University of Moratuwa, Sri Lanka

B.Sc. Engineering Degree Course

Semester 4

EE2043 — Electrical Measurements and Instrumentation

Mini Project Brief

Design a LabVIEW-controlled instrumentation system using a National Instruments DAQ card, integrating at least three sensors and two actuators to autonomously regulate environmental conditions. The LabVIEW program interfaces with the DAQ card to collect sensor data, analyze it, and send control signals to the actuators for adjustments. Additionally, the system should includes control over a programmable DC power supply through LabVIEW, enabling precise power adjustments to control an LED light intensity in three steps for every minute.

Instructions:

1. Identify a task or problem that can be resolved with the use of sensors and actuators. For example:
   - Constructing a basic robot capable of circumnavigating barriers through ultrasonic sensors.
   - Creating a system that regulates temperature and humidity in a small greenhouse using temperature and humidity sensors and heating and cooling actuators.

     Developing a security system that detects intruders through motion sensors and a camera, then triggers an alarm.

2. Research and comprehend how sensors and actuators work and how they can be integrated into your system. Out of the three sensors you select I highly recommend to build a sensor by your own including the signal conditioning circuit.

3. Sketch a workflow diagram for your Arduino Uno that will control your sensors and actuators using LabVIEW. Verify that the diagram is working correctly by testing it with the Arduino Simulator in LabVIEW.

4. Put together your system and assess its performance parameters to ensure that it is working as expected.

5. Present your project to the class, describing how your system operates, and demonstrating its functionality.

Note: Please do not hesitate to contact me, if you have any questions.