

ELEC 105: Review for Final Exam

Spring, 2004

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The final exam is on Friday, May 7 at 8:00 AM in room DANA 238. The exam will be comprehensive, open book, and open notes. Please bring your lab notebook to the final exam and submit it when you hand in your exam.

The following is a list of important concepts from the course. Most of these items were used in both lecture and lab.

- Basic analog circuits with resistors
 - Concepts of charge, current, voltage
 - Kirchoff's Current Law, Kirchoff's Voltage Law, Power
 - Ohm's Law, series/parallel resistors, **voltage divider**
 - Application: Temperature measurement system with thermistor
 - Node-voltage method of circuit analysis
 - Maximum power transfer to a load
 - Thevenin model for real sources: Understand what the model is, and what is the practical effect of the internal resistance
- Capacitors
 - Physical understanding of capacitor (storing charge)
 - Voltage/current relations, series/parallel connections
 - **Time constant** for RC circuits: we used this recently for AM radio detector circuit
- Frequency selective filters
 - Filter types: low pass, high pass, band pass, and band stop filters
 - Concepts of impedance (like frequency-dependent resistance) and phasors
 - **Key idea:** Identify type of filter, using ideas of impedance and voltage divider
- Operational Amplifiers (Op Amps)
 - Buffer: what it is, why it is useful
 - Inverting amplifier and summing amplifier: recognize these basic building blocks in circuits; you will *not* be asked to analyze op amp circuits
 - Application: audio equalizer used in lab
- Digital logic
 - Logic circuit analysis and design
 - Stopwatch: understand how the chips worked and how the stopwatch worked, including reading the tables that describe each chip
 - Simple design: word description, truth table, logic expression (sum-of-products, K-map)
Example: Majority voting circuit in lab
- Diodes and transistors
 - Ideal rectifier and large-signal model for diode
 - Application: AM radio detector circuit
 - Basic operation of transistor