Electrical and Computer Engineering 1 Curriculum Map

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

TOPICS	Duration	Fall	Spring
Unit 1: Electrical Fundamentals 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	Aug-Sept	Jan
Unit 2: Useful Electronic Components and Tools LEDs, Computing Resistor Value for an LED, Capacitors, Transistors, Integrated Circuits, Polarity, Simple Soldering	3 wks	Sept	Jan-Feb
Unit 3: Microcontrollers: Light, Sound, and Movement Electrical Components: Microcontrollers, Arduino, Potentiometer, RGB LED, Photoresistor, Buzzer, Push Button, Servo Motor, Ultrasonic Distance Sensor, Liquid Crystal Display (LCD), Battery Holder, Motor Driver, Switch, DC Gearmotor, Wheel Concepts: 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, PWM Duty Cycle, Arduino Libraries, Objects and Methods, Digital Sensors, Datasheets, Servo Mechanisms, Range Mapping, Contrast Software: 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, Including Libraries, Using the Servo Library, Range Mapping, Float Variables, NoTone Function, Constants, Strings, Using the LCD Library, Rounding Function	5 wks	Oct	Feb-Mar
Unit 4: Creative Design Project Design a holiday decoration, an animated toy, or another device which uses lights, sensors, and motion. Concepts: Engineering Design Process, Planning and Sketching, Implementing a Project in Phases, Wiring Options, Reliability Documentation: Fritzing or Tinkercad Tool for Simple Circuit Diagrams and Schematics, Bill of Materials, Citing Sources	3-7 wks	Nov-Dec	Apr-May





