EE/CE MS Program

- 30 credits total
  - all at 4000 level or above
  - min. 15 credits at 6000 level (CompEng: all in EE or CS)
  - min. 15 credits in EE
  - CompEng: min. 15 credits from “core” (min. 6 in EE and CS)
  - max. 6 credits for research projects (CompEng: max 9 credits)
  - 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 (e.g., basic statistics)
  - minimum 2.5 GPA (at any point in time <2.5 -> dismissal)
  - complete within 5 years for US citizens, 3 semesters for international students
EE/CE MS Program

• Normal load for full time students: ~12 credits/semester
  – i.e. 3 semesters to complete MS
  • Fall/Spring/Fall or Fall/Spring/Summer (more common among Ph.D./domestic students)
  – 12 credits per semester is a DHS (Department of Homeland Security) limits - for questions refer to Columbia ISSO

• Each student has the responsibility to ensure that his/her selected courses satisfy all requirements, especially if he/she is constrained by a deadline such as that imposed by a student visa
  – We do not verify every semester that the classes that you take satisfy the requirements
  – If there is any doubt, seek advice
# MS Program Checklist

*(on the web and in the package)*

## Electrical Engineering Master of Science Program Checklist

STUDENT: ____________________  UNI: ____________________  

*(Please print)*

This form serves as an unofficial checklist for the requirements of the M.S. Program in Electrical Engineering.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Pts.</th>
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**M.S.E.E. Degree requirements:**

1. ___ 30 points of credit, all 4000-level or above and taken for a letter grade (i.e., no P or R grades).
2. ___ 15 points at or above 6000 level.
3. ___ 15 points in EE (including joint courses). 12 of these should be taken within the first 24.
4. ___ No more than 6 points research (e.g., ELEN E4998, ELEN E6001, ELEN E6002).
5. ___ No more than 3 points total for APPROVED courses that are:
   a. Outside of SEAS and the Math & Science departments (e.g., Economics or Business courses).
   Or
   b. Non-technical courses within SEAS and the Math & Science departments (e.g., IEOR E4702 Human Factors).
6. ___ No credit for Math & Science courses covering traditional undergraduate engineering topics (e.g., STAT W4105 Probability).
7. ___ 2.5 GPA minimum.
8. ___ Completion within 5 years.

**Important Notes:**

1) All courses from outside the standard list on the next page must be approved.
2) Each student has the responsibility to ensure that their selected courses satisfy all requirements, especially if he or she is constrained by a deadline such as that imposed by a student visa.
3) Last updated August 2015.
Concentrations

- MSEE can have an **optional** ‘concentration’
  - a particular set of coordinated courses to cover a certain field
- Bulletin* lists several options
  - Multimedia Networking, Telecommunications Engineering, Lightwave Engineering...
- These are **just suggestions**!
  - You are free to put together your own program

*http://bulletin.engineering.columbia.edu/electrical-engineering
Selecting your Classes

- Lists of many EE, CS, and APAM classes (in the orientation package and online)
- Depth-area flowcharts indicate dependencies and sequences (in the orientation package and online)
- If in doubt regarding a pre-requisite for a particular course – discuss with the instructor
- Courses in different areas will be discussed later today
- Do not limit yourself to EE courses – explore other departments
Courses

Example of depth-area flowcharts

No prerequisites shown for courses from outside EE

Other Departments

Senior & Graduate

ELEN E608*
Topics in Sys. Biology

BMEE E6030
Neural Mod. & Neuroeng.

ELEN E6010

ELEN E610*
Intro to Control Thy.

ELEN E6201
Linear System Theory

ELEN E6860
Advanced Dig. Sig. Proc.

ELEN E4810
Digital Signal Processing

ECBM E4060

BMEE W4020
Comp. Neur: Circ. In Brain

ELEN E4815
Randon Sig. & Noise

MATH E1210
ODEs

BIOL W3004
Neurobio:

IEOR E3658
Probability

APMA E3101
Lin. Algebra

ELEN E6717
Information Theory

ELEN E6711
Stoch. Mod. in Info. Sys.

ELEN E6718
Algeb. Coding Theory

EEBM E6020
Meth. In Comp. Neuro.

EEBM E609*
Topics in Comp. Neur.

ELEN E609*
EEBM E9070
Seminars

CHEN E4760
Genom. Seq. Lab

BMEE E6030
Neural Mod. & Neuroeng.

APMA E4400
Intro. to Bioph. Mod.

IEOR E3658
Probability

CHEN E4700
Princ. of Genom. Tech.

BIOL W4037
Bioinfo. of Gene Reg.

BIOL W4400
Biological Networks

BIOM W4510
Molecular Sys. Biology

COMS W4771
Machine Learning

ELEN E9060
EEBM E9070
Seminars

Other Departments

Senior & Graduate

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Meth. In Comp. Neuro.

