WELCOME TO THE COLUMBIA ELECTRICAL ENGINEERING DEPARTMENT

Graduate Student Orientation, Fall 2025

Introduction to Graduate Programs and MS EE Program Details

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Note About Information in These Slides

If there is contradiction in information between the SEAS bulletin, checklists, slides, oral information, or other, the SEAS bulletin should be followed. Exceptions to the established rules must be approved in writing by the EE department.

- Students must follow the instructions of the SEAS and Columbia university
- International Students Office (ISSO) is the only competent body to establish if a student is following the requirements about their legal immigration and academic status, as well as appropriate course loads for individual students

Graduate Programs in the EE Department

Master of Science in Electrical Engineering (MS EE)

Master of Science in Computer Engineering (MS CE)

- In collaboration with the Computer Science department

Master of Science in Quantum Science and Technology

PhD in Electrical Engineering

- Research focus

MS EE Program

30 credits total:

- all courses at 4000 level or above
- minimum of 15 credits at 6000 level
- minimum of 15 credits in EE
- maximum of 6 credits for research projects (6001/6002 or similar)

EE credits: EE courses (code ELEN) and cross-listed/joint EE courses (codes EECS, CSEE, EEOR, BMEB, BMEE, ECBM, EEME, and similar)

MS EE Program

- 30 credits total:
  - max. 3 credits for classes outside science/engineering or for non-technical classes within the engineering school (course pre-approval in writing is required)
  - no credit for math/science classes covering traditional undergraduate material
  - see details in the checklist
- must be completed within
  - 5 years for domestic students
  - 3 semesters for international students
- **minimum cumulative GPA of 2.5 at the end of every semester is required**
  - if this criterion is not met, a student can be dismissed from the program in that semester
  - it is not possible to get a diploma with final GPA of less than 2.5

Full-Time Enrollment for International Students on a Student VISA

- US Dept. of Homeland Security requires international students on a student visa to maintain full-time enrollment
- Full-time enrollment = 12 credits/semester
  - The last semester is an exception, can be less than 12 credits (as many as needed to get to 30)
- 3 semesters to complete the MS program
- You need to take a min. of (i) 12 credits + (ii) 12 credits and then (iii) 6 credits, e.g., fall/spring/fall, fall/spring/summer, spring/fall/spring
- You can take 15 credits/semester and finish in two semesters, but few students do this. This is academically very challenging, and not advised .

Full-Time Enrollment for International Students on a Student VISA

Clarifications and special rules are communicated via SEAS email or other means.
ISSO office is able to address individual questions

Watch for emails from

- From SEAS Office of Graduate Student Affairs
  - SEAS GSA <seas_academics@columbia.edu>
- From EE dept.
  - ee-studentaffairs@ee.columbia.edu,

MS EE Program

Requirements checklist

Link (MSEEChecklist.20220908.pdf, updated 3/25/2021)

This form provides a checklist to track progress in the Master of Science Program in Electrical Engineering

COURSE NUMBER & NAME	CREDITS
Total credits	

Summary of MS EE. degree requirements

1. ___ 30 course credits, all 4000-level or above, and taken for a letter grade (i.e., no P or R grades).
2. ___ at least 15 credits at or above 6000 level.
3. ___ at least 15 credits in EE (including joint courses); 12 of which should be taken within the first 24 credits.
   (joint: EECS, CSEE, BLME, ECBM, …)
4. ___ No more than 6 research credits (e.g., ELEN E4998, ELEN E6001, ELEN E6002).
5. ___ No more than 3 credits total for courses
   (a) Outside of SEAS and the Math & Science departments (e.g., Economics or Business courses), or
   (b) Non-technical courses in SEAS or the Math & Science departments (e.g., IEOR E4702 Human Factors); these courses require prior advisor approval.
6. ___ No credit for Math & Science courses covering traditional undergraduate engineering topics (e.g., STAT GU4203 Probability Theory).
7. ___ Required 0-credit PDL course (no tuition fee).
8. ___ 2.5 GPA minimum.
9. ___ Completion within 5 years; students on a visa need to respect the time limit of their visa, typically a maximum of 3 semesters.
10. ___ No more than 1.5 credits for internships of any type over the whole MS program.

