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

From class to real life

- Extract knowledge of techniques from class and text
  - NOT specific answers and plug-in numbers!
- Apply this knowledge to real-life circuits
- “The circuits in class are not practical” vs. “Practical circuits are too difficult and we don’t have time to do them”

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

Working problems

- “I want to learn swimming but I don’t like getting wet”
- “I want to learn designing circuits but I don’t like messy equations, don’t like to work on problems, etc.”
- “Genius is 1% inspiration and 99% perspiration” - Thomas Edison

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:
  - Contact EE Advising no later than Wednesday afternoon
  - Preference in overload
- Other students:
  - Will be added on Thursday to reach limit of 72
  - Limited to available lab sessions (AA or AB)
- Class limit imposed by lab periods.