Welcome to Graduate Studies

Graduate Student Orientation
Electrical & Computer Engineering

Prof. Warren Perger
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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.
- 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, conceptually sound, make an advancement on existing state of the art.
ECE Graduate Programs

♦ Master of Science (MS) Program
♦ Doctor of Philosophy (Ph.D.) Program
♦ Master Of Engineering (M. Engg.) Program
  – Administered by the College of Engineering
Research Thrust Areas

♦ Computer Engineering
♦ Information Systems
♦ Energy Systems
♦ Solid State Electronics
♦ Electromagnetics
Faculty Research Areas

♦ Statistical Signal Processing
♦ Imaging Science
♦ Adaptive and Atmospheric Optics
♦ Pattern Recognition
♦ Digital Communication Systems
♦ Wireless Communications
♦ Estimation and Detection Theory
♦ Embedded Real-Time Systems
♦ Computer Architecture
♦ Fault-Tolerance
♦ Memory System Design
♦ Hardware-Software Co-Design
♦ Computer Networks & Security
♦ Wireless Micro-Systems

♦ Modeling of Energy Systems
♦ Real-time Power System Operation
♦ Alternate Energy
♦ Applications of Power Electronics
♦ Electronic Materials and Devices
♦ Thin Film Materials and Devices
♦ High-Speed VLSI Devices and Interconnects
♦ Semiconductor TCAD
♦ Nanotechnology Circuit Design
♦ Antennas & Antenna Systems
♦ Microelectromechanical Systems
♦ Chemical and Optical Sensors
♦ Control Systems
♦ Other Areas…..
Weekly Graduate Seminar

- Builds a community of scholars; develops your technical presentation skills; keeps you current on research in your area; forms natural collaborations.
- Four Seminar Courses offered per semester
  - EE 5920 – Energy/Power Systems
  - EE 5940 - Electrophysics
  - EE 5950 - Signals and Systems
  - EE 5970 - Computer Engineering
- Every week Thursday 2-3pm
- Occasionally merged for guest speakers, etc…
- Attendance and Participation encouraged every semester in attendance.
- Minimum enrollment required is one seminar course for graduation (1 credit hour), maximum of two.
The ECE Graduate Program

- www.ece.mtu.edu/pages/graduate/index.htm
- The student is responsible for following all rules and getting everything done in time.
- The minimum degree requirements are published in the graduate student bulletin and other university publications. The ECE department may have additional requirements than those of the MTU Graduate School.
- The so-called 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.
Ph.D. Degree Program
in
Electrical & Computer Engineering
at
Michigan Tech
Ph.D. Degree Requirements

Coursework

♦ A minimum of 60 credits of approved coursework and research (30 credits beyond Masters).
♦ If a student has an MS:
  – 18 classroom (non EE6990) credits are required, minimum of 9 credits in EE5000-6000, minimum of 3 credits 5000-level or higher from College of Eng, PH, MA or CS
♦ Without an MS:
  – a minimum of 21 credits EE5000-6000 (non EE6990) and minimum of 6 credits 5000-level or higher from College of Eng, PH, MA, or CS.
♦ Grades of B or better in all courses.
♦ 2 Credits of research thrust area seminar course
♦ Approval of the advisor.
Ph.D. Degree Requirements

Other Requirements

♦ Passing the Ph.D. qualifying examination and other examinations as explained later.
♦ Official final transcripts showing proof of your previous degrees (if not from MTU).
♦ Filled out Patent, Research and Proprietary Rights form.
Ph.D. Qualifying Examination [D4]

- You must have an advisor before taking this exam.
- It consists of the following two parts:
  - Written exam, questions in 6 of 8 areas.
  - 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 www.ece.mtu.edu/pages/graduate/PhD_Exam_Guidelines
- 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. **Approach it seriously, prepare rigorously, pass on first attempt!**
Other Ph.D. Examinations

♦ Dissertation Research Proposal Defense [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)

♦ Dissertation Defense [D8]
  - Public presentation and defense of the dissertation research.
Procedure for Ph.D. Students

♦ First Semester
   – Choose an advisor.
   – Complete a tentative study plan [D3] 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.
Other Important Issues/Info

♦ Writing your dissertation/thesis/report
♦ Academic Integrity
♦ Professional Development, ESL
♦ Cooperative Employment
♦ Job Hunting
♦ Graduate Program Committee in ECE
Dissertation/thesis/report

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

- See MTU’s information on Academic Integrity
  http://www.studentaffairs.mtu.edu/dean/judicial/policies/academic_integrity.html

- MTU Policy on Scientific Misconduct
  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.
Professional Development, ESL

- Presenting at Grad Seminars
- Being active student member of IEEE
- Writing and publishing papers
- Attending Conferences
  - Student paper contests
  - Presenting papers
  - Attending workshops or tutorials
- ESL courses offered on campus
- Writing Center – writing coaches available.
- Career Center – help with resume writing, practice interviews, job hunting, on-campus interviews.
Cooperative Employment

- Intern or co-op jobs can give good summer income and professional experience.
- Good for Plan D Masters students or self-supported graduate students.
- 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.
Job Hunting….

- It is reasonable to begin job hunting after your research is “under control” (research work mostly complete, writing underway). Work through the career center, take advantage of Career Fairs.
- Be careful! Job hunting and interview trips are very time-consuming. When you begin the process, it “gets a life of its own” and is very hard to stop it.
- If you begin job hunting too early, it may slow down or stop your research progress, and you risk not graduating.
- If you take a job and leave campus before you defend, you risk not graduating.
- Coordinate with your advisor and your research team. Your advisor can give you lots of good advice on job hunting and may have employment contacts for you.
Graduate Program Committee
2009-10

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