

COURSE CONTENT

INSTRUMENTATION AND CONTROL SYSTEMS LAB								
IV Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
2540379	Foundation	L	T	P	C	CIA	SEE	Total
		0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45			Total Classes: 45			
Prerequisites: There are no prerequisites to take this course.								

Course Overview:

Provides hands-on experience with sensors, transducers, signal conditioning, data acquisition, and control systems, enabling measurement, analysis, calibration, and implementation of practical instrumentation and control techniques in engineering applications

Course Objectives:

- Impart an adequate knowledge and expertise to calibrate instruments available in an Industry.
- Impart knowledge on various working principles and design of Instruments.
- Understand calibration of measuring instruments for temperature.
- Understand the functioning of strain gauges for measuring pressure, load and vibrations.
- Apply calibration of measuring instruments of flow and speed measurement.

COURSE OUTCOMES: After completion of the course the student is able to

- Analyse errors, integrate and interpret different types of measurements (L3)
- Understand how physical quantities are measured and how they are converted to electrical or other forms. (L2)
- Evaluate the measurement of speed in engineering applications and importance of speed measurement in instrumentation (L4).
- Visualize the areas affected with pressure in equipment and calibrate the pressure measuring devices (L3).
- Comprehend the level of liquid in any container and the various applications of measurement of flow (L4)
- Able to analyse Instrumentation and Control systems and their applications of various industries(L4)

LIST OF EXPERIMENTS (A minimum of 10 experiments to be conducted)

1. Calibration of pressure gauges
2. Calibration of transducer for temperature measurements
3. Study and calibration of LVDT transducer for displacement measurements
4. Calibration of strain gauge
5. Calibration of thermocouple for temperature measurements
6. Calibration of capacitive transducer for angular displacement
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.

8. Calibration of resistance temperature detector for temperature measurements
9. Study and calibration of Rota meter for flow measurement
10. Study and use of a Seismic pick up for the measurement of vibration
11. Study and calibration of McLeod gauge for low pressure
12. Measurement And Control Of Temperature Loop of A Process Using Resistance Temperature Detector With SCADA

Electronic Resources:

1. <https://vlabs.iitkgp.ac.in/ctrl/index.html> — Virtual Control & Instrumentation Lab (IIT Kharagpur)

Materials Online:

1. Lab Manuals