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Selecting your Classes

Attend multiple classes during the first week

Academic calendar:
http://registrar.columbia.edu/event/academic-calendar

Tuesday, August 30, 2016 to Thursday, September 01, 2016

- Summer Registration for Fall 2016

Tuesday, September 06, 2016

- Start of Fall 2016 Registration (Change of Program Period)

Friday, September 16, 2016

- End of Change of Program Period
- Last Day to Add Class
- Last Day to Receive Tuition Refund for Class Dropped

Thursday, November 17, 2016

- Last Day to Drop Class, Last Day to Pass/Fail
Waitlists

Waitlists for some COMS, CSEE, and DSI classes:

- SSOL waitlist for a class, after student cap has been reached
- SSOL waitlist for a “self-managed” class, no one can register directly into the class
- Custom CS waitlists for collecting information from students about their interest in particular high-demand classes, used for allocating classes to students – limited to 1 course/semester
  - COMS W4111 Databases
  - COMS W4771 Machine Learning
  - COMS W4115 Programming Languages & Translators
  - COMS W4118 Operating Systems
  - CSOR W4231 Analysis of Algorithms
- Custom waitlist for “Algorithms for Data Sciences”
Flipped Classes

Flipped classes (H sections) are new for Fall 2016:
• For on-campus students
• H sections do not have an assigned classroom
• Students view lecture videos online instead of coming to class
• Lectures are taped during a regular section, and promptly available for viewing (on the CVN=Columbia Video Network)
• 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

Please take advantage of flipped classes
Advising

• After the orientation, MS students are scheduled to see faculty members for advising
• An MS student should meet a faculty member once a semester to discuss class registration
  – a useful resource for other topics
  – any EE faculty member
  – ideally, talk to a single faculty in your area of interest
  – This afternoon – students are matched with faculty in their area
• Talk to students during the open lab session
• Talk to the EE ambassadors
Research

- Videos of the 2011 Research Overview Day: http://www.ee.columbia.edu/research-overview
- MSEE program allows up to 6 units of research
  - ELEN E4998/ELEN E6001
  - EE Typically 3 units/semester max (CompEng: 9 units)
  - Paid position are usually available during the summer
- Requires a faculty supervisor
  - .. a significant time commitment on part of faculty
- No formal structure
  - .. just need to establish a relationship
  - .. e.g. through coursework, discussion with Ph.D. students
- Open labs today are a good source of information
- Doing well in classes and looking for a spring project is usually a good idea
Doctoral Qualifying Exam (DQE)

• Oral/written exam required of students on Ph.D. track
  – MS students may take as evidence of their abilities
  – but they still must apply to the Ph.D. program and be accepted!
  – .. which means finding a willing Ph.D. supervisor

• Held in January every year
  • best taken at the earliest opportunity

• Written exam covers undergraduate-level material at graduate-level sophistication
  • 6 areas
  • more details on the EE web site

• Oral exam consists of three 15 minute one-on-one interviews
Course Assistant, Lab Assistant and Grader Positions

A limited number of Course Assistant (CA), Lab Assistant (LA) and Grader positions are available

• Application form available on the website:
  • http://www.ee.columbia.edu/pages/jobs/for_students/index.html

• Useful to have good grades and be known to faculty who teach a particular class

Computer engineering students can also apply for CS dept. positions:

• ta.cs.columbia.edu
• EE students can also try (may be more relevant in the spring)
Tesla Program and Honors Program

Tesla Scholars Program (revised starting 2016/2017):
• Students are chosen during the admissions process
• Students receive a stipend for the first semester and are invited to participate in special academic/cultural events.
• Old program had CA and RA opportunities - discontinued

MS EE Honors Program
• Students get the recognition as a MS EE Honor Student for an exceptionally high GPA during their studies at Columbia
• Revised per semester
• Opportunity to get a paid research assistant position, if a student finds an interested faculty advisor
• [http://www.ee.columbia.edu/ms-ee-honors-program](http://www.ee.columbia.edu/ms-ee-honors-program)
Internships - Curricular Practical Training (CPT)

Internship is an important step prior to finding a full time industry position.

• Presentation by the Center for Career Education later today
• Apply in time

For international students – requires registering for CPT class

• Curricular Practical Training course ELEN E6999
  – Requires an advisor
  – A 1 or 1.5 credit class
  – EE targeting total of 1.5 credits for the duration of MS studies
  – Submit a report and employer evaluation at the end of the summer

• Under some conditions can also be done in the last semester
• Summer research positions are also available
Career Advising

Columbia University career advising – multiple resources:
• http://www.columbia.edu/content/students.html
• http://www.careereducation.columbia.edu/findajob

MS EE career advising is focused on EE students:
• Useful information on the web: http://www.ee.columbia.edu/for-students
Information Resources

- Attend other orientation events, go over SEAS orientation package
- Ask students in the open labs
- EE, CE web sites
  - http://www.ee.columbia.edu/masters-program
- The SEAS Bulletin
  - http://www.engineering.columbia.edu/bulletin/
- Ask the faculty/staff:
  - MS advising committee - Professors: Zoran Kostic, Predrag Jelenkovic, Harish Krishnaswamy, John Wright, Debasis Mitra, Javad Ghaderi
  - Staff: Elsa Sanchez, Stella Tan-Torres, Raina Ranaghan, Student Affairs Coordinators
Next Presentation