Purpose of today’s meeting

- There are 216 grad students – 76 new students in this number
- Show you where to go for information
  - Who I am; who I am not
  - Help you become independent
- When you have a question, always remember that BOTH the grad school and departmental rules apply; departmental rules can be more stringent
Organizational Chart

Dean of Grad School
(Dr. Jackie Huntoon)

Dean of Engineering
(Dr. Wayne Pennington)

Mech Eng  Civ Eng  EE, CpE  ......  Biomed Eng

Signals/systems  Power/energy  Electrophysics  CpE
Introduction:

Ms. Joan Becker - grad program coordinator

- Submits paperwork once YOU fill it out.
- Take all forms to her for signatures!
- Works with me from Admission through Graduation for each of you
- Be NICE to HER!
Graduate School – What to expect

- Smaller size classes. Everybody is an A student, high expectations. Top students to study with, collaborate with.

- Take an active role in your education. Anticipate what needs to be done. Ask questions during lecture. **Grad school is not a spectator sport!**

- Open-ended problems and projects, larger scope, longer deadlines.

- **Professor will create an environment (lecture, lab, research) for you to succeed in, you do the rest.**

- Stress concept-based approaches (instead of procedural), abstract thinking, reward for developing creative innovative approaches.

- Communications – develop excellent speaking and writing skills.

- Research – scientific method, make an advancement on existing state of the art.
ECE Graduate Programs

Master of Science (MS) Program
Doctor of Philosophy (Ph.D.) Program
Research Thrust Areas

- Computer Engineering
- Signals and Systems
- Power and Energy Systems
- Electrophysics

It should be no surprise that graduate course offerings generally follow the research areas.
The ECE Graduate Program

- www.mtu.edu/ece/graduate/

- The student is responsible for following all rules and getting everything done in time.

- The minimum University degree requirements linked off the Graduate School’s Degree Requirements webpage: http://www.mtu.edu/gradschool/administration/academics/requirements/

- The ECE department may have additional (more specific) requirements than those of the MTU Graduate School.

- The M-Forms and D-forms are available at the Graduate School webpage: http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/

- Go there to get the most up-to-date forms, procedures, and requirements for successful completion of the degree.
When the rules change....

- You are subject to the rules TODAY
- Therefore, save a copy of these rules, as posted on:
  
  http://www.mtu.edu/ece/graduate/electrical/ for when you graduate
What courses do I take?

- What is your program, MS-A, B, D or PhD?
- What are the requirements of that program? (see web and degree Self Audit spreadsheet - found under Quick Links on every ECE webpage, for requirements)
- Consult BANWEB for courses offered, which semester, course pre-reqs, etc.
- Consult with person teaching the course(s) if questions remain
- If a section is full, only the instructor can allow more students
- Note: International students may only take 3 on-line credits per semester
Suggested First Semester Courses in Signals and Systems

- E5500 – Probability and Stochastic Processes
- EE5725 – Linear Systems Processes and Design
- EE5525 – Wireless Communications
- EE5726 – Embedded Sensor Networks
- EE5500 – Fourier Optics

Math – Linear algebra, real analysis, scientific computing, numerical PDE’s, etc. See the schedule of classes at https://www.banweb.mtu.edu/pls/owa/bwckgens.p_proc_term_date
Suggested First Semester Courses in Power and Energy

- There are two paths: Energy generation and distribution, and power electronics.
- You should work with the faculty in the power and energy area to determine what is best for you.
- EE5200 – Advanced Methods in Power Systems
- EE5227 – Advanced Power Electronics
- EE5230 – Power Systems Operations
- EE5251 – Distribution Engineering
- Math – Linear algebra, real analysis, scientific computing, numerical PDE’s, etc. See the schedule of classes at https://www.banweb.mtu.edu/pls/owa/bwckgens.p_proc_term_date
Suggested First Semester Courses in Electro-Physics

- EE5410 - Engineering Electromagnetics
- EE5430 - Electronic Materials
- EE547- Semiconductor Fabrication, and Fabrication Lab courses.
Suggested First Term Courses in Computer Engineering

- EE5500 – Probability and Stochastic Processes
- CS4321 - Introduction to Algorithms
- CS5321 – Advanced Algorithms
- Any Relevant Math (linear algebra, statistical processes, ...)

Summary

- All of this is summarized at:
  
  http://www.mtu.edu/ece/graduate/sequences/
MS Degree Program in Electrical & Computer Engineering at Michigan Tech
MS Degree Options

- Master of Science in Electrical & Computer Engineering:
  - Thesis Option (Plan A)
  - Report Option (Plan B)
  - Coursework Option (Plan D)
MS Degree Requirements

- Fill out Patent, Research and Proprietary Rights form.
- Choose an Advisor if Plan A or B (good mutual match).
- Plan out your course of study [self audit].
- Complete 30 Total approved credits.
- Grades of BC or better in all EE/In Department courses.
- Grades of C or better for non-major courses.
- Must maintain 3.0 GPA, and 3.0 GPA is the minimum to graduate.
MS Degree Requirements (cont.)

