



Pasadena Unified School District

## JOHN MUIR HIGH SCHOOL

Engineering & Environmental Science Academy  
1905 Lincoln Ave. Pasadena CA 91103

**Project Name:** Printed Circuit Board Design & Manufacture

**Course Name:** Digital Electronics

**Grade Level:** 11<sup>th</sup>

**Time Required:** ~4 weeks (8 block periods)

- Day 1: 30 min lecture [PCB Intro to Design & Manf PPT](#)  
1 hr research time [PCB Research Assignment](#)
- Day 2: 30 min interactive tutorial [Ultiboard Software PPT](#)  
1 hr work time Ultiboard Assignment
- Day 3: 1 hr video/demonstration [PCB Fabrication](#)  
30 min overview of [PCB Fabrication Project](#)
- Day 4-6: Group & 1-on-1 assistance as needed
- Day 7-8: Class Presentations [Presentation Rubric](#)

### Summary:

This is to be the cumulating project of a student's 2<sup>nd</sup> semester in Digital Electronics. The final project of this unit is to design and fabricate a custom circuit from scratch, and to present the results to one's peers. Students shall reinforce the skills which they have learned throughout the year while also building an understanding of how printed circuit boards are designed and manufactured.

### Educational Standards:

Common Core standards for Engineering (TBD)

### Industry Skills Practiced:

- Reading Circuit Schematics
- Reading Material Safety Data Sheets
- Electrical Component Identification
- Multisim Circuit Design Software
- Ultiboard PCB Layout Software
- Using a Band Saw
- Using a Heat Transfer Machine
- Using an Etch Tank
- Using a Drill Press
- Using a Multimeter
- Electrical Soldering