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:
  - Course Website
  - 1st Day Handouts
  - Definitions for MEMS
  - MEMS roadmap
  - Benefits of Miniaturization
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- Course Website:
- https://inst.eecs.berkeley.edu/~ee247b/sp19/
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- I will record lectures on my computer and post them on the class website in the far right column of the Lecture 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
  - Thus, videos will post more than two days after the lecture
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- Piazza is generally the best way to ask questions and communicate concerns
- 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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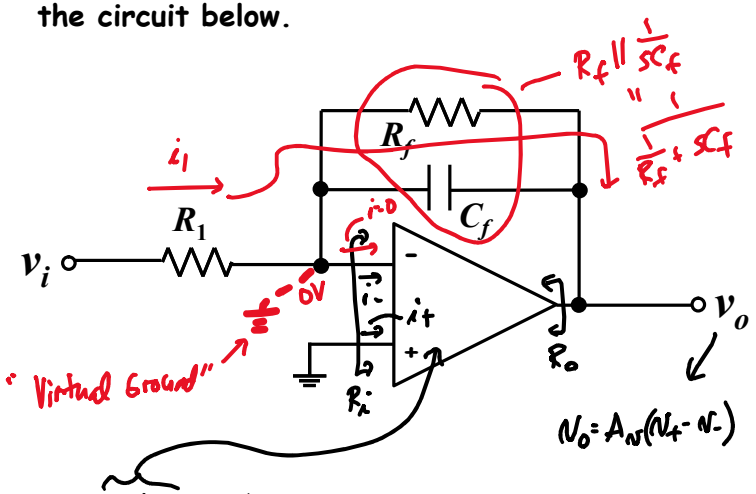
- Now, start going through Module 1: Admin & Overview

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.



Ideal Op Amp Rules:

1. $R_i = \infty \rightarrow i_- = i_+ = 0$
2. $R_o = 0\,\Omega$
3. Gain, $A_{ol} = \infty \rightarrow$ $v_o = \infty(v_+ - v_-) =$ finite
4. $v_+ = v_-$

Feedback ↓

$v_+ - v_- = 0 \rightarrow v_+ = v_-$

$$i_1 = \frac{v_i - 0}{R_1} = \frac{v_i}{R_1}$$

$$v_o = -i_1\left(R_f \| \frac{1}{sC_f}\right) = -\frac{v_i}{R_1}\left(\frac{R_f}{1 + sR_fC_f}\right)$$

$$\omega_0 = \frac{1}{R_fC_f}$$

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