The class met at 10 AM.

Today's goal was to learn about impedance, how it's a central aspect of speaker design and why we always make our computers do the math for us. I also wanted the students to listen to a little music through different speakers and understand how modifying the frequency response changes the tone of sound. I used a bunch of graphs on the computer to help demonstrate phase shift, instantaneous power, and various frequency responses.

Equipment on hand

- Microphone, preamp, soundcard and laptop
- Edgerton Center amplifier and CD player
- IAP class speaker with and without crossover
- Soldering irons and other Edgerton tools

Chat/review - Give up at 10:15

Catch-up and little things - Give up at 10:45

- Review phase shift / offsets
- Sound levels: try SPL meter, measure speaker efficiency
- Hearing sensitivity variation - A vs. C weighting example
- Ohm's Law: show voltage and current waves allowing phase shift
- RMS voltage/current and average power

Impedance - Give up at 11:15

- Resistor voltage divider
- Compare result of ideal resistor load and speaker
- Replace resistors in divider with impedances
- Do math to show FR of a capacitor filter; find Fc
- Show 2nd order, 4th order, LP and BP, notch

Break / Speaker driver response - Give up at 11:20

- Anechoic responses of a couple different drivers
- Actual measurements on baffle: point out Peerless baffle step
- Breakup modes - HiVi M8A
- Sensitivity examples from hi-fi, PA audio

Build you own filter - Class ends at 12:00

- Pair up, choose filter type and frequency
- Find closest available components
- Solder together filter - 2 wires in, 2 out
- Try it, listen, and measure!