**Round 1**

**Experiment Electrical Measurements and Instrumentation Lab**

| **Discipline** | **Electrical Engineering/ Electrical and Electronics Engg.** |
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| **Lab** | **Electrical Measurements and Instrumentation Lab** |
| **Experiment** | **Measuring Pressure Using Piezoelectric Pick up.** |

**1.Focus Area : Instrumentation and Practical Skills**

By this experiment we want students to understand the connections of piezoelectric transducer and how it is measuring pressure applied at its input then how it passed to instrumentation differential amplifier to produced the output in the form of electrical signals.

**2.Learning Objectives and Cognitive Level**

**Description:**

There will be a tentative circuit diagram shown in the theory part of the experiment. There will be block diagram of different instruments provided in the simulation and the same will be required to be connected as per the circuit diagram shown in the theoretical part by student while performing the experiment. After completing the circuit diagram students will apply the Known pressure and calibrate the voltmeter accordingly with the help of amplifier gain control. Once the pressure transducer is calibrated then it shows the different value of applied pressure in the form of voltages in digital meter/ analog meter.

**Method:**

To achieve attainment of all the objectives the experiment is designed for different sets of input values of pressure so that students can learn through performing.

| **Sr. No** | **Learning Objective** | **Cognitive Level** | **Action Verb** |
| --- | --- | --- | --- |
| 1. | User will be able to:  Understand the connection of piezoelectric transducer. | Understand | [Describe](http://vlabs.iitb.ac.in/vlabs-dev/document.php) |
| 2. | User will be able to:  Calibrate the digital voltmeter to display the applied pressure with the help of amplifier gain control. | Evaluate | Select |
| 3. | User will be able to: Measure the applied pressure with the help of piezoelectric transducer. | Understand | [Describe](http://vlabs.iitb.ac.in/vlabs-dev/document.php) |

**3.Instructional Strategy**

Name of Instructional Strategy : Expository

Assessment Method: Formative assessment

**Description:**

Step by step instructions are provided at each level in the simulator to make it more user friendly.

**Scope:**

Various runs of the same experiment are possible by changing the different input values of pressure.

**4.Task & Assessment Questions:**

Read the theory and comprehend the concepts related to the experiment. (LO1, LO2, LO3)

| **Sr. No** | **Learning Objective** | **Task to be performed by the student in the simulator** | **Assessment Questions as per LO & Task** |
| --- | --- | --- | --- |
| 1. | Understand the connection of piezoelectric transducer. | Students will make connections in the simulator. | 1.How many terminal are present in the piezoelectric transducer?  A. one  **B. two**  C. six  D. five |
| 2. | Calibrate the digital voltmeter to display the applied pressure with the help of amplifier gain control. | Student will calibrate the digital voltmeter with the help of amplifier gain control. | 1.At what value of amplifier gain control the voltmeter is calibrated in this experiment?  A. 20  B. 30  **C. 40**  D. 50 |
| 3. | Measure the applied pressure with the help of piezoelectric transducer. | By selecting the various pressure inputs corresponding value is shown at the digital voltmeter. | 1.What is the unit of pressure observed in this experiment?  **A. PSI**  B. Bar  C. Atm  D. pascal |

**5.Simulator Interactions:**

| **Sr.No** | **What Students will do?** | **What Simulator will do?** | **Purpose of the task** |
| --- | --- | --- | --- |
| 1. | Student click on the simulation tab. | Simulator screen of the experiment will open up. | To open the screen for performing the experiment. |
| 2. | Draw the circuit diagram according to the circuit provided in the theoretical part by using the different blocks of instrument. | Circuit is drawn accordingly in the simulator and input switch to apply the pressure is activated. | Circuit diagram is formed for which student have to provide input to calculate the pressure in terms of voltage. |
| 3. | Then student will select the various input pressure values. | According to the selected input output is shown on the digital voltmeter. | To calculate the pressure by using the pressure transducer. |
| 4. | Now the student will set the amplifier gain control in such a way that the output displayed is same as the input value. | Gain control knob is shown and selected and output value on the digital meter is displayed accordingly. | Exact value of input pressure is shown as output in the digital meter. |
| 5. | Then again student will select the various input pressure values. | Digital Voltmeter will show the voltage numerically equal to the selected input pressure. | To calculate the pressure by using the pressure transducer. |

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