 5688 Analysis of Unbalanced Power Networks 4 SH
EECE 5698 Special Topics: Electric Vehicles 4 SH
EECE 7200 Linear System Analysis 4 SH
EECE 7211 Nonlinear Control 4 SH
EECE 7213 System Identification and Adaptive Control 4 SH
EECE 7214 Optimal and Robust Control 4 SH
EECE 7220 Power System Analysis 2 4 SH
EECE 7221 Power Systems Operation and Control 4 SH
EECE 7224 Power System State Estimation 4 SH
EECE 7226 Modeling of Transients in Power Systems 4 SH
EECE 7228 Advanced Power Electronics 4 SH
EECE 7250 Power Management Integrated Circuits 4 SH
EECE 7323 Numerical Optimization Methods 4 SH
EECE 7398 Special Topics: Power System Constrained Optimization 4 SH
EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH (only for PhD and MST students)
EECE 7400 Special Problems in Electrical and Computer Engineering 1 4 SH
EECE 7401 Special Problems in Electrical and Computer Engineering 2 (for PhD-BS entry students only)
EECE 7674 Master's Project 4 SH (MST students cannot take this course)
EECE 7990 Master's Thesis 4 SH (MSC students cannot take this course)

18.9   Special Courses

EECE 7399 Preparing High Stakes Written and Oral Materials 4 SH

MSC students cannot register in this course as part of their degree course requirements. PhD and MST students can take this course as part of their course requirements. This course counts as concentration courses for MST and 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.

18.10   Excluded Courses for All Concentrations

Excluded courses are courses that you **cannot take as part of your MSECE program**. Please *do not* petition to take these courses, 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.

The following classes of course are excluded:

Courses offered by the Multidisciplinary Graduate Engineering Programs (MGEN). These courses have one of the following prefixes INFO, DAMG, CSYE, TELE

Courses offered by the engineering leadership programs

ALIGN courses in the Khoury College of Computer Sciences**

Certain CS course listed below:

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 6350 Empirical Research Methods 4SH

CS 6710 Wireless Networks 4SH

**Excluded Courses do not apply to MSIoT

19   Master's of Science in Internet of Things (MSIoT)

Fundamental Courses:
EECE 5155 Wireless Sensor Networks and the Internet of Things 4 SH
Fundamental Options

Concentration Courses:
EECE 5360 Combinatorial Optimization 4 SH
EECE 5550 Mobile Robotics 4 SH
EECE 5554 Robotics Sensing and Navigation 4 SH
EECE 5606 Micro- and Nanofabrication 4 SH
EECE 5638 Compilers for Modern Computer Architectures 4 SH
EECE 5639 Computer Vision 4 SH
EECE 5640 High-Performance Computing 4 SH
EECE 5641 Introduction to Software Security 4 SH
EECE 5642 Data Visualization 4 SH
EECE 5643 Simulation and Performance Evaluation 4 SH
EECE 5645 Parallel Processing for Data Analytics 4 SH
EECE 5649 Design of Analog Integrated Circuits with CMOS 4 SH
EECE 5652 Microwave Circuits and Networks 4 SH
EECE 5666 Digital Signal Processing 4 SH
EECE 5693 Electromagnetic Devices for RF and Wireless Communications 4 SH
EECE 5697 Acoustics and Sensing 4 SH
EECE 5698 ST GNSS Signal Processing 4 SH
EECE 5698 ST Network Programming 4 SH
EECE 5699 Computer Hardware and System Security 4 SH
EECE 7150 Autonomous Field Robotics 4 SH
EECE 7200 Linear Systems Analysis 4 SH
EECE 7201 Solid State Devices 4 SH
EECE 7202 Electromagnetic Theory 1 4 SH
EECE 7204 Applied Probability and Stochastic Processes 4 SH
EECE 7205 Fundamentals of Computer Engineering 4 SH
EECE 7240 Analog Integrated Circuit Design 4 SH
EECE 7242 Integrated Circuits for Mixed Signals and Data Communication 4 SH
EECE 7245 Microwave Circuit Design for Wireless Communication 4 SH
EECE 7247 Radio Frequency Integrated Circuit Design 4 SH
EECE 7275 Antennas and Radiation 4 SH
EECE 7310 Modern Signal Processing 4 SH
EECE 7323 Numerical Optimization Methods 4 SH
EECE 7336 Digital Communications 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 7370 Advanced Computer Vision 4 SH
EECE 7374 Fundamentals of Computer Networks 4 SH
EECE 7390 Computer Hardware Security 4 SH
EECE 7397 Advanced Machine Learning 4 SH
EECE 7398 ST Wireless Network Systems and Applications 4 SH
EECE 7398 ST An Experimental Approach to Wireless Communications 4 SH
EECE 7398 ST Terahertz Communications 4 SH
EECE 7398 ST Advances on Deep Learning 4 SH

20 Master's of Science in Wireless and Network Engineering (MSWiNE)

Fundamental Courses:
EECE 5576 Wireless Communication Systems 4 SH
EECE 7364 Mobile and Wireless Networking 4 SH
EECE 7374 Fundamentals of Computer Networks 4 SH

