Instrumentation and Control Laboratory
Objective

This laboratory is used to give an understanding of Measuring Instruments and Control System concepts to the students of Mechanical Departments.

Courses that avail the facilities offered by the lab:

Undergraduate Courses:

✓ Measurement & Instrumentation

✓ Control Engineering

Laboratory Group

Lab Director: Muhammad Moeen Sultan  
Lecturer

Coordinating Staff: Muhammad Sajid Naushad  
Lab Assistant
Description of Lab Equipment

Sensors and Transducers Modular System, Base Unit (BSPC)

This equipment works as signal conditioner. It contains different type of Amplifiers, Signal converter circuits, Comparators, Generators, Oscillators, Filters, Integrator, Differentiator, Pulse generator, PID control, Current Generator, Potentiometers, 12V DC source, 5V DC source and a variable DC and AC Source.

Vibration AND/OR deformation Test Module (BS-1)

With this system it is possible to carry out practices related to physical phenomena like vibration and object or surface movement. In this case the BS-1 system is made up of a vibrant girder that can change the vibration state in a manual way. Grinder displacement is measured by LVDT.
**Temperature Test Module (BS-2)**

The temperature control test bench has been thought to teach the use and applications of sensors of temperature as a measure, and its control. This test module is designed to be used with the main module (BSPC), nevertheless it can be used independently. This test module enables us to see not only the different temperature measure techniques but also control techniques of temperatures used in domestic and industrial environments.

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**Pressure Test Module (BS-3)**

The pressure sensor testing bench has been designed to teach the use and applications of pressure measurement systems. The pressure sensor testing bench shows the different pressure measurement technique. By studying the different sensors it is possible to compare how they work and to determine their strengths and weakness.
**Flow Test Module (BS-4)**

The BS-4 testing bench for flow volume measurement is part of the modular system of EDIBON to teach the use and application of transducers, measurement systems and signal processing techniques. The objective of this apparatus is to show techniques to measure changeable fluids.

**Oven Test Module (BS-5)**

This testing module was designed to be used with the main module. With this equipment it is possible to see temperature measurement techniques using several kinds of sensors placed inside the sealed place that is used as oven. BS-5 system is basically made up of an oven that contains a changeable speed circular fan that enables to modify the oven time constant. The heating element that the oven has can be manually controlled or work through a triac which can be regulated with a PID.
**Liquid Level Test Module (BS-6)**

The liquid level test module is designed to teach the use and applications of level sensors and their measurement systems. This module enables to carry out different practices related with the level control of tank liquids. The unit has 6 different types of liquid level sensors: capacitive, optical, magnetic, by condition, by pressure and fixed float with end and beginning switches.

**Tachometer Test Module (BS-7)**

The tachometer testing module is designed to teach linear and angular speed measurement techniques. All the connections of the different transducers and of the motor will have an outlet through a group of 2mm terminals. These are place on the front part of the testing module with a drawing representing their functions.
Transducers And Instrumentation Trainer (SAIT)

The SAIT Trainer is designed to show most of the devices used in the industry that allow the electronic systems to communicate with the real world, to measure physical variables and to control industrial processes. It is a trainer with a logical distribution of its components that facilitates the rapid comprehension of the elements that form it, all housed in a solid robust with the power supply incorporated. It contains input transducers, output transducers and signal conditioning circuits.

PLC Trainer (PLCE)

The PLCE is designed to teach how PLC trainer works and explain PLC programming from both specific and general point of views. PLCE interface is constituted by several 12V sources that we may activate through switches, 8 lever type and 8 button type switches with their corresponding led that indicate the ON/OFF state of the source, and a screen touch screen, 15 digital inputs, 13 digital outputs, 8 analogue inputs, 4 analogue outputs, an ON / OFF switch and several mass connections (GND), which are intertwined.
**Industrial Servo System Trainer (SERIN/CA)**

The SERIN/CA trainer consists of an Control Interface Box connected to a three-phase motor and to a computer (PC). The control interface has a resolver for three-phase motors that controls the speed, position and current of the motor. The PC 830 has six digital inputs, three digital outputs, and an output relay that are available, so users will be able to connect to the interface external devices such as: proximity switches, PLC, LED.

**Process Control Unit (UCP)**

The process unit used for the measurement of level, flow, temperature and pH regulation, together with the different equipment and necessary instruments for the physical simulation of the corresponding dynamic systems.
Pneumatics, Hydraulic & Electro-Pneumatic Trainers

The aluminum framed storage case with component mounting panes, screen printed with all relevant symbols. It is capable of providing fast, simple and effective education about the pneumatic/Hydraulic/electro pneumatic control of possesses. Allow the students to teach the use of a variety of devices to build circuits that allow the student to use valves for control/operation of the devices.