UC San Diego
Electrical and Computer Engineering
JACOBS SCHOOL OF ENGINEERING

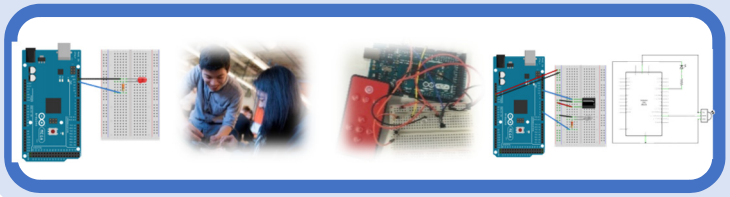
ECE 5 - Introduction to ECE for Freshmen
"Making, Breaking and Hacking Stuff"

Motivation | Analog Circuits | MATLAB | Control | Soldering | Function Generators | Op-Amps | Sensors | Arduino Microcontrollers | C Programming | Signal Processing | Oscilloscopes | Motors | 3D Printing | Confidence

Lab 1: Communication

Objective: Communicate using light by programming microcontrollers with sensors and LEDs

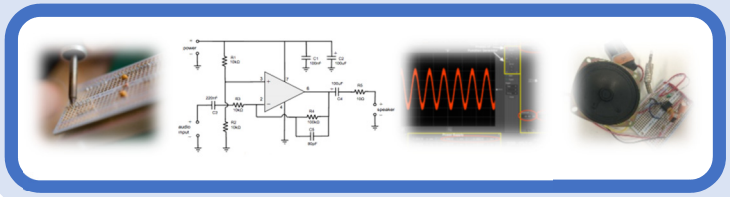
Skills Acquired: C programming, building circuits from diagrams, LEDs, infrared, Arduino microcontrollers



Lab 2: Analog Circuits

Objective: Create an audio amplifier with analog circuits understanding Time vs Frequency domains

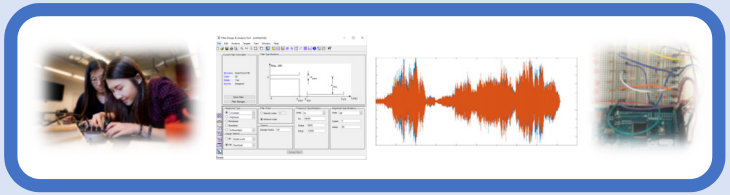
Skills Acquired: Soldering, power sources, function generators, oscilloscopes, RC circuits with op-amps



Lab 3: Digital Signal Processing

Objective: Digitally sample and filter audio signals extending signal processing techniques w/ computers

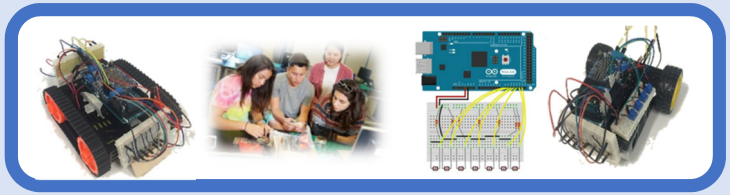
Skills Acquired: Matlab programming and tools, Fourier transforms, analog to digital conversion



Lab 4: Systems and Control

Objective: Build a line following robot using Arduino microcontrollers to implement PID control

Skills Acquired: Basic control theory, motor drivers, more C programming & soldering, sensors, DC motors



Workshops:

Intro to Arduino
C Programming
Eagle CAD
PCBing (extension of EagleCAD)
Virtual Bench (Power supply, O-scope, function generator)
Soldering
SolidWorks / MCAD
3D printing
Arduino + MATLAB GUI
Lasercutting
ECE Depths
Team Ethics (toward end of lab 4)