JEE2330 Midterm Review Summary

Midterm Exam
Tuesday, March 18, 2025
Jubel Hall – Room 120
Closed book/Closed notes
Open one 8.5" x 11" sheet (both sides)
Open one calculator

The midterm exam covers the first five experiments of the semester. All the theory covered in class and in the book is fair game.

Recommendations for preparation:
- Review the lab problems for Labs 1 through 5.
- Skim the lab reports for Labs 1 through 5.
- Review AC and DC circuit analysis skills.

- **Chapter 1: DC Circuit Measurement and Analysis**
  - Effect of placing a meter in a circuit
  - Effect of a meter's scale on measurements (20mA vs. 200mA, etc)
  - Indirect current measurement (voltage across resistor)
  - Percent error
  - Voltage/Current divider
  - Reduction of series/parallel resistors
  - Thevenin/Norton equivalents
  - Source transformation

- **Chapter 2: The Oscilloscope and Transient Analysis**
  - RC circuit analysis
  - Electrical representation of the probe
  - Probe effects on a circuit
  - Effect of improper grounding on a circuit
  - RL circuit analysis
  - Relay analysis (ex: Find V_{CH2} in Fig 2-25 for V_t square wave between 0 and V_{pp}, and any R_3, R_4)
  - RLC circuit analysis

- **Chapter 3: AC Circuit Analysis**
  - Phasor analysis (converting between $X\angle\theta$ to $X\cos(\theta)+jX\sin(\theta)$ and back)
  - Impedance of R, L, and C
  - Finding real and complex currents and voltages using phasors
  - Drawing bode diagrams
  - Magnitude and phase calculations
  - Low-pass filter circuit and characteristics
  - High-pass filter circuit and characteristics

- **Chapter 4: Characteristics of Periodic Waveforms**
  - Power and energy of a circuit element
  - Fourier series representation of a signal
  - RMS and EFF voltage (similarly V_{AC} and V_{DC})
  - Power and energy of a sinusoidal wave
  - Parseval's Relation

- **Chapter 5: Circuits Containing Inductance**
  - Output impedance of a function generator
  - Terminal properties of inductors
  - Series resonance
  - Parallel resonance
  - Mutual inductance