Graduate Student Orientation

Introduction to Graduate Programs and MS EE Program Details

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WELCOME TO THE COLUMBIA ELECTRICAL ENGINEERING DEPARTMENT
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
- PhD in Electrical Engineering
  - Research focus
MS EE Program

- 30 credits total
  - all courses at 4000 level or above
  - min. 15 credits at 6000 level
  - min. 15 credits in EE
  - max. 6 credits for research projects
MS EE Program

• 30 credits total
  – max. 3 credits for classes outside science/engineering and for non-technical classes within the engineering school (course approval required)
  – no credit for math/science classes covering traditional undergraduate material

• minimum GPA=2.5, at the end of every semester

• must be completed within 5 years
Full-Time Enrollment for International Students on a Student VISA

• The 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

• So, 3 semesters to complete the MS program
  • You need to take a min. of 12 credits, 12 credits and then 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.
EE MASTER OF SCIENCE PROGRAM CHECKLIST

NAME: ___________________________  UNI: ___________________________

(Please print)

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

Summary of M.S.E.E. 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
   these should be taken within the first 24.
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 advisor approval.
6. ____ No credit for Math & Science courses covering
   traditional undergraduate engineering topics (e.g.,
   STAT GU4203 Probability Theory).
7. ____ 1 credit for required PDL course (outside of 30 credits,
   but 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.

Important Notes:
1) All courses outside the standard list on the next page must be approved.
2) Course “credits” are 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 and the SEAS bulletin is the
   authoritative source for the M.S.E.E. program requirements.

Updated July 20, 2018.
Tracking MS Program Progress

• Each student is responsible to ensure that his/her selected courses satisfy all the requirements, especially if he/she is constrained by a deadline such as that imposed by a student visa
• The department does not verify every semester if the student’s course selection satisfies the requirements
• If it is not clear if a particular course can be used for the MS program, consult with the EE Associate Director of Student Affairs
MS EE Concentrations

- Concentrations
  - 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
    - [http://www.ee.columbia.edu/ms-concentrations](http://www.ee.columbia.edu/ms-concentrations)
    - [http://bulletin.engineering.columbia.edu OPTIONAL MS CONCENTRATIONS](http://bulletin.engineering.columbia.edu OPTIONAL MS CONCENTRATIONS)

- Concentrations are optional, but recommended, and students can freely choose courses as long as they comply with program requirements
MS EE Program - Course Selection

• Key Requirements:
  – Min. of 15 credits from EE-listed courses (ELEN, EECS, CSEE, ECBM, …)
  – 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 contains the list of pre-approved courses
  – If not clear, request for approval has to be submitted to the EE Associate Director of Student Affairs
MS EE Program - Course Selection

• Course Flowcharts:
  – Flowcharts indicate the pre-requisites and suggested program sequences
  – For details of course prerequisites, attend the first lecture and discuss with the course instructor
Example of a course flowchart (for Signals, Information and Data)
Course Registration

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

• Academic calendar
  – [http://registrar.columbia.edu/event/academic-calendar](http://registrar.columbia.edu/event/academic-calendar)
  – Friday, September 14, 2018
    • End of Change of Program Period
    • Last Day to Add Class, Last Day to Receive Tuition Refund for Class Dropped
  – Thursday, November 15, 2018
    • Last Day to Drop Class (no refund)
    • Last Day to Pass/Fail
MS EE Registration for COMS and CSOR courses

CS Department manages registration for EE students for CS classes through direct SSOL registration or through SSOL waitlists

- EE students have access to the waitlists for 4000 and 6000-level CMOS courses starting August 28.
- COMS W4771 Machine Learning will have two large sections and enrollments will be decided based on a homework calibration assignment. EE students will be able to access the waitlists for regular (non-hybrid) courses starting August 28.

