



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY  
SERGARH-756060, BALASORE (ODISHA)  
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## LESSON PLAN

**SUBJECT: Th-3 (ELECTRICAL MEASUREMENT & INSTRUMENTATION)**

### CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	MEASURING INSTRUMENTS	5	5
2	ANALOG AMMETERS AND VOLTMETERS	10	10
3	WATTMETERS AND MEASUREMENT OF POWER	8	8
4	ENERGYMETERS AND MEASUREMENT OF ENERGY	8	8
5	MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR	7	7
6	MEASUREMENT OF RESISTANCE, INDUCTANCE & CAPACITANCE	8	8
7	SENSORS AND TRANSDUCER	9	9
8	OSCILLOSCOPE	5	5
10	Tutorial	15	15
	TOTAL	75	75

Discipline: EE	Semester: 4 <sup>th</sup>	Name of the Teaching Faculty: Er. BISWAJIT PARIDA
Week	Class Day	Theory / Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	<b>1. MEASURING INSTRUMENTS</b> 1.1 Define Accuracy, precision, Errors, Resolutions Sensitivity and tolerance.
	2 <sup>nd</sup>	1.2 Classification of measuring instruments. 1.3 Explain Deflecting, controlling and damping arrangements in
	3 <sup>rd</sup>	1.3 Explain Deflecting, controlling and damping arrangements in indicating type of instruments.
	4 <sup>th</sup>	1.3 Explain Deflecting, controlling and damping arrangements in indicating type of instruments.
	5 <sup>th</sup>	1.4 Calibration of instruments.
2 <sup>nd</sup>	1 <sup>st</sup>	<b>2. ANALOG AMMETERS AND VOLTMETERS</b> 2.1. Describe Construction, principle of operation, errors, ranges merits and demerits of:
	2 <sup>nd</sup>	2.1.1 Moving iron type instruments.
	3 <sup>rd</sup>	2.1.2 Permanent Magnet Moving coil type instruments.
	4 <sup>th</sup>	2.1.2 Permanent Magnet Moving coil type instruments.
	5 <sup>th</sup>	2.1.3 Dynamometer type instruments
3 <sup>rd</sup>	1 <sup>st</sup>	2.1.3 Dynamometer type instruments
	2 <sup>nd</sup>	2.1.4 Rectifier type instruments
	3 <sup>rd</sup>	2.2 Extend the range of instruments by use of shunts and Multipliers.
	4 <sup>th</sup>	2.3 Solve Numerical
	5 <sup>th</sup>	<b>3. WATTMETERS AND MEASUREMENT OF POWER</b> 3.1 Describe Construction, principle of working of Dynamometer type wattmeter. (LPF and UPF type)
	1 <sup>st</sup>	3.1 Describe Construction, principle of working of Dynamometer type wattmeter. (LPF and UPF type)

4 <sup>th</sup>	2 <sup>nd</sup>	3.2 The Errors in Dynamometer type wattmeter and methods of their correction.
	3 <sup>rd</sup>	3.3 Discuss Induction type watt meters.
	4 <sup>th</sup>	<b>4. ENERGYMETERS AND MEASUREMENT OF ENERGY</b> 4.1 Introduction .
	5 <sup>th</sup>	4.2 Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments.
5 <sup>th</sup>	1 <sup>st</sup>	4.2 Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments.
	2 <sup>nd</sup>	4.3 Testing of Energy Meters.
	3 <sup>rd</sup>	<b>5. MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR</b> 5.1 Tachometers, types and working principles
	4 <sup>th</sup>	5.2 Principle of operation and construction of Mechanical and Electrical resonance Type frequency meters.
	5 <sup>th</sup>	5.3 Principle of operation and working of Dynamometer type single phase and three phase power factor meters.
6 <sup>th</sup>	1 <sup>st</sup>	<b>6. MEASUREMENT OF RESISTANCE, INDUCTANCE &amp; CAPACITANCE</b> 6.1 Classification of resistance.
	2 <sup>nd</sup>	6.1.1 Measurement of low resistance by potentiometer method. .
	3 <sup>rd</sup>	6.1.2 .Measurement of medium resistance by wheat Stone bridge method.
	4 <sup>th</sup>	6.1.3 Measurement of high resistance by loss of charge method.
	5 <sup>th</sup>	6.1.3 Measurement of high resistance by loss of charge method.
7 <sup>th</sup>	1 <sup>st</sup>	6.2 Construction, principle of operations of Megger & Earth tester for insulation resistance and earth resistance measurement respectively.
	2 <sup>nd</sup>	6.2 Construction, principle of operations of Megger & Earth tester for insulation resistance and earth resistance measurement respectively.
	3 <sup>rd</sup>	6.3 Construction and principles of Multimeter. (Analog and Digital)

