Exam 1 will have a written part (counting about 60% of the exam grade) and a practical part (counting about 40% of the exam grade).

Written part of exam 1: Closed book and notes, except that you may bring one 3"x5" index card (or equivalent) with anything you want written/printed on both sides (no magnifying aids allowed ☺). Expect about 5 short-answer questions and about 3 problems, similar to homework problems and questions.

Practical part of exam 1: You will be allowed to use your lab book. Expect me to ask you to build a circuit (similar but not necessarily exactly the same as one you've already built in lab) from scratch using a breadboard, measure various quantities using meters and/or oscilloscopes, interpret the results, and answer questions about how it works. This part will be scheduled individually.

Topics for exam 1:
- Ohm's law
- Power supplied/dissipated
- Voltage dividers (V_{in}, V_{out})
- Thévenin model: What does equivalent circuit look like? Determining values of R_{Th} and V_{Th}
- 10x rule
- Use of (how to connect) and characteristics of meters (V, A)
- Measuring input, output impedances of meters, voltage sources
- Use of and characteristics of oscilloscopes and function generators, how to make measurements of time and voltage on scope using just the grid and the scales; 10x probe for scope
- Charging and discharging capacitors; RC time constant. Equivalent responses of RL circuits
- Relationship between angular frequency (ω) and frequency (f) and period and tau
- Capacitors (C), inductors (L): frequency dependence of reactance (impedance)
- Phase relationships: ELI the ICE-man; phasor diagrams
- Impedances of series combinations of R, L, C
- Voltage amplitude, peak-to-peak, and rms relationships
- Filters (high-pass, low-pass, etc.): V_{in}/V_{out} vs. frequency; -3dB (breakpoint) frequency; limiting phases.
- RC integrators, differentiators; outputs for given inputs; conditions under which they work