

Prerequisites

- This course builds heavily on EE 215.
- You will be expected to know and be able to use:
 - Kirchhoff's Laws.
 - Thevenin and Norton equivalents.
 - Node voltage and mesh current methods.
 - Supernodes, supermeshes, superposition.
 - Ideal op-amps and limits of operation.
 - Capacitors and inductors.
 - Complex numbers.
 - Solution of linear differential equations.

Individual and team

- This course represents a transition toward becoming an engineer.
 - Powerful methods to analyze and design real circuits.
 - More responsibility for your own learning.
 - More open-ended problems, labs.
- This class includes a combination of individual and team work.
 - Both are important.
 - Individual: homework, exams, lab exam
 - Team: Prelab, Lab

Why teamwork?

- Industry people work in teams
- Sharing ideas and learning from others
- Practicing communication skills
- “I am better than the others in the team”
 - Team only as strong as the weakest person
 - Learn how to explain and communicate
 - Learn patience and people skills

Good team make-up

- Different ideas and perspectives in a team to learn from each other
- Examples:
 - Mixed gender
 - Native and non-native speakers
 - Diverse backgrounds
 - Various age levels

Teamwork in lab

- Various roles in each experiment:
 - analysis of circuits in an experiment
 - simulation (SPICE)
 - building the circuits
 - recording data in the lab
 - data analysis and comparison
 - report writing
- Each student should take on various roles during the quarter

Lab experiments

- First EE course with lab
 - learn how to use lab instruments
- Materials: where from?
 - real-life circuits vs. textbook circuits
 - company interviews of junior EE students for Co-op jobs
 - examples from current industry designs

Using lab & quiz times

- “Pre-lab takes too long”
 - industry practice (typical chip design)
 - design and simulation: 100-person team over 3 years (“pre-lab”=300 man-years)
 - product fabrication: 50-person team over 3 months (“lab work”=150 man-months)
 - Spend time on Pre-lab: it pays off!!
 - uses quiz section time, work in team
- Quiz time
 - Ask questions about lectures & labs, work extra problems
 - Guaranteed access to TA

Use of computer tools

- “Why should I learn circuits when I can run Matlab, SPICE, Mathcad, etc.?”
- Understanding circuit operations vs. crunching numbers
 - use any tool you want to crunch numbers, plot waveforms, etc.
 - tools are only good to VERIFY ideas and designs.
 - what happens when tools fail?

Techniques vs. numbers

- Emphasis on problem-solving technique, NOT on answer
- Correct technique, correct answer: full credit
- Correct technique, incorrect answer: most of credit
- Incorrect technique, correct answer: little or zero credit

Design real-life circuits

- Given a specification, how to design?
 - many options exist
 - how do you choose which options to explore?
 - need to understand operations
 - need to do quick “back of the envelope” estimates
 - need to select viable options
 - use computer tools to explore the selected options and choose the best option
 - impossible to use tools on all options (too many, too long, too costly)
 - use computer tools to perform detailed analysis, crunch numbers, plot
- “Designer experience” vs. tools

Learning habit

- “Active” vs. “Passive” learning
 - ask questions
 - work in teams
 - use quiz section time effectively
 - do more practice problems
- Think first, get a clear procedure BEFORE jumping into a lab or problem
- The only way to become a good designer is to work

What to do after class today

- Homework:
 - Download and start Homework 0 if you want to drop a homework score.
- Lab:
 - Download Laboratory Manual and Lab 1, and start working
 - Buy lab kit from EE stock room in EE1 137
- Quiz:
 - Go to quiz section to get organized
- Start reading Chapter 9 to prepare for upcoming lectures
 - Review prerequisite topics in EE 215

Adding EE 233

- EE majors:
 - Preference if we hit course limits (not likely this quarter).
 - Contact EE Advising if there is an issue.
- Other students:
 - Currently multiple slots available in all lab sections.
- Class limit imposed by lab stations and lecture room.