Important Notes:

1) All courses outside the list on the next page must be pre-approved.
2) Course "credits" are the same as the number of "points" for each course.
3) Each student is responsible to ensure that the courses they select satisfy all requirements, especially if they are constrained by a deadline, e.g. imposed by their student visa.
4) This checklist is just for tracking purposes. The SEAS bulletin is the authoritative source for the M.S.E.E. program requirements.

Updated March 25, 2021.

Tracking MS Program Progress

- Each student must ensure that the selected courses satisfy all requirements, especially if a student is constrained by deadlines imposed by a student visa
- The department does not verify every semester if the students' course selections satisfy the requirements
- If it is not clear if a particular course can be used for the MS program, students must consult with the EE Associate Director of Student Affairs, and ask for written/email approval, which may or may not be granted by the faculty committee
    - If a student takes a course that has not been approved, it will not count towards the degree

MS EE (Elective/Optional) Specializations

Specializations (link)

- Data-Driven Analysis and Computation
- Networking
- Wireless and Mobile Communications
- Integrated Circuits and Systems
- Smart Electric Energy
- Systems Biology and Neuroengineering
- Lightwave (Photonics) Engineering
- Microelectronic Devices

Specializations are suggestive/optional - students can freely choose courses as long as they comply with program requirements (checklist)

MS EE Program - Course Selection

Key Requirements:

- Min. of 15 credits from EE-listed courses (ELEN, EECS, CSEE, ECBM, …)
  - “Pure” EE is ELEN, other courses are EE cross-listed/joint courses
- Min. of 12 credits out of first 24 credits have to be from EE-listed courses

Students can take courses outside of the EE department:

- Many courses in SEAS, some courses in other schools
- The checklist (back side) contains the list of pre-approved courses
- If not clear, a request for approval has to be submitted to the EE Associate Director of Student Affairs, for consideration by the faculty committee
- Example: by default SIPA and business school classes do not qualify

MS EE Program - Course Selection

Course Flowcharts:

- Flowcharts indicate the pre-requisites and suggested program sequences
- For details on course prerequisites, attend the first lecture and discuss with a course instructor
- Flowcharts do not have to be followed exactly, they just communicate reasonable course selections to become an expert in a subfield

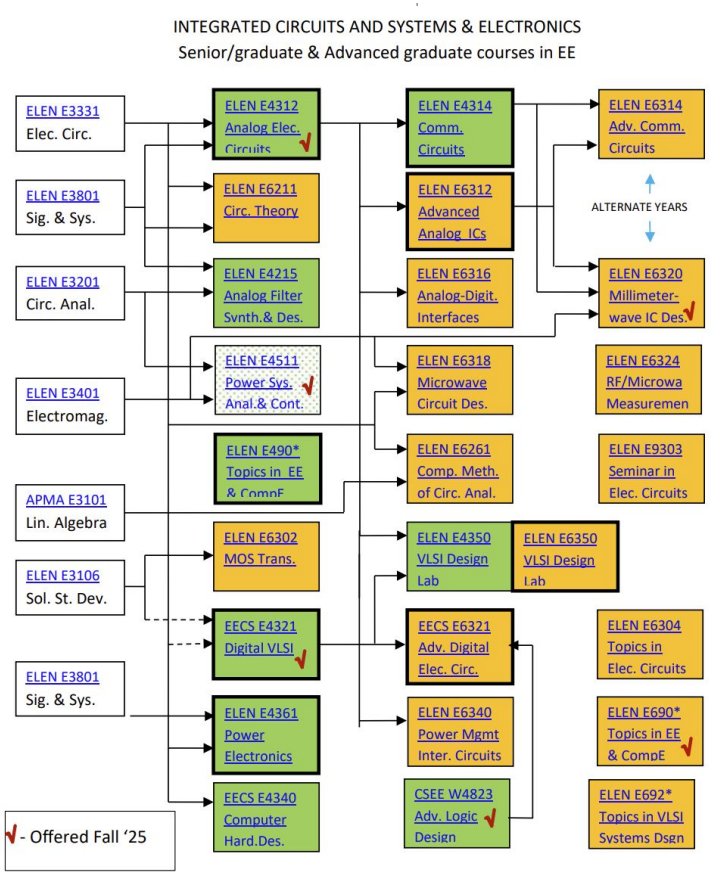
Course Flowcharts

Example of a course flowchart
for 2025 IC and systems & electronics
link.

