BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

Lesson Plan of Sidharth Sekhar Mallick, Lecturer AE&I

(Winter. 2021)

VISION & MISSION OF APPLIED ELECTRONICS & INSTRUMENTATION ENGINEERING DEPARTMENT

VISION OF THEDEPARTMENT:-

To produce efficient professional in applied electronics & instrumentation engineering and other allied area's with update technical knowledge to meet the challenges of society in relevant sector.

MISSION OF THE DEPARTMENT:-

- To provide the student competent in applied electronics and instrumentation engineering with societal, environmental and human values through quality education, training.
- Provide knowledge of basic science, applied mathematics, instrumentation technology and communicative skills to identify and solve problems related to Applied Electronics and Instrumentation engineering.
- To enable the students to acquire various parameter measurement and automatic control technology used for industrial automation and inculcate quality of leadership, mentorship &teamwork in collaboration with parents, alumni & industry.

PROGRAMME EDUCATIONAL OBJECTIVES:

- To provide students with a solid foundation in basic science, electrical, electronics, instrumentation and interdisciplinary subjects that is necessary to excel in professional career, entrepreneur in future and/or higher education.
- To prepare students to meet the needs and face the challenges of real life as well as industry automation and digitalization in terms of technical, economic and social feasibility.
- To inculcate professionalism, communication skills, attitudes, team work and to adapt to the current trends by engaging in lifelong learning.
- To utilize the technology in domestic, medical, industry and community for proper utilization of instrument for measurement & control.

Discipline: Applied Electronics & Instrumentation Engineering.	**Semester : 5TH**	**Name of the teaching faculty:** Sidharth Sekhar Mallick
Subject: Industrial Measurement & Instrumentation-II	No. of Days/per week class allotted: **04 periods/per week (MON ,WED , THU & FRI:- 1 Period each)**	Semester From Date:- 01-10-2021 To Date:- 08-01-2022 No. of weeks: 15 weeks
Week	**Class Day**	**Theory Topics**
1st	01/10/2021	Introduction, syllabus discussion and define the vision, mission, PEOS of the department
2nd	04/10/2021	**Chapter-1** Measurement of Stress and Strain 1.1 Define Stress and Strain. 1.2 Explain different types of sensor and Transducers to convert stress and strain converted electrical Voltage.
	06/10/2021	1.3 Define strain and classify strain gauge. 1.4 Explain theory of operation of Resistive strain Gauge.
	07/10/2021	1.5 Explain the concept multi-axial strain measurement by Rosette Gauge. 1.6 Selection criteria strain gauge material and bonding material Techniques.
	08/10/2021	1.7 Concept of semiconductor strain Gauge. 1.8 Strain Gauge auxiliary circuit (Wheatstone bridge method)
3rd	11/10/2021	Durga Puja Vacation
	12/10/2021	
	14/10/2021	
	15/10/2021	
4th	18/10/2021	
	19/10/2021	
	21/10/2021	1.9 Effect of change of temperature of strain gauge operation. 1.10 Explain the operation instrument for static and dynamic strain gauge measurement. 1.11 Give some application of strain gauge.
	22/10/2021	**Chapter-2**. Measurement of Distance and Velocity

		2.1 Define Velocity and Distance. 2.2 Potentiometric Displacement Transducer performance Characteristics.
5th	25/10/2021	2.3 Linear variable Differential Transducer (L.V.D.T) Performance , Characteristics and application. 2.4 Capacitive type Transducer and its signal conditioning circuit.
	27/10/2021	2.5 Piezo electronic crystal circuit equivalent capacitor piezo electric type displacement transducer
	28/10/2021	2.6 Measurement of velocity. 2.7 calibration Method of velocity (RMM measuring)
	29/10/2021	**Revision on Chapter 1 & 2**
6th	01/11/2021	**Class Test-1**
	03/11/2021	**Chapter-3** Measurement of Density and Viscosity 3.1 Define Viscosity and Density. 3.2 Explain different units viscosity and density.3.3 Explain different types density sensor and viscosity sensor.. 3.4 Explain the function of hygrometer and hydraulic head type densitometer and chain balance densitometer.
	05/11/2021	3.5 Explain the measurement of density of slurry type of fluid. 3.6 U Tube density gauge.
7th	08/11/2021	3.7 Radiation type densitometer. 3.8 Gas density detector
	10/11/2021	3.9 Electrometer magnetic suspension type gas densitometer 3.10 Orifice gas density meter
	11/11/2021	3.11 Measurement of specific gravity of glass. 3.12 Explain various method viscosity measurements. 3.13 Explain the function of osest ward apparatus.
	12/11/2021	3.14 Define Co-efficient of viscosity and explain different types viscosity co-efficient and Stroke's Law. 3.15 Distinguish between Newtonian and Non-Newtonian method. 3.16. Explain function two flow viscosity, Torque viscosity and side volt viscosity.
8th	15/11/2021	**Chapter-4** Measurement of Humidity and Moisture

