Arduino Workshop Handout

Microcontroller – uses an ATmega328 microprocessor, programmable

Uses free Integrated Development Environment (IDE) software (C, C++ based)

Senses input from switches, sensors, potentiometers, and detectors (digital and analog)

Controls low power output devices like LEDs, LCDs, servos, actuators and DC motors (with motor driver board) (< 40 mA per output, 200 mA total)

Semester based course

Lectures (1-hour or less per week)

Laboratories (2-hour blocks or more preferred)

Use SparkFun Inventor's Kit with case

Manufacturer's Product Number: KIT-21301 (Previously KIT-15267)

Digi-Key#: 1568-KIT-15631-ND (Previously 1568-KIT-15267-ND)

Description: Inventor's Kit V4.1.2 (Previously V4.1)

Includes a guidebook with 16 laboratory activities plus challenge labs

Includes a carrying case, redboard, breadboard, power cable, components, devices, wires, and a screwdriver (Does not include 4 AA batteries)

Free downloadable code for labs available at: https://www.sparkfun.com/SIKcode

Best practices and helpful hints:
Install the redboard and breadboard on the base plate as follows:
- Sparkfun Electronics logo is at the bottom of the base plate
- Redboard power connections are at the top
- Breadboard letters (a-j) are right side up and readable

Be aware of ESD (Electrostatic Discharge) when handling components

Power off while building and wiring circuits (Unplug USB)

Never connect the battery power and USB power at the same time

Troubleshooting procedures
- Double check power source
- Double check wiring connections and component polarity

Arduino code
- Instructions described in SIK (Code to Note)
- Include comments while coding (notes describing code operation)
- Close any sketches not in use (reduces confusion)
- Modify code for different operations
- Upload to redboard (GUI arrow to right)

Discuss online sketches and examples

Demonstrate laboratory activities
Basic
Advanced (modified)

SIK guidebook examples
1 – Contents and Projects: Light, Sound, Motion, Display, Robot
2 – Redboard Platform
3 – Baseplate assembly
4 – Anatomy of the SparkFun RedBoard
5 – Anatomy of the Breadboard
6 – Install Arduino IDE (Integrated Development Environment) & USB Drivers
7 – Install SIK code and code examples
8 – GUI (Graphical User Interface)
9 – Select board and serial device port
10 – Inventory of Parts
12-14 – Project 1A BLINK
15 – Hookup Guide & Connections
16 – Upload code
17-19 – Code to Note, New Ideas, Coding Challenges, and Troubleshooting