Electrical, Computer & Power Engineering in the 21st Century

- Post CMOS Integrated Electronics
- Artificial Intelligence
- Electric Vehicle
- High Performance Computing
- Autonomous Vehicles
- Space Technologies
Electrical, Computer & Power Engineering in the 21\textsuperscript{st} Century

Digital Manufacturing

Clean Energy

Healthcare Technology

Cybersecurity

Resilient Power & Power Electronics
Research Addressing 21\textsuperscript{st} Century Grand Challenges

- Make solar energy economical
- Provide energy from fusion
- Develop carbon sequestration methods
- Manage the nitrogen cycle
- Provide access to clean water
- Restore and improve urban infrastructure
- Advance health informatics
- Engineer better medicines
- Reverse-engineer the brain
- Prevent nuclear terror
- Secure cyberspace
- Enhance virtual reality
- Advance personalized learning
- Engineer the tools of scientific discovery
ECSE Research Areas

https://www.ecse.rpi.edu/research

https://ecse.rpi.edu/research/faculty-research-summaries
https://www.ecse.rpi.edu/people
Central location to submit forms, make inquiries, and seek help with any graduate program related matters.

E.g. submit/update:

- PoS (MS or PhD)
- Advisor Form (MS or PhD)
- DSYR (PhD)

Usually via e-mail to kritzk@rpi.edu
What we provide

– Central Location
  - Forms, student mailboxes (pre-Covid), information, and questions

– Source of support
  - Point of contact for all matters throughout entire academic career.
  - Foster a supportive, stable, inclusive environment.

– Communication hub
  - Institute and Department policies.
https://www.ecse.rpi.edu/
ECSE Degree Programs

Computer & Systems Engineering: B.S., M.S., M.Eng., Ph.D.
Electrical Engineering: B.S., M.S., M.Eng., Ph.D.
Electric Power: M.S., M.Eng., Ph.D.

M.S., M.Eng.: 30 Credit Hours Beyond B.S. Degree (24 course credit-hours)
Ph.D.: 72 Credit Hours Beyond B.S. Degree (36 course credit-hours)
Ph.D.: 48 Credit Hours Beyond M.S. Degree (12 course credit-hours)
Typical: 12-15 Credits per semester (6-9 course credit-hours)

Typical time to graduate (after B.S):
M.S./M.Eng: 1-2 years (2-4 semesters)
Ph.D. : 3-5 years (6-10 semesters)

Note:
• Doctoral students may add a Master’s degree while completing their PhD requirements
• Master’s students may apply to the doctoral program
Registration Requirements

MS/MEng (excluding Co-Term) and PhD:
- Full-time status **16 Credit maximum**
- Full-time status minimum:
  - 9 credits for TA
  - 12 credits for RA and Self-Pay

Co-Terminal:
- Full-time status minimum is **12 credits**.
- **Maximum 21 credits** if course load is predominately UG courses.
- Co-term students should **aim for 15 credits** per semester, especially if taking graduate level courses.
- You must follow OGE requirements once the bachelor degree is completed.
Why is this important?

- Financial aid cannot be entered into the system until you are registered. You cannot be paid until it is entered.

- Registration deadlines:
  - TAs – check with Kelley.
  - RA and Self Pay – check with Kelley (1st day of classes).

- If you are a Teaching Assistant:
  - You already filled in the TA information (including your class schedules) to Kelley (if not, do so ASAP)
  - Prof. James Lu uses this information to ensure your TA assignment does not conflict with your course schedule.
  - TA assignments has been sent via email last week.
Graduate Plan of Study (PoS)

- A Plan of Study (PoS) must be on file with (ECSE→OGE) for all graduate students

- Deadline to submit PoS to our office: **9/30/2020**.
  - Plans of Study are brought/emailed to Kelley for initial review and forwarding for final signatures
  - Plans of Study can be revised as needed, and may be returned for revision before approval

  - Plans of Study must be followed.
    - If you decide to change courses, you can submit a PoS anytime.
    - However, if you don’t update PoS, you risk having issues at graduation time, and may delay your graduation
Other Common Required “Paper”-work

- **Orientation Packet paperwork & deadlines**
  - TA Information Forms (every semester for TAs)
  - Intellectual Property Agreement
  - Communications in ECSE
  - Program/Research Advisor

- **Master’s Program Paperwork**
  - Nomination of Master’s Thesis Committee*
  - Record of Master’s Thesis & Oral Presentation*

- **Doctoral Program Paperwork**
  - RQE Application (First week of each semester, 9/7/2020)
  - Major/Minor Form (once, with first PoS, 9/30/2020)
  - Doctoral Committee Nomination
  - Record of Candidacy Examination
  - Record of Dissertation Exam*

*Institute deadlines for each semester are posted on the Academic Calendar at rpinfo.rpi.edu
Reminders will be sent on a semester basis but don’t wait to be reminded!
TA/RA Expectations

- You are considered an employee of the Institute:
  - Show up on time.
  - Do the work thoroughly and completely.
  - Communicate with your advisor and/or Student Services.