Monitor updates on EE emails to students
H Sections

- H sections are hybrid course sections for on-campus students
- H sections do not have an assigned classroom
- Students view lecture videos online instead of going to a classroom
- Lectures are taped during a regular section, and promptly available for viewing on the Columbia Video Network (CVN)
H Sections

- All other components of H sections are exactly the same as non-H sections
- Instructors and TAs hold office hours
- Students do the same homework assignments and take the same exams as classroom sections
MS Student Advising

- After this orientation, MS students will see an EE faculty member for 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.
- Talk to students during open lab sessions.
- Talk to EE ambassadors.
Research Opportunities for MS Students

• MS EE program allows up to 6 credits of research
  – First, you need to find a faculty member who will supervise your research
  – Then, you need to register for independent research: ELEN E4998 or ELEN E6001
  – Each professor has a separate section
  – Maximum of 3 credits/semester
  – 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 faculty supervisor
  - significant time commitment on part of faculty
- No formal structure
  - Students need to establish a relationship through course work, discussions with Ph.D. students
- Open labs during orientation are a good source of information
- Students need to do well in courses
- Spring semester is typically a good first opportunity, but starting to explore early is key
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
- Honor Students get the opportunity to obtain a paid research assistant (RA) position, if the student finds an interested faculty advisor
- They can take part in up to two RA engagements
- [http://www.ee.columbia.edu/ms-ee-honors-program](http://www.ee.columbia.edu/ms-ee-honors-program)
Course Assistant, Lab Assistant and Grader Positions

- A limited number of paid Course Assistant (CA), Lab Assistant (LA) and Grader positions are available in the EE dept. for qualified students
  - EE dept. application information on the web
  - Some positions are available in the CS department
- Students need to have good grades and be known to faculty who teach a particular class
- Applications are kept on file throughout the semester, and continuously searched for matches
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
  – up to 1.5 credits counting to 30 MS EE credits
Internships – Fieldwork or Curricular Practical Training (CPT)

• International students on a VISA need to register for course E6999 Fieldwork
  – Requires an advisor
  – 1 or 1.5 credit course

• The EE career placement officer (CPO) assists students in the process of applying for E6999
Internships – Fieldwork or Curricular Practical Training (CPT)

• Requirements
  – Need to apply well ahead of the engagement
    • Letter from employer with a job description
  – Need to submit a report and employer evaluation at the end of the internship

• As an alternative, some summer research positions are available on campus
  – They do not require formal CPT process
Doctoral Qualifying Exam (DQE)

• Written + oral exam required of 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 as evidence of abilities
  - However, passing the exam does not imply that a student will be accepted into the PhD program
  - To transfer into the Ph.D. program, MS students need to apply to the Ph.D. program and be accepted.
  - Finding a Ph.D. supervisor is a prerequisite for getting accepted into the Ph.D. program
Career Advising

Columbia University career advising:

- http://www.columbia.edu/content/students.html
- https://www.careereducation.columbia.edu/jobs-internships

The MS EE Career Placement Officer (CPO) is focused on assisting EE students with career planning:

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

• Attend other orientation events, go over the SEAS orientation package
• Ask students during today’s visits to open labs
• Discuss with student ambassadors
• EE, CE web sites
  – http://www.ee.columbia.edu/
  – http://www.ee.columbia.edu/ms-program-0
  – http://www.compeng.columbia.edu/
Information Resources

• The SEAS Bulletin

• EE staff:
  – Elsa Sanchez, Director of Student Affairs
    – Office: 1313 S. W. Mudd, Phone: +1 212-854-3104
    – Email: elsa@ee.columbia.edu
    – Office hours: 10:30am-12:00pm, 2:30pm-4:00pm or by appt.
  – Raina M. Ranaghan, Career Placement Officer
    – Office: 1311 Mudd, Phone: 212-851-9252
    – Email: rmr2185@columbia.edu
    – Office Hours: Tues. & Thur. (10 - 11 am) & (1:30 - 3:30 pm) or by appt.
Information Resources

• Faculty members of MS EE student advising committee:
  – Dion Khodagholy, dk2955@Columbia.edu
  – Zoran Kostic, zk2172@columbia.edu, chair of the committee
  – John Paisley, jpaisley@columbia.edu
  – Matthias Preindl, mp3501@columbia.edu
Note About Information in the Slides

- If there is any contradiction between the SEAS bulletin, checklists, slides, oral information, or other, the SEAS bulletin should be followed. Any exception needs to be approved in writing by the EE department.
GOOD LUCK!