

Course Advancement Exam - Honors Engineering/Robotics Assessment Skills

1. Students must be able to effectively explain proper soldering techniques and terminology including but not limited to:
 - a. Solder
 - b. Soldering iron
 - c. Flux
 - d. Prewarming components
 - e. Heat sink
 - f. Tinning
 - g. bridging / shorting
 - h. Safety
2. Students must be able to effectively explain Electrical / electronic components and terminology including but not limited to:
 - a. Resistors
 - b. Resistor selection & color code
 - c. Diodes
 - i. Anode, cathode
 - d. LEDs
 - i. Anode, Cathode
 - e. Capacitors
 - i. Anode, Cathode
 - f. Transistors
 - i. Collector, emitter, base
 - g. Switches (multiple types)
 - i. On/off, Single pole, 3way, double pole/double throw
 - h. Motors
 - i. Lights
 - j. Batteries
 - k. SCR (Silicon controlled rectifier)
3. Students must be able to effectively explain proper Breadboarding techniques and terminology including but not limited to:
 - a. Battery placement
 - b. Component placement
 - c. Bridged lines on the breadboard
 - d. Electrical opens or breaks on a breadboard
 - e. Shorting a component or circuit
4. Students must be able to effectively explain Electrical design (schematics) and terminology including but not limited to:
 - a. Component symbols & use
 - b. Series

- c. Parallel
 - d. Bridge / Short
 - e. Open circuit
 - f. Overlapping lines (connecte / not connected)
5. Students must be able to effectively explain Physical Design and terminology including but not limited to:
- a. Sketching
 - b. Design process
 - c. Measurement (English standard & metric)
6. Students must be able to effectively explain Prototyping and terminology including but not limited to:
- a. Tool usage & identification
 - i. Screw drivers
 - ii. Allen Keys
 - iii. Wrenches
 - iv. Pliers
 - v. Multimeter
 - b. Schematic and design reading
7. Students must be able to effectively explain OHM's and Watt's Law and terminology including but not limited to:
- a. Formulas
 - b. Series circuits
 - c. Parallel circuits
 - d. Series parallel circuits
 - e. Amps, current
 - f. Voltage
 - g. Watts, Power
 - h. Ohms, Resistance