- Choose an Option (Plan A, B, or D)
- Present a Research/Project Proposal (A or B)
- Complete a Thesis or Project (A or B)
- File the MS Degree Schedule [Form M4]
- Logically 'AND' each requirement; MUST USE degree Self audit Spreadsheet
- Complete an Oral Thesis or Project Defense (Plan A or B)
- File the Oral Examination [Forms M5 & M6] (Plan A or B) or Form M6 (Plan D)
Spreadsheet for degree Self Audit

- Found on all ECE webpages, under Quick Links, Self Audit
- Fill it out (read directions and list courses in the order completed)
- Send it to Joan (jebecker@mtu.edu)
- Forms will be signed if courses meet requirements
- ECE (all) grad courses listed at:
  https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr#EE
MS Thesis Option (Plan A)

- [http://www.mtu.edu/ece/graduate/electrical/](http://www.mtu.edu/ece/graduate/electrical/)

- This plan requires a research thesis prepared under the supervision of an advisor. A thesis describes a research investigation and its results. The minimum requirements are as follows:

  - A minimum of 30 approved credits is required
    - 20 credit minimum of course work
    - 12 credit minimum EE5000-6000 series
    - 1 credit of Advanced Responsible Conduct of Research Training; An on-campus, approved course is required. See [http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/](http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/)
    - 9 credit maximum 4000 series
    - 3 credit minimum 4000 or higher level courses outside the department
    - 3 credit maximum EE 5805 (directed study)
    - 3 credit maximum of Co-op credits
    - 6 to 10 Research credits EE 5990

- Approval of your Advisor

- All EE/In Department courses must have a grade of 'BC' or better; Non EE/In Department courses must have a grade of 'C' or better.

- Must maintain a university cumulative GPA of 3.0 or above.
MS Report Option (Plan B)

- [http://www.mtu.edu/ece/graduate/electrical/](http://www.mtu.edu/ece/graduate/electrical/)

- This plan requires a report describing the results of an independent study project. Of the minimum total of 30 credits, at least 24 must be earned in course work other than the project.

- A minimum of 30 approved credits is required
  - 24 credit minimum of course work
  - 12 credit minimum [EE5000-6000 series](http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/)
  - 1 credit of [Advanced Responsible Conduct of Research Training](http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/); An on-campus, approved course is required. See [http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/](http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/)
  - 12 credit maximum 4000 series
  - 3 credit minimum 4000 or higher level courses outside the department
  - 3 credit maximum EE 5805 (directed study)
  - 3 credit maximum of Co-op credits
  - 2 to 6 project credits [EE 5991](http://www.mtu.edu/ece/graduate/electrical/)

- Approval of your Advisor

- All EE courses must have a grade of 'BC' or better; Non EE courses must have a grade of 'C' or better.

- Must maintain a university cumulative GPA of 3.0 or above.
MS Coursework Option (Plan D)

- [http://www.mtu.edu/ece/graduate/electrical/](http://www.mtu.edu/ece/graduate/electrical/)
- This plan requires the minimum of 30 credits be earned through course work. Research credits taken by students in Plan D may not be counted as course-work credits.
- A minimum of 30 approved course work credits is required
  - 18 credit minimum [EE5000-6000 series](http://www.mtu.edu/ece/graduate/electrical/)
  - 1 credit of Advanced Responsible Conduct Research; [Advanced online CITI training course](http://www.mtu.edu/ece/graduate/electrical/) (free)
  - 9 credit maximum 4000 series
  - Seminar not required, but up to 2 credits allowed
  - 3 credit minimum 4000 or higher level courses outside the department
  - 3 credit maximum EE 5805 (directed study)
  - 3 credit maximum of Co-op credits
- Approval of your Advisor
- All EE courses must have a grade of 'BC' or better; Non EE courses must have a grade of 'C' or better.
- Must maintain a university cumulative GPA of 3.0 or above.
Look carefully at the timelines for each of the three MS degree options.  
- [http://www.mtu.edu/gradschool/administration/academics/timeline/](http://www.mtu.edu/gradschool/administration/academics/timeline/)

Make sure that in your final semester, you meet the Deadlines to complete a degree in ‘your graduating semester’. Not meeting deadlines will delay your graduation.  
- [http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/](http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/)

There is a tremendous amount of information that you should be moderately familiar with now, and in more detail as you progress.
Ph.D. Degree Program in Electrical & Computer Engineering at Michigan Tech
Ph.D. Degree Coursework Requirements

- There are requirements imposed by both the Graduate School and the ECE Department for the Ph.D.

- Details of the Grad school requirements listed at: http://www.mtu.edu/gradschool/administration/academics/requirements/phd/

- Details of the ECE Department requirements listed at: http://www.mtu.edu/ece/graduate/electrical/

- Summary of coursework requirements follows.
Graduate School Coursework Requirements for Ph.D.