Research presentation videos link.

Recently added classes:

- ELEN E4361 Power Electronics
- ELEN E4944 Principles of Device Microfabrication



Course Registration

Attend multiple classes during the initial week of classes and add and/or drop classes.

Columbia academic calendar:

- https://www.registrar.columbia.edu/event/academic-calendar

Important dates are related to:

- End of Change of Program Period = Last Day to Add Class, Last Day to Receive Tuition Refund for Class Dropped (in September)
- Last Day to Drop Class (no financial refund)
- Last Day to Pass/Fail

Course Registration for EE and EE Cross-Listed/Joint Classes

Many EE classes are managed via waitlists, by EE staff and faculty.

- The entry into these classes is virtually guaranteed for EE, CE, and quantum students.
- Some delays are possible, but are merely logistical.

EE-listed courses are ELEN, EECS, CSEE, ECBM, …

- “Pure” EE is ELEN, other courses are EE cross-listed/joint courses

Registration into Courses in Other Departments

Computer Science department manages registration for EE students for CS classes through SSOL waitlists. CS classes open the waitlists in September. Actual move from a waitlist to the registration occurs later in September.
EE students have access to the waitlists for 4000 and 6000-level COMS courses.

Privileged admission into algorithms courses for EE students

- Spring - CSOR W4231 ANALYSIS OF ALGORITHMS I
- Fall - CSOR 4246W ALGORITHMS FOR DATA SCIENCE

Monitor EE emails for announcements and updates
Contact the CS/DSI departments for details.

MS Student Advising

After this orientation, MS students will have an opportunity to talk to an EE faculty member in an advising session.

Once per semester, MS students should meet one of the EE faculty on the MS advising committee:

- discuss class registration and academic matters
- best to talk to a single faculty in your area of interest
- good time is during the course registration periods

Seek interaction with senior students.

Seek interaction with EE ambassadors.

Research Opportunities for MS Students

MS EE program allows up to 6 credits of research:

- First, a student must find a full time faculty member who is willing to supervise the student's research
- Then, register for independent research: ELEN E4998 or ELEN E6001/E6002
- Each professor has a separate section
- Maximum of 3 credits of research per semester. Max of 6 credits out of 30.
- Some faculty may be able to offer paid positions

Information about research in the EE department:

- http://www.ee.columbia.edu/ee-research

Research Opportunities for MS Students

Requires finding a full time EE faculty mentor:

- significant time commitment on part of a mentor

There is no formal structure for admissions into a research program:

- Students need to establish a relationship with potential mentors through their course activities or via discussions with Ph.D. students

Students need to do well in courses prior to applying for research.

The second semester is the best first opportunity, but starting to explore the opportunities early is advisable.

MS EE Thesis Option

Research in an area of Electrical Engineering culminating in a verbal presentation and a written thesis document approved by the thesis advisor. Must obtain permission from a thesis advisor (full time EE faculty member) to enroll. Typical thesis projects span two terms: an ELEN E6001 or E6002 advanced project and the E6003 Master Thesis with the same instructor. Students must use a department recommended format for thesis writing.

Prerequisites: A minimum of 3 points of credits in ELEN E6001 or E6002 advanced projects with the same instructor, the instructor's permission to enroll, and the following MS program requirements: a minimum 12 points of credit completed and a GPA of at least 3.5.

