INSTITUTE OF ENGINEERING AND MANAGEMENT

GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005

LESSON PLAN

Name of the Subject: **ELECTRONICS MEASUREMENT & INSTRUMENTATION**
Name of the Faculty: Subrat Prasad Rath
Semester: 3RD Semester **Branch:** ETC
Semester From: July to December **No. of Weeks:** 15 Weeks

Week	Day	Theory/ Practical Topics	Classes
1		**Unit 1 - Qualities of Measurement**	**5**
	1.	Discuss the Static Characteristics	1
	2.	Accuracy, sensitivity	1
	3.	Reproducibility & static error of instruments	1
	4.	Dynamic characteristics & speed of instruments.	1
2	5.	Errors of an instrument & explain various types.	1
		Unit 2 - Indicating Instruments	**10**
	6.	Introduction to Indicator & Display devices & its types	1
	7.	Basic principle of meter movement, permanent magnetic moving coil movement & its advantages & disadvantages.	1
	8.	Operation of Moving Iron Instrument	1
3	9.	Basic principle of operation of DC Ammeter and Multi range Ammeter	1
	10.	Basic principle of operation of AC Ammeter and Multi range Ammeter	1
	11.	Basic principle of operation of DC Voltmeter and its applications	1
	12.	Basic principle of operation of DC Voltmeter and its applications	1
4	13.	Basic principle of Ohm Meter (Series & Shunt type)	1
	14.	Basic principle of Analog Multimeter, its types & applications	1
	15.	Operation of Q meter and its essentials	1
		Unit 3 - Digital Instruments	**10**
	16.	Principle of operation of Ramp type Digital Voltmeter & applications	1
5	17.	Operation of display of 3 1/2, 4 1/2– Digital Multimeter& Resolution and Sensitivity	1
	18.	Basic principle of operation of working of Digital Multimeter, its types & applications	1
	19.	Basic principle of operation of working of Digital Frequency Meter	1
	20.	Operation of working of Digital Measurement of Time	1
6	21.	Measurement of Frequency.	1
	22.	Principle of operation of working of Digital Tachometer	1
	23. 24.	Principle of operation of working of Automation in Digital Instruments (Polarity Indication, Ranging, Zeroing & Fully Automatic)	2

7	25.	Block diagram of LCR meter & its working principle.	1
		Unit 4 -Oscilloscope	**8**
	26.	Basic principle of Oscilloscope & its Block Diagram	1
	27.	Basic principle & Block diagram of CRO, Dual Trace Oscilloscope & its specification CRO Measurements, LissajIous figures	3
	28.		
8	29.		
	30.	Applications of Oscilloscope (Voltage period & frequency measurement)	2
	31.		
	32.	Operation of Digital Storage Oscilloscope & High frequency Oscilloscope	2
9	33.		
		Unit 5 -Bridges	**11**
	34.	Types of Bridges (DC& Ac Bridges)	1
	35.	DC Bridges (Measurement of Resistance by Wheatstone’s Bridge)	2
	36.		
10	37.	AC bridges (Measurement of inductance by Maxwell’s Bridge & by Hay’s Bridge)	2
	38.		
	39.	Measurement of capacitance by Schering’s Bridge &DeSauty Bridge	2
	40.		
11	41.	Working principle of Q meter its circuit diagram & measurement of Low impedance	2
	42.		
	43.	Measurement of frequency	1
	44.	LCR Meter & its measurements	1
12		**Unit 6 - Transducers & Sensors**	**11**
	45.	Parameter, method of Selecting & advantage of Electrical Transducer & Resistive Transducer	2
	46.		
	47.	Working principle of Strain Gauges, define Strain Gauge (No mathematical Derivation)	2
	48.		
13	49.	Working principle of LVDT	1
	50.	Working principle of capacitive transducers (pressure)	1
	51.	Working principle of Load Cell (Pressure Cell)	1
	52.	Working principle of Temperature Transducer (RTD, Optical Pyrometer, Thermocouple, Thermister)	2
14	53.		
	54.	Working principle of Current transducer and KW Transducer.	1
	55.	Working principle of Proximity & Light sensors.	1
		Unit 7 - Signal Generator, Wave Analyser& DAS	**5**
	56.	General aspect & classification of Signal generators	1
15	57.	Working principle of AF Sine & Square wave generator .	1
	58.	Working principle of the Function Generator	1
	59.	Function of basic Wave Analyser& Spectrum Analyser	1
	60.	Basic concept of Data Acquisition System (DAS)	1

Books Recommended:

1. Electronic Instrumentation by H S Kalsi –McGraw Hill
2. Electrical & Electronics Measurement & Instrumentation by A K Sawheny
3. Electrical and Electronic Measurements and Instrumentation by R.K.Rajput –S Chand
4. Electrical Measurement Instrumentation by J.B.Gupta – Katson books

NPTEL Lectures

1. **https://nptel.ac.in/courses/108/105/108105153/**
2. **https://nptel.ac.in/courses/108/105/108105064/**