Concentration Courses:
EECE 5155 Wireless Sensor Networks and the Internet of Things 4 SH
EECE 5360 Combinatorial Optimization 4 SH
EECE 5610 Digital Control Systems 4 SH
EECE 5612 Statistical Inference: An Introduction for Engineers and Data Analysts 4 SH
EECE 5640 High-Performance Computing 4 SH
EECE 5641 Introduction to Software Security 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 5666 Digital Signal Processing 4 SH
EECE 5693 Electromagnetic Devices for RF and Wireless Communications 4 SH
EECE 5697 Acoustics and Sensing 4 SH
EECE 5698 ST GNSS Signal Processing 4 SH
EECE 5698 ST Network Programming 4 SH
EECE 5699 Computer Hardware and System Security 4 SH
EECE 7200 Linear Systems Analysis 4 SH
EECE 7202 Electromagnetic Theory 1 4 SH
EECE 7204 Applied Probability and Stochastic Processes 4 SH
EECE 7205 Fundamentals of Computer Engineering 4 SH
EECE 7242 Integrated Circuits for Mixed Signals and Data Communication 4 SH
EECE 7245 Microwave Circuit Design for Wireless Communication 4 SH
EECE 7247 Radio Frequency Integrated Circuit Design 4 SH
EECE 7275 Antennas and Radiation 4 SH
EECE 7352 Computer Architecture 4 SH
EECE 7336 Digital Communications 4 SH
EECE 7345 Big Data and Sparsity in Control, Machine Learning, and Optimization 4 SH
EECE 7337 Information Theory 4 SH
EECE 7393 Analysis and Design of Data Networks 4 SH
EECE 7398 ST Wireless Network Systems and Applications 4 SH
EECE 7398 ST An Experimental Approach to Wireless Communications 4 SH
EECE 7398 ST Terahertz Communications 4 SH
EECE 7400 Special Problems in Electrical and Computer Engineering 4 SH
EECE 7401 Special Problems in ECE 2 4 SH (for PhD-BS entry students only)
EECE 7990 Master's Thesis 4 SH (course-only students cannot take this course)

21 Grading Guide for Special Graduate Courses

These courses require registration override signed by the instructor/advisor

Course #	Course Title	Credits	Grading	Comments
EECE 7400*	Special Problems in ECE	1-4 SH	A to C− or F	Can be taken once in the MSECE and once in the PhD program. Usually taken as 4 SH.
EECE 7674*	Master's Project	4 SH	IP (in progress) if not completed in one semester; otherwise A to C− or F	
EECE 7990*	Master's Thesis	4 or 8 SH (usually two semesters, 4 SH in each)	IP before defense, after defense changed to A to C− or F.	8 SH total, can be taken in one or two semesters.
EECE 7996* (course can be taken only once)	Master's Thesis Continuation	0 SH	S/U (satisfactory or unsatisfactory)	For students who, after taking 8 SH of EECE 7990, have not yet defended their MS thesis. This course maintains FT** status.
EECE 8986*	(MS) Research	0 SH	S/U	For MSECE project students who, after taking 4 SH of EECE 7674, have not yet finished their project. This course maintains FT** 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 should register course. Maintains FT** status.
EECE 9990* EECE 9991*	Dissertation Term 1 and Dissertation Term 2	0 SH	S/U	Taken in two consecutive semesters after passing the qualifying exam. This course maintains FT** status.
EECE 9996*	Dissertation Continuation	0 SH	S/U	For PhD students that after taking two semesters of EECE 9990 have not yet defended their dissertation. This course maintains FT** status.

See next page for details

Please note the following:

- During internship students must be enrolled in one of the following courses:

  - EECE 9990 (PhD Dissertation Term 1, 0 SH, FT** Equivalent)
  - EECE 9991 (PhD Dissertation Term 2, 0 SH, FT** Equivalent)
  - EECE 9996 (PhD Dissertation Continuation, 0 SH, FT** Equivalent)
  - EECE 9986 (PhD Research, 0 SH, FT** Equivalent)
  - EECE 8986 (Master's Research, 0 SH, FT** Equivalent)
  - EECE 7990 (Master's Thesis, 4 SH) and EECE 8986 (Master's Research, 0 SH, FT** Equivalent)
  - EECE 7996 (Master's Thesis Continuation, 0 SH, FT** Equivalent)

- Students on Coop must be enrolled in EECE 6964 (Coop Work Experience, 0 SH, FT** Equivalent).

- During the summer terms, registration in these courses is for full summer *not* summer 1 or 2.

- Continuing PhD students who have passed EECE 9991 (PhD Dissertation Term-2) must be registered in EECE 9996 (PhD Dissertation Continuation, 0 SH, FT Equivalent) in all fall and spring semesters until they graduate. They do not need to register in this course in summer *unless they are graduating in August*. If they are graduating in August, they must register in this course **for the entire summer 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 (this last step does not apply to EECE 7996 and EECE 9996). If a section of this course under the name of the advisor/instructor does not exist, the student should complete a Registration Override From found here, to request generation of a section.

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

22   Course Registration Frequently Asked Questions

If you encounter an issue during course registration, this section may contain a solution for you. If you still have questions, please contact the Assistant Director of Graduate Programs (ece-studentservices@ece.neu.edu).

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 are given priority to these courses, just 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 thesis or research course.*

A: If a section with your advisor already exists, please fill out an Override Request Form. If a section does not exist, please submit an Individual Instruction Request.

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: The short answer is yes, although ultimately, it is up to the instructor. 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.

23   Useful Links

- General Information Links

  - 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)

- Links to Forms

  1. Announcement form for MS Thesis Defense, PhD Proposal Review, or Dissertation Defense
  2. Change in Degree Program/Concentration
  3. Change in Degree Level
  4. COE Forms (petition, registration override, ...)
  5. PhD Dissertation Proposal Review Form
  6. PhD Proposal Review Approval Form - Submission Link
  7. Individual Instruction Registration Request
  8. LaTeX templates for MS thesis and PhD Dissertation
  9. PhD Annual Review Form
  10. PhD Committee Form
  11. PhD Research Advisor Form
  12. Qualifying Exam Proposal Form
  13. Various ECE Forms