- **Minimum requirements**
  - Programs may have stricter requirements than listed here and may require more than the minimum numbers of credits listed here.
  - Thirty credits beyond the bachelor’s degree are required for a master’s degree.
  - Thirty credits beyond the master’s degree are required for a PhD.
  - Maximum of 12 credits may be at the 3000 or 4000 level (with program approval).
  - MEng allows a maximum of 14 credits at the 3000 or 4000 level.
  - One-third of the non-research credits may be transfer credits as long as they were not applied toward another degree.
  - Research credits are the only non-graded classes that may be counted toward a degree.
  - All credits must meet the [Scholastic Standards](#) of the Graduate School in order to be counted toward the credit requirements.

- **Not allowed to count towards Ph.D:**
  - Courses numbered below 3000
  - Audited courses
  - Continuous enrollment courses (ex: UN5951, UN5953)
  - Non-research courses taken for a pass/fail courses
  - Credits applied toward another degree
Ph.D. Degree Requirements

Other Requirements

Fill out Patent, Research and Proprietary Rights form.

Complete Advanced Responsible Conduct of Research Training; An on-campus, approved course is required. See http://www.mtu.edu/research/administration/integrity-compliance/responsible-conduct/training/courses/

Pass the Ph.D. qualifying examination and other examinations as explained later.

- Look carefully at the Doctor of Philosophy timeline.
  - http://www.mtu.edu/gradschool/administration/academics/timeline/

- Make sure that in your final semester, you meet the Deadlines to complete a degree in ‘your graduating semester’. Not meeting deadlines will delay your graduation.
  - http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/
You must have an advisor before taking this exam.

Qualifying exam consists of the following two parts:

- Written exam, questions from 3 grad-level courses.
- Oral – To test student’s grasp of fundamentals, ability to solve problems on the spot, and ability to research, write, and defend a technical paper.

Details given at
http://www.mtu.edu/ece/graduate/advising/qualifying-exam/

A maximum of two attempts are allowed.

- The first attempt must be made by the third semester. (Summer semesters are not counted).
- This exam is typically offered around the fourth week of the Fall and Spring semesters.
Other Ph.D. Examinations

- **Research Proposal Examination [D6]**
  - Oral presentation of dissertation proposal and an oral examination on the proposed research by the advisory committee.
  - This must be passed before the end of the sixth semester. (Not counting summer semesters)

- **Final Oral Examination [D8]**
  - Public presentation and defense of the dissertation research.
Procedure for Ph.D. Students

First Semester

- Choose an advisor. This is an important choice – should be a topic of mutual interest, with the possibility of original, significant research being done in the timeline of a Ph.D.

- Create a tentative study plan including plans for taking the qualifying examination.

- Register for the second semester courses.

- Submit final official transcripts to graduate school showing proof of your previous degrees (if not from MTU or unless done previously).

- Fill out the Patent, Research and Proprietary Rights form.
Dissertation/thesis/report

- Most challenging document you’ve ever planned, organized, and written.

- Generally contains things that have been published in peer reviewed publications.

- Must be text-book perfect.

- Follow Graduate School guidelines.

- Follow departmental and advisor guidelines.

- Consistent notations, equation editor, professional graphics.

- Lots of good examples from past students.

- Will likely get lots of help from your advisor and committee.
Academic Integrity

- **Graduate School: Professional Conduct – Academic Integrity** (academic misconduct, plagiarism, cheating, fabrication, falsification, sanctions)
- **Office of Academic and Community Conduct** Academic Integrity (Video Presentation by Academic & Community Conduct Director, Robert Bishop)
  - MTU Policy on Scientific Misconduct
    [http://www.mtu.edu/research/administration/integrity-compliance/pdf/Misconduct_in_Research_Scholarly_Creative_Endeavors_Policy.pdf](http://www.mtu.edu/research/administration/integrity-compliance/pdf/Misconduct_in_Research_Scholarly_Creative_Endeavors_Policy.pdf)
- **Plagiarism**
  - Definition: Presenting another’s work as your own.
  - Thus, always reference the source to your numbered Reference List.
  - Use quotation marks or “block quotation” for direct quotes.
  - Expect ZERO tolerance for gross infractions.
Cooperative Employment

- Administered by Career Services, **NOT** ECE!!!
- Intern or co-op jobs can give good summer income and professional experience.
- Difficult for Plan A or Plan B Masters students, or for PhD students. Your research project schedule (and your Advisor!) may not allow you to just come and go as you please. Exception: if employer is sponsoring your research.
- International students should arrange as a Graduate Coop / CPT.
- If you also work Fall or Spring semester, you run risk of missing required courses while away from campus – Be careful! Coordinate with your advisor.
- As a general rule, Co-ops beyond the scope of the guidelines listed previously will not be approved.
Quiz!
(Stuff you should know!)

- A section is full: who do you consult?
- You are not sure if a course will count towards degree: where do you find out?
- You wish to transfer credits: where do you find info?
- You want to plan your future courses: where do you find info?