

# Electrical and Computer Engineering 1 Curriculum Map

Course Book: *SparkFun Inventor's Kit Version 4.0a (2017)*, SparkFun Electronics, Inc.

TOPICS	Duration	Month(s)
<b>Unit 1: Electrical Fundamentals</b> Voltage, Current, Resistance, Schematic Symbols, Electrical Safety, Resistors, Resistor Color Code, Voltage, Ohm's Law, Voltmeter, Ammeter, Ohmmeter, Breadboards, Series Circuits, Parallel Circuits, Kirchoff's Current and Voltage Laws, Equivalent Resistance	3 wks	Jan
<b>Unit 2: Useful Electronic Components and Tools</b> LEDs, Computing Resistor Value for an LED, Capacitors, Transistors, Integrated Circuits, Polarity, Simple Soldering	3 wks	Jan-Feb
<b>Unit 3: Microcontrollers: Light and Sound</b> <u>Electrical Components:</u> Microcontrollers, Arduino, Potentiometer, RGB LED, Photoresistor, Buzzer, Push Button <u>Concepts:</u> Analog vs. Digital, Digital Output, Digital Input, Analog Input, Analog Output, Voltage Divider, Analog to Digital Conversion, Pulse Width Modulation, Binary, Pull-Up Resistor, For Loops, Measuring Elapsed Time, Functions <u>Software:</u> Comments, Program Structure, Setup and Loop Functions, Variables and Types, Output Pin Mode, Input Pin Mode, Digital Write, Analog Write, Delay, For Loops, Serial Communications to the PC, Arithmetic Operators, Logical Operators, If-Else Statements, Defining and Calling Functions, Tone Function, Arrays, Digital Read, Elapsed Time (millis), Int Variables, Boolean Variables	4 wks	Feb-Mar
<b>Unit 4: Microcontrollers: Motion and Displays</b> <u>Hardware:</u> Servo Motor, Ultrasonic Distance Sensor, Liquid Crystal Display (LCD), Temperature Sensor, Battery Holder, Motor Driver, Switch, DC Gearmotor, Wheel <u>Concepts:</u> PWM Duty Cycle, Arduino Libraries, Objects and Methods, Digital Sensors, Datasheets, Servo Mechanisms, Range Mapping, Contrast, Button Debounce, Input Voltage, Autonomous Vehicles <u>Software:</u> Including Libraries, Using the Servo Library, Range Mapping, Float Variables, NoTone Function, Constants, Strings, Using the LCD Library, Rounding Function, Random Function, Array of Strings, ASCII Characters	4 wks	Mar-Apr
<b>Unit 5: Creative Design Project</b> Design a holiday decoration, an animated toy, or another device which uses lights, sensors, and motion. <u>Documentation:</u> Fritzing Tool for Simple Circuit Diagrams and Schematics, Bill of Materials	3 wks	May

