Lecture 1: Admin & Overview

- Announcements:
- EE C247B/ME C218: Introduction to MEMS Design
- Instructor: Prof. Clark T.-C. Nguyen
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- Lecture Topics:
  - 1st Day Handouts
  - Definitions for MEMS
  - MEMS roadmap
  - Benefits of Miniaturization
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- Today, basically go through
  - 1st day handouts
  - Lecture Module 1: MEMS Overview
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- This class will be recorded by ETS
- But I'm not sure how good ETS is, so I'll record too, at least the first few lectures
  - Lecture videos will be posted on the class website in the far right column of the table
- Not a good idea to rely on recorded lectures
  - Sometimes they don't record correctly
  - Most who say they will watch the video later won't due to other obligations
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- You will be added to the Piazza course page
  - The access list will be updated weekly to account for newcomers and drops

- How many have taken EE 147/247A?
- How many have taken ME 119?
- How many know microfabrication basics, i.e., oxidation, diffusion, etc.?
- How many already know MEMS fabrication?
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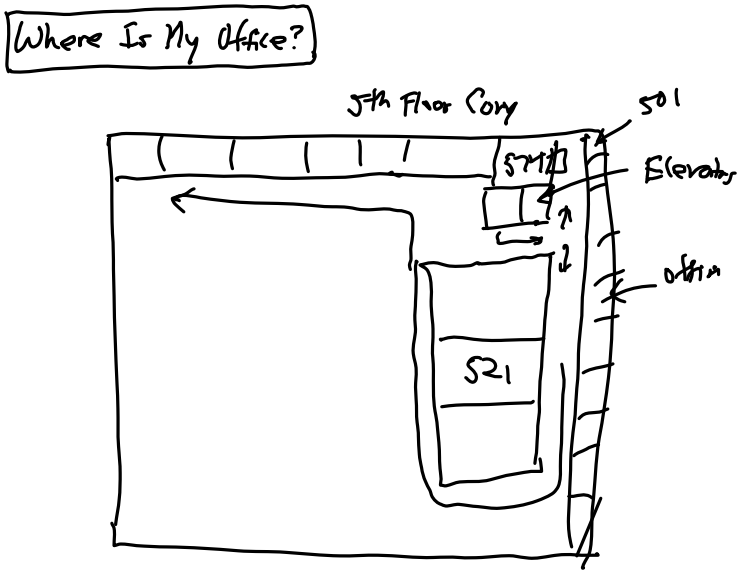
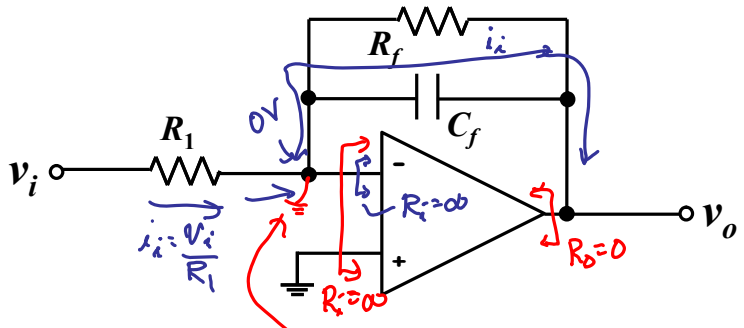
- Now, start going through Module 1: Admin & Overview



What You Should Know

- Basic circuit analysis & design using op amps
- *Example*: Find the transfer function $v_o(s)/v_i(s)$ of the circuit below.



"virtual ground" → current will not go into this

But current will be attracted to its 0V.

Ideal Op Amp Rules:

① $i_- = i_+ = 0 \rightarrow R_i = \infty$

② $R_o = 0\Omega$

③ $A_V = \infty$

④ $v_+ = v_- \rightarrow v_- = 0V$

$i_i = \frac{v_i}{R_1}$

$v_o = -i_i\left(R_f \| \frac{1}{sC_f}\right)$

$v_o = -\left(\frac{v_i}{R_1}\right)\left(\frac{R_f}{1+sR_fC_f}\right)$

$\frac{v_o}{v_i}(s) = -\frac{R_f}{R_1}\frac{1}{1+\frac{s}{\omega_0}}, \quad \omega_0 = \frac{1}{R_fC_f}$

complex variable = $j\omega$, frequency