BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

Lesson Plan of Sidharth Sekhar Mallick, Lecturer in AE&I

Academic Session- 2024-2025(Winter-2024)

(3rd Sem.)Elements of Instrumentation

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 :** 3rd		**Name of the teaching faculty:** Sidharth Sekhar Mallick
Subject: Elements of Instrumentation	No. of Days/per week class allotted: **04 periods/per week(MON ,TUE , THU & FRI:- 1 Period each)**		**Semester From Date**:- 01-07-2024 To Date:- 08-11-2024 **No. of weeks:** 18 weeks
Week	**Date**	**No. of period available**	**Theory Topics**
1st	01/07/2024	01	Introduction, syllabus discussion and define the vision, mission, PEOs of the department
	02/07/2024	01	**Chapter-1 Principles of measurement, units & standards**: 1.1 Calcification of measurement of process & measuring instrument 1.2 Basic block diagram of general instrument system
	03/07/2024	01	1.3 Selection criteria of measurement instrument 1.4 Performance characteristics of an instrument: A: Measurement characteristic.
	04/07/2024	01	B: electrical design characteristic. C: static performance characteristic.
	05/07/2024	01	D: dynamic performance characteristic. E: endearment characteristic.
	06/07/2024	01	G: reliable characteristic 1.6 Distinguish between fundamental & derived unit & also distinguish units & dimensions.
2nd	08/07/2024	01	1.7 Concept instrumental units. 1.8 Derived the relationship between electrostatic unit & electromagnetic unit.
	09/07/202	01	1.9 Concept of S.I system of units& its advantage & dis advantage. A: S.I. based units, B: supplementary units
	10/07/2024	01	C: derived units D: classification of standards: 1. absolute standard, 2. Secondary standard, 3. Inter laboratory standard.
	11/07/2024	01	**Revision chapter-1**
	12/07/2024	01	Quiz test on Chapter-1
	13/07/2024	01	**Chapter-2**. **SENSING ELEMENT** 2.1 Concept of sensor, Distinguish between sensor and Transducer.
3rd	15/07/2024	01	2.2 Classification of sensor on the basics of quantity its senses field where it used conversions Techniques.
	16/07/2024	01	2.3 Working principle of pneumatic &Hydraulic, Electronics optical and Biomedical sensor (pulse sensor, respiration sensor).

	18/07/2024	01	2.4 Function of elastic, pressure, mass, force, temperature, motion flow label density, vibration, speed & light sensor with neat sketch.
	19/07/2024	01	2.5 Concept of micro sensor & smart sensor
	20/07/2024	01	**Revision chapter-2**
4th	22/07/2024	01	**Class Test-1**
	23/07/2024	01	**Chapter-3 TRANSDUCER** 3.1 Fundamental concept & principle and characteristics of transducers.
	24/07/2024	01	3.2 Classification of transducer.
	25/07/2024	01	3.3 Distinguish between Active & passive type of Transducer.
	26/07/2024	01	3.4 Basic principles of voltage generating Analog, Piezo electric, Thermoelectric (RTD, Thermistor & thermocouple) optoelectronics & hall effect transducer.
	27/07/2024	01	3.4 Basic principles of voltage generating Analog, Piezo electric, Thermoelectric (RTD ,Thermistor & thermocouple) optoelectronics & hall effect transducer.
5th	29/07/2024	01	3.4 Basic principles of voltage generating Analog, Piezo electric, Thermoelectric (RTD ,Thermistor & thermocouple) optoelectronics & hall effect transducer.
	30/07/2024	01	3.5 Working of the different types of variable parameters, electrical analog type transducers (R, L, C Types & L.V.D.T).
	31/07/2024	01	3.5 Working of the different types of variable parameters, electrical analog type transducers (R, L, C Types & L.V.D.T).
	01/08/2024	01	3.6 Working of the frequency generating digital transducer & fiber optics transducer.
	02/08/2024	01	3.7 Introduction of Bio-medical transducers.
	03/08/2024	01	**Chapter-4 DATA ACQUISITION SYSTEM** 4.1 Analog DAQ system.
6th	05/08/2024	01	4.2 Digital DAQ System.
	06/08/2024	01	4.3 Advance digital DAQ System (Data logger & data logging), General purpose enter face Bus, (GPIP).
	07/08/2024	01	4.3 Advance digital DAQ System (Data logger & data logging), General purpose enter face Bus, (GPIP).
	08/08/2024	01	4.4 Single channel & multi- channel data acquisition system.
	09/08/2024	01	4.5 Application of DAQ system.
	10/08/2024	01	**Revision chapter- 3 & 4**
7th	12/08/2024	01	**Class Test-2**
	13/08/2024	01	**Chapter-5 TRANSMISSION METHOD** 5.1 Various types of transmission method such as (hydraulic, pneumatic, Electrical & electronics types of data transmission).
	14/08/2024	01	5.1 Various types of transmission method such as (hydraulic, pneumatic, Electrical & electronics types of data transmission).

