Pop Up Class – Microcontroller I

1. Class Overview
   o Description
     This class will introduce the fundamentals of microcontrollers, give a brief overview of Integrated Development Environment (IDE), and provide practical hands-on experience in designing simple GPIO (General Purpose Input/Output) control circuits and debugging code in the IDE.

   o Prerequisites
     None

   o Anticipated Class Size – 20 max

   o Class Duration – 1 ½ hours

   o Material Needed
      10 TI-MSP430 Launchpad (MSP430G2553)
      10 Breadboards
      10 each
       • 470 ohm resister
       • Tri-color RGB (Red-Green-Blue) LED
      Breadboard wire and jumper wire for hookup

2. Safety
   o 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
   o Students will be able to:
      Gain a basic knowledge of TI MSP430 microcontrollers.
      Create and manage designs by using the TI CCS (Code Composer Studio) integrated development environment.

4. Class Format
   o Pre-Class activity
     i. None
o **In-Class activity**
  i. What is inside the microcontroller?
     1. Memory RAM, ROM, EEPROM, Flash, etc.
     2. CPU
     3. Oscillator and Timers
     4. GPIO
     5. Analog-to- Digital Converter
     6. Serial Communication
     7. Others
  ii. Introduction to TI IDE- Code Composer Studio
      1. Creating a project
      2. Building and Loading the project
  iii. GPIO Controlling Tri-color LED Circuit Design
      1. Voltage, Current, Resistance, and Ohm’s Law
      2. LEDs and Tri-color RGB LEDs
      3. Connecting to a Breadboard (hardware design)
  iv. Blinking a Tri-color RGB LED
      1. Input the code in CCS (programming)
      2. Debugging the code

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