

**MAS.500**  
**Hands on Foundations in Media Arts and Technology**  
**Electronics Module**

**Description:**

This class is a crash course in the basics of electronic circuit design, prototyping, and fabrication. Through lectures, lab work, and problem sets, students will gain a working knowledge of sensors, signal conditioning, digital electronics, microcontrollers (Arduino), debugging techniques, use of test equipment, and soldering.

**Units: 4**

Although this module is only 4 units, it is also only 1/3<sup>rd</sup> of a term, so the expected hours per week match a typical 12 unit course. These hours roughly break down to 4-4-4 (lecture, lab, problem sets).

**Schedule:** TR 10-12, E15-341

**Grading:**

The course is Pass/Fail. A passing grade is given for students who complete all assignments and have a satisfactory attendance record. There will be a lab and problem set due each week.

**Syllabus (lectures may be moved around to accommodate lab assignments):**

Lecture 1: Voltage, current, resistors, capacitors, Kirchoff's laws.

Lecture 2: Filters, Inductors, energy storage, diodes.

Lecture 3: Power supplies, voltage regulators, rectifiers.

Lecture 4: Peak detectors, sample and hold, zener diodes, LEDs, circuit protection.

Lecture 5: Op-amp circuits, biasing, gain.

Lecture 6: Resistive sensors, capacitive sensors, digital sensors, high power and motor driving.

Lecture 7: Communication protocols, modulation, demodulation, RF.

Lecture 8: Microcontrollers, digital, and Arduino programming.

Lecture 9: Soldering techniques.