- TAs:
  - Continuation of TA assignment is subject to satisfactory performance
  - TA evaluation form submitted by instructors at end of semester
  - TA assignment could be terminated in extreme cases of under-performance
  - Time-budget and discuss the TA assignment and expectations with your instructors

- Time Off
  - RAs: Discuss with your advisor well in advance.
  - TAs: You must be available throughout the semester. You cannot leave for the break without checking when the final grading will be done.

- ECSE TA Best Practices
  - A workshop will be announced. Attendance is required.
ADD/DROP Deadlines

- Add Deadline: September 11, 2020
- Drop Deadline: October 23, 2020
- Late Adds are not permitted. OGE will NOT approve (except in extreme situations)
  - My grade was not going to be good is not a valid excuse
- You should not drop a course if it lowers your load below the minimum full-time requirements, esp. if the add deadline has passed.
- The critical period where students make mistakes is [9/11, 10/23]
Mercer Distinguished Lectures

Darrin Communications Center (DCC) 324
(now Online during Covid19 protocols)
Refreshments: 3:30 p.m., Lecture: 4:00 – 5:00 p.m.

Schedule available at:
• https://www.ecse.rpi.edu/lectures
ECSE Master’s Degrees

• Master of Science (MS) with or without Thesis
  – MS in Electrical Engineering
  – MS in Computer and Systems Engineering

• Master of Engineering (MEng)
  – MEng in Electrical Engineering
  – MEng in Computer and Systems Engineering

• ME, MS w/ or w/o Thesis can be used for Co-Terminal, but MS w/o Thesis degree is most typical
Differences Among Degrees

- w/ vs. w/o thesis matters a lot in PoS requirements.
- EE vs. CSE doesn’t matter in PoS Requirements, just area of concentration/research:

**EE**
- Microelectronics
- Electronic Materials
- Electromagnetics
- Nanotechnology
- Energy
- Power Electronics
- Photonics

**CSE**
- Computer Systems
- Computer Graphics
- Computer Networks
- Wireless Networks
- Robotics
- Imaging

**Either**
- Controls
- Signal Processing
- Telecommunication
- Computer Hardware
- Electronic Circuits
- Energy Systems
Master of Engineering (M.Eng.)

- Preparation for Professional Practice
- Semesters to complete: 2 possible w/ heavy load; 3 semesters more typical.
- 3-Course Technical Concentration.
- 2-Course Non-Technical Sequence.
  - MGMT/ECON/ courses encouraged.
- Max time period 2-1/2 yrs (Grad School Policy).
- Professional Master’s Project an option but not typical (need a willing Advisor for this).
- Academic Advisor = an ECSE Faculty or GPD.
Master of Science with Thesis

- Preparation for Research Career and/or a PhD
- Emphasis on depth in research area.
- 3 semesters to complete (recommended).
- Max time period 2.5 yrs (Grad School Policy).
- Master’s Thesis required: Need 6 (or 9) credits of ECSE-6990 MS Thesis in your PoS.
- Must publicly present master’s thesis research, with Committee (3 ECSE faculty) sign off (even if also pursing a PhD).
- Academic Advisor = Research Advisor.
Master of Science w/o Thesis

- Typically does not focus on research
- Semesters to complete: 2 possible w/ heavy load; 3 semesters more typical
- Max time period 2.5 yrs (Grad School Policy)
- Professional / Master's Project an option but not typical (need a voluntary Advisor for this)
- Academic Advisor = an ECSE Faculty or GPD
Co-Terminal MEng

Identical to MEng, except:

• PoS must reflect completion by end of Year 5 (that is, 1 AY after your normal 4-Year BS).

• ECSE strongly recommends at least 6 Master’s PoS credits by end of Year 4!

• Co-terminal students must complete all BS requirements and graduate within 8 semesters, at which point their status will change to graduate.