	16/08/2024	01	5.2 Explain the basic function of force transmitter (Beam type & STACK).
	17/08/2024	01	5.3 Force balance transmitter.
8th	20/08/2024	01	5.4 Transmission channel & medium.
	21/08/2024	01	5.5 Distinguish between data transmitter & receiver
	22/08/2024	01	**Revision on Chapter -5**
	22/08/2024	01	**Important Semester question Discussion**
9th	27/08/2024	01	**Chapter-6 ELECTRICAL & ELECTRONICS INSTRUMENT** 6.1 Important characteristics of electrical indicating types & displaying types of instrument.
	29/08/2024	01	6.2 Classification of electrical measuring instrument.
	29/08/2024	01	6.3 Explain the function & construction of moving iron & moving coil types of indicating electrical Instrument.
10th	02/09/2024	01	6.3 Explain the function & construction of moving iron & moving coil types of indicating electrical Instrument.
	03/09/2024	01	6.4 PMMC instrument, Dynamometer instrument, induction type's instrument & electrostatic instrument (only function & construction).
	05/09/2024	01	6.5 Explain various types of instrument transformer (current& voltage transformer)
	05/09/2024	01	6.6 Explain the Galvanometer, ohmmeter, wattmeter.
11th	09/09/2024	01	6.7 Analog & digital types of multimeter (Basic principles & function only)
	10/09/2024	01	6.8 Basic block diagram of CRO &its function Different types of oscilloscope (Analog & Digital type) only introduction continues...
	12/09/2024	01	**Internal Assessment**
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12th	17/09/2024	01	6.8 Basic block diagram of CRO &its function Different types of oscilloscope (Analog & Digital type) only introduction.
	19/09/2024	01	6.9 Attenuator & sweep-generator.
	19/09/2024	01	6.10 Signal Generator (standard signal generator, Audio Generator function Generator) only function.
13th	23/09/2024	01	6.11 Frequency synthesize & spectrum analyzer (only principles & concept)
	24/09/2024	01	**Chapter-7 OPTICAL INSTRUMENT** 7.1 Working of the basic advantage of optical instruments.
	26/09/2024	01	7.2 Working of refractive meter, lux meter.
	26/09/2024	01	7.3 Define fiber optics, sensor, and Nano sensor.
14th	30/09/2024	01	7.4 Function of telescope & Microscope Photographic camera, refract meter & Lux meter (Basic principles & constructions).
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	03/10/2024	01	**Revision on Chapter -6 & 7**
	03/10/2024	01	**Chapter-8 BASIC ELEMENTS OF CONTROL SYSTEM** 8.1 Basic elements of a automatic closed loop feedback control system.

15th	14/10/2024	01	8.2 Various types such as, hydraulic, pneumatic, Electrical, electronics & Analog and digital) type controller.
	15/10/2024	01	8.2 Various types such as, hydraulic, pneumatic, Electrical, electronics & Analog and digital) type controller.
	17/10/2024	01	8.3 Basic introduction of microcontroller & PLC.
	17/10/2024	01	8.4 Basic principle of relay &various types of relays.
16th	21/10/2024	01	8.5 Control valves only, basic principles & types of control valves (plug valves, butterfly valves, sounder valves, solenoid types of valves.
	22/10/2024	01	8.5 Control valves only, basic principles & types of control valves (plug valves, butterfly valves, sounder valves, solenoid types of valves.
	24/10/2024	01	8.6 Introductions of various types of final control elements.
	24/10/2024	01	**Revision on Chapter -8**
17th	28/10/2024	01	**Class Test-3**
	29/10/2024	01	Quiz Test
18th	04/10/2024	01	Revision-1 & 2 and question discussion
	05/11/2024	01	Revision-3 & 4 and question discussion
	07/11/2024	01	Revision-5 & 6 and question discussion
	07/11/2024	01	Revision-7 & 8 and question discussion