MS EE Honors Program

- Students with an exceptionally high GPA during their studies at Columbia get the recognition of "MS EE Honor Student"
- Approximately 10% of students are selected
- MS EE Honors students get the opportunity to obtain a stipend to support two semesters of research, if they find an interested faculty advisor (full time EE faculty member)
- http://www.ee.columbia.edu/ms-ee-honors-program

Teaching Assistant, Course Assistant, Lab Assistant and Grader Positions

- A limited number of paid Teaching assistant (TAII), Course Assistant (CA), Lab Assistant (LA) and Grader positions are available in the EE dept. for qualified students
- EE dept. application information is on the web
- https://www.ee.columbia.edu/content/part-time-academic-positions-students
- Some positions are available in the CS or other departments
- Students need to have good grades and be known to faculty who teach a particular class

Internships in Companies – Fieldwork or Curricular Practical Training (CPT)

- Internships in industry offer a great way to gain experience and can be an important step to finding a full-time industry position
- Internships are most often taken during the summer and/or the last semester
- International students on a student VISA: can take an internship after 2 semesters
- Students can earn credit towards the MS degree
- At most, total of 2.0 credits count towards 30 MS EE credits.

Jennifer Lee, the Director of Career Placement for EE, assists students in finding internships and applying for E6999 fieldwork (CPT) course.

Internships – Fieldwork or Curricular Practical Training (CPT)

International students on a VISA must register for course E6999 Fieldwork:

- Requires an approval by Jennifer Lee
- 1 credit course
- Total number of CPT credits for the whole MS EE program can be no more than 2.0

Internships – Fieldwork or Curricular Practical Training (CPT)

Requirements:

- Need to apply well ahead of the engagement (Jennifer processes in Spring)
- Letter from employer with a job description
- Need to submit a report and employer evaluation at the end of the internship
- https://www.ee.columbia.edu/content/fieldwork-and-campus-internship-guidelines

As an alternative, some summer research positions are available on campus:

- They do not require the formal CPT process

GET - Global Engineering Track

DETAILS AVAILABLE FROM THE SEAS OFFICE

GET Program:

- SEAS-level add-on program, available to all majors
- GET requires students to participate in a 6 to 10-week summer internship in the U.S. or globally, as well as to enroll in our ENGI E4200 Global Engineering course
- Has modified internship participation rules, compared to a usual program
- https://www.gradengineering.columbia.edu/global-engineering-track

Doctoral Qualifying Exam (DQE)

Written and oral exam is required for students in the MS/Ph.D. or Ph.D. track:

- Held in January every year
- Students should take it at the earliest opportunity

Written part covers undergraduate-level material at graduate-level sophistication:

- 6 areas
- more details on the EE website

Oral part consists of three 15 minute one-on-one interviews.

Doctoral Qualifying Exam (DQE)

MS students can take the exam to verify their abilities.
However:

- Passing the exam (as a MS EE student) does not imply that a student will be accepted/transferred into the PhD program
- To get into the Ph.D. program, MS EE students need to additionally apply to the Ph.D. program and be accepted.
- Finding a Ph.D. supervisor is a prerequisite for getting accepted into the EE Ph.D. program

Career Advising

Columbia University Graduate Career Placement team:

- https://career.engineering.columbia.edu/content/students
- https://career.engineering.columbia.edu/content/career-connect-students

Jennifer Lee, Director of Career Placement, is focused on assisting EE students with career development and placement:

- http://www.ee.columbia.edu/students-0

Information Resources

Attend other orientation events, go over the SEAS orientation package.

Seek discussion with student ambassadors, and senior students.

Electrical Engineering and Computer Engineering websites:

- http://www.ee.columbia.edu/
- https://www.ee.columbia.edu/ms-program-ee
- https://compeng.columbia.edu/

Information Resources

The SEAS Bulletin:

- http://www.engineering.columbia.edu/bulletin/

EE academic support staff:

Elsa Sanchez, Director of Student Affairs

- Office: 1312 Mudd, Phone: 212-854-3104
- Email: elsa@ee.columbia.edu

EE Careers:

Jennifer Lee, Director of Career Placement

- Office: 1311 Mudd, Phone: 212-851-9252
- Email: jl308@columbia.edu

Information Resources

Faculty members in the MS EE academic advising committee:

2025/2026:

- Zoran Kostic, zk2172@columbia.edu, *chair of the MS EE committee*
- Predrag Jelenkovic, predrag@ee.columbia.edu
- Matthias Preindl, mp3501@columbia.edu

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Thanks!

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