• Academic Advisor = Undergraduate Advisor.
Co-Terminal MS w/o Thesis

Identical to MS w/o Thesis, except:

• PoS must reflect completion by end of Year 5 (that is, 1 AY after your normal 4-Year BS).
• ECSE strongly recommends at least 6 Master’s PoS credits by end of Year 4
• Co-terminal students must complete all BS requirements and graduate within 8 semesters, at which point their status will change to graduate.
• Academic Advisor = Undergraduate Advisor.
Co-Terminal MS with thesis

Identical to MS, except:

- Need an existing Research Advisor, who fully endorses PoS Completion by end of Year 5 (1 AY after your normal 4-Year BS).
- ECSE strongly recommends at least 6 Non-Thesis Master’s PoS credits by end of Year 4
- Co-terminal students must complete all BS requirements and graduate within 8 semesters, at which point their status will change to graduate.
- Academic Advisor = Research Advisor.
ECSE 2020 Handbook


- MS/MEng PoS Examples
- MS and PhD Program Requirements
- ECSE PhD Forms
  - Application for ECSE Research Qualifying Examination
  - RQE Assignment to Doctoral Student
  - RQE Student Evaluation by RQE Faculty
  - RQE Student Evaluation by Faculty Advisor
  - Doctoral Student Major/Minor Concentrations
Important Links!

- **www.rpi.edu**
  - RPI Web Page

- **www.ecse.rpi.edu**
  - ECSE Web Page
  - Master PoS Files, a copy of these slides! ("academics" link)
  - Research Areas, Advisor Interests, etc.

- **rpinfo.rpi.edu**
  - Course Catalog
  - Institute Directory, Academic Calendar (Add/Drop Deadlines!), Final Exam Schedule, etc.

- **sis.rpi.edu**
  - Class-Hour Schedule
  - Special-Topics Courses and New-Course Descriptions, etc.
Personal Well Being

- Sleep and vitamins
- Social life [http://www.visittroyny.com/aboutTroy/history/history.aspx](http://www.visittroyny.com/aboutTroy/history/history.aspx)
- Sexual misconduct investigative process
  - [http://www.rpi.edu/dept/hr/policy/17_Sexual_Harassmen_Policy.pdf](http://www.rpi.edu/dept/hr/policy/17_Sexual_Harassmen_Policy.pdf)
  - [https://www.dropbox.com/s/cx3s20iujuyutfwx/studentsexualmisconductinvestigativeprocess.pdf?dl=0](https://www.dropbox.com/s/cx3s20iujuyutfwx/studentsexualmisconductinvestigativeprocess.pdf?dl=0)
Cyber Presence

- Personal webpage (e.g., homepages.rpi.edu/~xxxx, WordPress https://jenpazour.wordpress.com)
- Resume
- Code: GitHub
- Google Scholar
- LinkedIn
- Blog
- Youtube (e.g., lecture, teaching, research results)
- Twitter, Facebook, etc.
Key Attributes of Successful Students

- **Knowledge and Creativity**
  - Has a broad perspective on the field
  - Is among the brightest persons I know
  - Produces novel ideas
  - Is intensely curious about the field

- **Communication Skills**
  - Speaks in a clear, organized and logical manner
  - Writes with precision and style
  - Speaks in a way that is interesting
  - Organizes writing well

- **Teamwork**
  - Supports the efforts of others
  - Behaves in an open and friendly manner
  - Works well in group settings
  - Gives criticism/feedback to others in a helpful way

- **Resilience**
  - Accepts feedback without getting defensive
  - Works well under stress
  - Can overcome challenges and setbacks
  - Works extremely hard

- **Planning and Organization**
  - Sets realistic goals
  - Organizes work and time effectively
  - Meets deadlines
  - Makes plans and sticks to them

- **Ethics and Integrity**
  - Is among the most honest persons I know
  - Maintains high ethical standards
  - Is worthy of trust from others
  - Demonstrates sincerity
Fellowship/Awards/Internship

• NSF Fellowship
• DOE Fellowship
• SMART Fellowship
• Company internships (CCPD https://www.rpi.edu/dept/cdc/)
• Departmental and school awards (Founder’s Award)
Additional RPI Resources

• Rensselaer Student Handbook

• Graduate student handbook supplement
  http://rpi.edu/dept/grad/docs/The%20Graduate%20Student%20Supplement%20.pdf

• Graduate student forum (Wednesdays)

• TA training course (other graduate students can sign on too)

• Faculty, Counseling Center, Graduate Class Dean
Additional Resources

- CITI training (required for RAs)  http://research.rpi.edu/compliance/citi

- Academic integrity: courses, research, thesis, papers
  http://doso.rpi.edu/update.do?artcenterkey=676
  Plagiarism: Representing the work or words of another as one’s own through the omission of acknowledgment or reference. For example, using sentences verbatim from a published source in a term paper without appropriate referencing, or presenting as one’s own the detailed argument of a published source, or presenting as one’s own electronically or digitally enhanced graphic representations from any form of media.

- Writing: writing center  http://www.ccp.rpi.edu
  William Zinsser’s On Writing Well: https://ia600308.us.archive.org/31/items/OnWritingWell/on-writing-well.pdf

- Presentation:
  https://www.dropbox.com/s/uif4ojh7uczuyjyf/AdviceToBeginningPhysicsSpeakers.pdf?dl=0
Thank you for joining us!

Questions?