Pop Up Class – Electronic Measurement Techniques

1. Class Overview
   - Description
     This class will review the electronic measurement tools and techniques that are available in the EIC. Measurements include voltage, current, resistance, analog signals, digital signals, and frequency.
   - Prerequisites
     None
   - Anticipated Class Size – 20 max
   - Class Duration – 1 ½ hours
   - Material Needed
     - 10 Multi-meters
     - 10 Function Generator/Power Supply/Oscilloscope measurement modules
     - Hook up leads for measurement modules
     - 10 Breadboards
     - 10 each
       - 1K ohm resister
       - 5K ohm resister
       - 10k ohm resister
       - 50k ohm resister
     - Breadboard wire for hookup

2. Safety
   - Proper safety processes must be described and followed for connecting equipment, placing probes onto desired measurement points, and insuring safety of others in the immediate area.

3. Educational Objectives
   - Students will be able to:
     - Identify the electronic measurement tools available in the EIC and describe what parameter each is used to measure.
     - Perform the needed steps to set up and take electronic measurement to document the parameters desired.

4. Class Format
   - Pre-Class activity
     i. None
In-Class activity

i. Use of a Multi-meter
   1. Voltage measurement at a source
   2. Build a simple resistance circuit to test source voltage and voltage drop across a resistor.
   3. Use the circuit to measure current through the circuit.
   4. Measure resistance of various resistors. Describe the difference between a short, an open, and a resistance measurement

ii. Use of a variable power supply
   1. Set up a variable power supply
   2. Measure voltage as the power supply settings are changed

iii. Function Generator
   1. Develop familiarity with a function generator and its usage.

iv. Oscilloscope usage
   1. Measurement of various waveforms from a Function generator. Also include dc bias and amplitude.
   2. Describe trigger settings
   3. Identify limitations of scope specific characteristics

v. Describe a Digital Analyzer
   1. What it is
   2. How it is used
   3. What it measures

vi. Describe a Spectrum Analyzer
   1. What it is
   2. How it is used
   3. What it measures

vii. Assessment
   1. Take the following measurements
      a. Voltage
      b. Current
      c. Resistance
      d. Analog waveforms
      e. Digital waveforms

5. Evaluation
   o Students fill out an evaluation on the content, learning objectives, and instructor.