

BHUBANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

Lesson Plan of Industrial Measurement and Instrumentation-I

By

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Academic Year -2023-24(Summer)

Discipline: Applied Electronics & Instrumentation		Semester : 4 th	Name of the teaching faculty: Sidharth Sekhar Mallick
Subject: Industrial Measurement & Instrumentation-I		No. of Days/per week class allotted: <u>05 periods/per week</u> (TUE,WED, SAT:- 1 Period each& FRI:- 02 Period)	Semester From Date:- 16-01-2024 To Date:-26-04-2024 No. of weeks: 15 weeks
Week	Class Day	Theory Topics	
1 st	16/01/2024 17/01/2024	Introduction, syllabus discussion and Previous year question discussion Unit-1MEASUREMENT OF TEMPERATURE 1.1 Classify methods of temperature measurements 1.2 Explain measurement of temperature by non-electrical methods. A. Liquid expansion type B. Solid expansion type. , Continuing.... C. Gas & Vapour expansion type.	
	19/01/2024	1.3 Explain measurement of temperature by electrical methods of measurement. A. Resistance thermometer i. State advantage of resistance thermometers are other types. ii. Describe the method of measurement of change in resistance by null balance bridge method.	
	20/01/2024		
2 nd	24/01/2024 27/01/2024	iii. Compensation of lead resistance by 3-wire & 4-wire method. B. Thermocouples. i. Explain principle of thermoelectricity (See back, Peltier, Thompson effects). Continuing...	
3 rd	30/01/2024 31/01/2024	ii. Classify thermocouples materials. iii. Describe the function of thermocouple extension wires. iv. Describe the methods of measurement of output of thermocouples state the types of thermocouples insulation materials & their function.	

	02/02/2024	v. State the advantages & disadvantages of thermocouples types thermometer.
	02/02/2024	vi. Explain the cold junction compensation of thermocouple.
	03/02/2024	C. Thermistors. i. Explain the basic principle & characteristics of thermistors.
4 th	06/02/2024	ii. State the method of temperature measurement by thermistors & their uses.
	07/02/2024	D. Pyrometers. i. Explain the principle & operation of radiation & optical pyrometer with suitable diagram.
	09/02/2024	E. Describe the function & use of temperature switch.
	09/02/2024	Unit-2 MEASUREMENT OF PRESSURE 2.1 Classify methods of pressure measurement. 2.2 Explain the working principle & use of mechanical methods of measurements of pressure by: i. manometers (U-tube, Well Type, Inclined type), Continuing...
	10/02/2024	ii. Elastic type pressure gauge (Bourdon tube, Diaphragm, Bellows)
5 th	13/02/2024	iii. Bell gauge
	16/02/2024	2.3 Explain the working principles & use of electrical methods of measurement of pressure by: i. Strain gauge pressure transducer ii. Capacitive pressure transducer, Continuing...
	16/02/2024	iii. Reluctance pressure transducer
	17/02/2024	iv. Piezoelectric pressure transducer
6 th	20/02/2024	2.4 Describe the operation and Explain the working principle of vacuum gauge
	21/02/2024	i. Thermal conductivity Gauge ii. McLeod gauge, Continuing...
	21/02/2024	iii. Hot filament ionization vacuum gauge
	23/02/2024	2.5 Explain the working principle of mechanical & pneumatic pressure transmitter, Pressure Switch (Two wire and four wire type of transmitter) and State their uses.

	23/02/2024	Revision on Chapter 1 & 2
	24/02/2024	Class Test-1
	27/02/2024	Unit-3 MEASUREMENT OF FLOW AND LEVEL
7 th	28 /02/2024	3.1 Classify flow meters and explain the principle of operation with diagram.
	01/03/2024	3.2 Variable head type flow meter:
	01/03/2024	Explain the principle of operation, advantages & disadvantages of
	02/03/2024	i. Orifice plate, ii. Venturi tube, Continuing...
	01/03/2024	iii. Nozzles, iv. Dall tube, v. Elbow Taps
	02/03/2024	3.3 Explain variable area flow meter (Rota meter), Cylinder & Piston type & their uses.
8 th	06/03/2024	3.4 Explain Non-hydraulic meter and State their industrial uses.
	09/03/2024	i. Magnetic flow meter
		ii. Ultrasonic flow meter
		3.5 Describe the construction and explain working principle of thermal flow meter.
		3.6 Describe the construction and explain principle of Quantity flow meter.
9 th	12/03/2024	i. Positive displacement type
	13/03/2024	ii. Reciprocating piston type
	15/03/2024	3.7 Level Measurement
		i. Classify level indication
	15/03/2024	ii. Explain the working of sight glass, float type of indicator and displacement level detector. Continuing...
		iv. Explain the working of capacitive level detector and radiation level detector
	16/03/2024	v. State and explain the function of different types of level switches.
		Unit -4 MEASUREMENT OF FORCE, TORQUE & SHAFT POWER
		4.1 Define force, torque and shaft power.
	19/03/2024	4.2 Explain basic method of measurement of force.
10 th	20/03/2024	4.3 State & Explain equal and non-equal arm balance.
	22/03/2024	4.4 Explain multiple level systems of force measurement.
	21/03/2024	4.5 Explain Hydraulic and Pneumatic load cell.
	23/03/2024	4.6 Explain methods of measurement of torque using strain sensor and magnetostriuctive torque- transducer.
		4.7 Explain measurement of shaft power using rope break and prony brake.
11 th	27/03/2024	Revision on chapter-3 & 4
	30/03/2024	Unit -5 TELEMETRY & VARIOUS CONVERTERS
12 th	02/04/2024	

		5.1 Define telemetry.
		5.2 General telemetry system.
	03/04/2024	Internal assessment
	05/04/2024	Internal assessment
	05/04/2024	5.3 Types of telemetry system.
	06/04/2024	5.4 Problems in telemetry system.
	09/04/2024	5.5 Pressure to current converter.
13 th	10/04/2024	5.6 Pressure to voltage converter.
	12/04/2024	Unit -6 Aquastic measurement :-
		6.1 Define Aquastic pressure.
	12/04/2024	6.2 Explain characteristic of sound pressure level & power level.
	13/04/2024	6.3 explain the function of typical sound system such as microphone.
14 th	16/04/2024	Revision on chapter- 5 & 6
	19/04/2024	2nd Internal Assessment
	19/04/2024	Revision and important question discussion on unit-1 & 2
	20/04/2024	Quiz test on chapter- 4,5 &6 and important question discussion
15 th	23/04/2024	Class Test-2
	24/04/2024	Revision and important question discussion on unit-1 & 2
	26/04/2024	Revision and important question discussion on unit-3 & 4
	26/04/2024	Revision and important question discussion on unit-5 & 6

