

# **ELECTRICAL MEASUREMENT & INSTRUMENTATION (Th. 03)**

Date of Commencement of classes: 02.01.2024

Date of Closing of classes: 23.04.2024

## **CHAPTER-WISE DISTRIBUTION OF PERIODS**

<b>Sl. No.</b>	<b>Name of the Chapter</b>	<b>Periods as per Syllabus</b>	<b>Required period</b>	<b>Expected Marks</b>
01	<b>MEASURING INSTRUMENTS</b>	05	05	05
02	<b>ANALOG AMMETERS AND VOLTMETERS</b>	10	10	20
03	<b>WATTMETER AND MEASUREMENT OF POWER</b>	08	06	20
04	<b>ENERGYMETERS AND MEASUREMENT OF ENERGY</b>	08	05	10
05	<b>MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR</b>	07	07	10
06	<b>MEASUREMENT OF RESISTANCE INDUCTANCE AND CAPACITANCE</b>	08	08	10
07	<b>SENSORS AND TRANSDUCER</b>	09	09	10
08	<b>OSCILLOSCOPE</b>	05	06	10
	<b>TOTAL</b>	<b>60</b>	<b>56</b>	<b>100</b>

**Lesson Plan By –PRADEEP PARIDA**

## LESSON PLAN

Class day	Art. No.	Theory Topics
1 <sup>st</sup>	1.0	<b>Chapter No.- 01 (Measuring Instruments)</b> Introduction to Measurement, Instrument, Standard
2 <sup>nd</sup>	1.1	Define Accuracy, precision, Errors, Resolutions Sensitivity & Tolerance
3 <sup>rd</sup>	1.2	Classification of measuring instruments.
4 <sup>th</sup>	1.3	Explain Deflecting torque of an instrument-controlling and damping arrangements in indicating type of instrument
1 <sup>st</sup>	1.4	Calibration of instruments
2 <sup>nd</sup>	2.1	<b>Chapter No.- 02 (Analog Ammeters and Voltmeters)</b> Describe construction, principle of operation, errors, ranges merits and demerits of
	2.1.1	Moving iron type instruments-construction, principle of operation
	3 <sup>rd</sup>	-errors & ranges, Merits & demerits
4 <sup>th</sup>	2.1.2	Permanent Magnet Moving coil type instruments. - construction & principle of operation
5 <sup>th</sup>		-error, range & merits & demerits
6 <sup>th</sup>	2.1.3	Dynamometer type instruments -construction principle of operation-errors, ranges, merits & demerits
1 <sup>st</sup>		-errors, ranges, merits & demerits
2 <sup>nd</sup>	2.1.4	Rectifier type instruments
3 <sup>rd</sup>	2.1.5	Induction type instruments
1 <sup>st</sup>	2.2	Extend the range of instruments by use of shunts and Multipliers.
2 <sup>nd</sup>	2.3	Solve numerical
1 <sup>st</sup>	3.1	<b>Chapter No.- 03(Wattmeter and measurement of Power)</b> Describe Construction of dynamometer type wattmeter
2 <sup>nd</sup>		principle of working Dynamometer type wattmeter
3 <sup>rd</sup>		Discuss L P F Electro – Dynamometer type wattmeter
4 <sup>th</sup>		Discuss U P F Electro – Dynamometer type wattmeter
5 <sup>th</sup>	3.2	The Errors in Dynamometer type wattmeter and methods of their correction
1 <sup>st</sup>	3.3	Discuss Induction type wattmeters
2 <sup>nd</sup>	4.1	<b>Chapter No.- 04 (Energy meters and measurement of energy)</b> Introduction -Single Phase induction type energy meter-
3 <sup>rd</sup>	4.2	Construction. working Principle & their
4 <sup>th</sup>		-Compensation and adjustments
1 <sup>st</sup>		- Compensation and adjustments.
2 <sup>nd</sup>	4.3	Testing of energy Meters

3 <sup>rd</sup>	5.1	<b>Chapter No.- 05 (Measurement of Speed Frequency and Power Factor)</b> Tachometers, types
4 <sup>th</sup>		Tachometer working principles
1 <sup>st</sup>	5.2	Principle of operation and construction of Mechanical resonance type frequency meter
2 <sup>nd</sup>		Cont...
3 <sup>rd</sup>		- Electrical resonance Type frequency meters.
4 <sup>th</sup>	5.3	Principle of operation and working of Dynamometer type single phase power factor meter
5 <sup>th</sup>		Three phase power factor meters
6 <sup>th</sup>	6.1	<b>Chapter No.- 06 (Measurement of Resistance, Inductance and Capacitance)</b> Classification of resistance
1 <sup>st</sup>	6.1.1	Measurement of low resistance by potentiometer method
2 <sup>nd</sup>	6.1.2	Measurement of medium resistance by wheat Stone bridge method
3 <sup>rd</sup>	6.1.3	Measurement of high resistance by loss of charge method.
4 <sup>th</sup>	6.2	construction & principle of operations Megger and Earth tester for insulation resistance and Earth resistance measurement respectively
5 <sup>th</sup>	6.3	Explain construction and principles of Multimeter (Analog and Digital).
1 <sup>st</sup>	6.4	Measurement of Inductance by Maxwell's Bridge method
2 <sup>nd</sup>	6.5	Measurement of capacitance by Schering Bridge method
3 <sup>rd</sup>	7.1	<b>Chapter No.- 07 (Sensors and Transducers)</b> Define transducer, sensing element or detector element and transduction elements
4 <sup>th</sup>	7.2	Classify transducer. give examples of various class of transducer
1 <sup>st</sup>	7.3	Resistive transducer
2 <sup>nd</sup>	7.3.1 7.3.2	Linear and angular motion Potentiometer. Thermistor and Resistance Thermometer
3 <sup>rd</sup>	7.3.3	Wire resistance strain gauges
4 <sup>th</sup>	7.4 7.4.1 7.4.2	Inductive transducer Principle of linear variable differential transformer (LVDT), Uses LVDT
1 <sup>st</sup>	7.5 7.5.1 7.5.2	Capacitive transducer), General principle of capacitive transducer Variable area capacitive transducer
2 <sup>nd</sup>	7.5.3	Change in distance between plate capacitive transducer
3 <sup>rd</sup>	7.6	Piezo electric transducer and its application and Hall effect transducer with their application

4 <sup>th</sup>	8.1	<b>Chapter No.- 08 (Oscilloscopes)</b> Principle of operation of cathode ray tube
5 <sup>th</sup>	8.2	Principle of operation of oscilloscope (with help of block diagram)
1 <sup>st</sup>		Cont...
2 <sup>nd</sup>	8.3	Measurement of DC voltage & current
1 <sup>st</sup>	8.4	Measurement of AC voltage, current, phase& frequency
2 <sup>nd</sup>		Cont.
3 <sup>rd</sup>		Chapter 1&2 Revision
1 <sup>st</sup>		Chapter 3& 4 Revision
2 <sup>nd</sup>		Chapter 5 & 6 Revision
3 <sup>rd</sup>		Chapter 7 Revision
4 <sup>th</sup>		Chapter 8 Revision
5 <sup>th</sup>		Previous Year question Answer discussion
6 <sup>th</sup>		Cont.

### ***Learning Resources:***

<b>Sl. No.</b>	<b>Name of the Book</b>	<b>Author Name</b>	<b>Publisher</b>
01	A.K. Sawhney	Electric Measurement and Measuring instruments	Dhanpat Rai & Co
02	J. B. Gupta	Electrical and Electronics Measuring instruments and Measurement	S.K.Kataria & Sons