		4.1 Define Moisture and Humidity. 4.2 Define absolute relative specific humidity and Dew point.
	17/11/2021	4.3 Classified difference types humidity measuring instrument (Hydrometer, Phychrometer).
	18/11/2021	4.4 Explain the function Humidity measurement by using Hair, Electrical type hygrometer (Resistive, capacitive and crystal Hygrometer) 4.5 Explain the difference type Phychrometer.
9th	22/11/2021	4.6 Define Dew point and Explain Dew point measurement Techniques 4.7 Distinguish between Humidity measurements.
	24/11/2021	4.8 Infrared Techniques Humidity measurement. 4.9 Explain conductive and dielectric type moisture meter.
	25/11/2021	**Revision on chapter-3 &4**
	26/11/2021	Chapter-5 PH value of different solution 5.1 Define PH value of solution and hydrogen Ion concentration. 5.2 Explain PH Scale.
10th	29/11/2021	5.3 Explain the different types of electrode (PH sensor Hydrogen electrode, Calomel electrode, Glass electrode for PH measurement).
	01/12/2021	5.4 Explain electrical Method PH measurement. 5.5 Explain PH measurement Techniques by using Glass electrode.
	02/12/2021	**Chapter-6** Speed and Acceleration 6.1 Different speed measurement process. 6.2 Explain the function various types Tachometer (Mechanical type, Electrical type).
	03/12/2021	**Internal assessment**
11th	06/12/2021	6.3 Explain the non-contact method speed measurement by using optical method such as Stroboscope.
	08/12/2021	6.4 Electrical type Tachometer Eddy current, Electro-generator type, Digital Tachometer, contact type Tachometer.
	09/12/2021	6.5 Mechanical type Tachometer –Centrifugal force type Tachometer, Revolution type and Resonance type.
	10/12/2021	6.6 Define Tachometer and distinguish between AC and DC

		Tachometer.
12th	13/12/2021	6.7 General purpose acceleration (Piezo electric and Strain Gauge type.).
	15/12/2021	**Revision on chapter- 5 & 6**
	16/12/2021	**Class Test-2**
	17/12/2021	**Chapter-7** Virtual Instrument 7.1 Introduction of VI and architecture. 7.2 Block diagram and front panel of VI
13th	20/12/2021	7.3 Explain Front panel different parameters of VI.
	22/12/2021	7.4 Explain array, structure and cluster. 7.5 Instrument drive.
	23/12/2021	**Chapter-8** Gas Analyzer 8.1 Explain the principal of Gas analyzer.
	24/12/2021	8.2 Describe the function of In-farad and oxygen gas. 8.3 Explain the measurement techniques gas constitutions by Thermal conductivity method
14th	27/12/2021	**Revision on chapter- 7 & 8**
	29/12/2021	**Class Test-3**
	30/12/2021	Quiz test on chapter- 1,2,3&4 and important question discussion
	31/12/2021	Quiz test on chapter- 5,6,7&8 and important question discussion
15th	03/01/2022	Revision and important question discussion on unit-1 & 2
	05/01/2022	Revision and important question discussion on unit-3 & 4
	06/01/2022	Revision and important question discussion on unit-5& 6
	07/01/2022	Revision and important question discussion on unit-7 & 8