ECE110: Semester Overview

There are 13 weekly laboratory meetings during each Semester of ECE110. The first lab meets for Experiment 1 the first full week of classes (this semester, the week starting January 25th). The final lab meets to demo projects during the last full week of class (this semester, the week ending April 29th).

At each laboratory meeting, you will join your classmates in the small lecture room (1005 ECEB) adjacent to the ECE110 lab for instruction. A pre-lab exercise must be completed before coming to lab.

The first nine laboratory exercises are highly-structured, cookbook-style labs where you are strongly guided by the procedure and explicit questions. These core labs are augmented with Learn More! Laboratory Modules which extend your understanding of the material and/or provide timely resources for moving forward to future labs. Some of these modules will be explicitly required (you must do them during the course of the semester) and others are optional. You will be required to earn at least 40 points (tentative...TAs will confirm if this value is correct) from these modules for full credit in the lab.

The tenth laboratory exercise is partially-guided. It serves as an introduction to design and will aid you when you begin to structure your own independent lab report for the final project.

The last four laboratory meetings are design-based where each lab group will design, build, and demonstrate an electronic device to accomplish a task provided by the lab instructor. In this “project-phase” of the course, you are required to utilize the skills developed in your earlier lab meetings to produce a written report.

While the focus of each individual lab appears to explore individual concepts in hardware, circuit theory, and the construction of an autonomous vehicle, the complete set of lab procedures are designed to help you build a skill set in engineering exploration that will serve you well both in this class and throughout your engineering career.

A short, tentative breakdown of your semester laboratory exercises are provided in the table below.
Labs (Subject to Change):

1. A Lab Course Introduction
   - Build a robotic car, build a circuit, record data
2. DC Circuits and Tools
   - Benchtop hardware
3. Validating Kirchhoff’s Laws using a Breadboard
   - Simple measurements to affirm circuit laws
4. Time-Varying Circuits
   - PWM generation and tools to measure time-varying signals
5. The Oscillator Circuit
   - Building and testing of a time-varying circuit.
6. Motors and Batteries
   - Characterization of devices
7. Semiconductor Devices
   - First look at diode/BJT, Final Project Guidelines
8. Pulse Wave Modulation
   - Efficient motor drive, Project Brainstorming
9. Navigation
   - VDR feedback for control, Project Brainstorming
10. The Project Proposal (Due!)
    - Step-by-step proposal of the task
11. Proposal Review and Project Progression
    - Review comments, revise, and begin
12. Project Progression
    - Continue and finish
13. Project Presentations
    - Presentation by schedule and report due
A little about the Final Project

The key to doing well on the final project is to learn the mechanics of experimentation in electronics. The early labs will prepare you. You will need to be able to

- Characterize a sensor you have never seen before by collecting circuit data.
- Analyze your data using a graph and use that analysis to model its behavior.
- Show proficiency with the equipment used to collect/analyze data.
- Characterize an actuator, perhaps a motor or a loudspeaker.
- Analyze your data using a graph and use that analysis to model its behavior.
- Properly bias that sensor and utilize it in a broader design in a control loop to affect the output in a manner that completes a pre-defined task.
- Properly document your procedure, data, observations, summary and conclusions in a well-written report.