	4 <sup>th</sup>	6.3 Construction and principles of Multimeter. (Analog and Digital)
	5 <sup>th</sup>	6.4 Measurement of inductance by Maxewell's Bridge method.
8 <sup>th</sup>	1 <sup>st</sup>	6.4 Measurement of inductance by Maxewell's Bridge method.
	2 <sup>nd</sup>	6.5 Measurement of capacitance by Schering Bridge method
	3 <sup>rd</sup>	6.5 Measurement of capacitance by Schering Bridge method
	4 <sup>th</sup>	6.5 Measurement of capacitance by Schering Bridge method
	5 <sup>th</sup>	Tutorial class
9 <sup>th</sup>	1 <sup>st</sup>	<b>7. SENSORS AND TRANSDUCER</b> 7.1. Define Transducer, sensing element or detector element and transduction elements
	2 <sup>nd</sup>	7.1. Define Transducer, sensing element or detector element and transduction elements
	3 <sup>rd</sup>	7.2. Classify transducer. Give examples of various class of transducer.
	4 <sup>th</sup>	7.2. Classify transducer. Give examples of various class of transducer.
	5 <sup>th</sup>	7.3. Resistive transducer
10 <sup>th</sup>	1 <sup>st</sup>	7.3. Resistive transducer
	2 <sup>nd</sup>	7.3.1 Linear and angular motion potentiometer.
	3 <sup>rd</sup>	7.3.1 Linear and angular motion potentiometer.
	4 <sup>th</sup>	7.3.2 Thermistor and Resistance thermometers.
	5 <sup>th</sup>	7.3.2 Thermistor and Resistance thermometers.
11 <sup>th</sup>	1 <sup>st</sup>	7.3.3 Wire Resistance Strain Gauges
	2 <sup>nd</sup>	7.3.3 Wire Resistance Strain Gauges
	3 <sup>rd</sup>	7.4. Inductive Transducer
	4 <sup>th</sup>	7.4. Inductive Transducer

	5 <sup>th</sup>	Tutorial class
12 <sup>th</sup>	1 <sup>st</sup>	7.4.1 Principle of linear variable differential Transformer (LVDT)
	2 <sup>nd</sup>	7.4.1 Principle of linear variable differential Transformer (LVDT)
	3 <sup>rd</sup>	7.4.1 Principle of linear variable differential Transformer (LVDT)
	4 <sup>th</sup>	7.4.2 Uses of LVDT.
	5 <sup>th</sup>	Tutorial class
13 <sup>th</sup>	1 <sup>st</sup>	7.5. Capacitive Transducer.
	2 <sup>nd</sup>	7.5. Capacitive Transducer.
	3 <sup>rd</sup>	7.5.1 General principle of capacitive transducer.
	4 <sup>th</sup>	7.5.1 General principle of capacitive transducer.
	5 <sup>th</sup>	Tutorial class
14 <sup>th</sup>	1 <sup>st</sup>	7.5.2 Variable area capacitive transducer.
	2 <sup>nd</sup>	7.5.2 Variable area capacitive transducer.
	3 <sup>rd</sup>	7.5.3 Change in distance between plate capacitive transducer.
	4 <sup>th</sup>	7.5.3 Change in distance between plate capacitive transducer.
	5 <sup>th</sup>	7.6. Piezo electric Transducer and Hall Effect Transducer with their applications.
15 <sup>th</sup>	1 <sup>st</sup>	7.6. Piezo electric Transducer and Hall Effect Transducer with their applications.
	2 <sup>nd</sup>	<b>8. OSCILLOSCOPE</b> 8.1. Principle of operation of Cathode Ray Tube.
	3 <sup>rd</sup>	8.2. Principle of operation of Oscilloscope (with help of block diagram).
	4 <sup>th</sup>	8.3. Measurement of DC Voltage & current.
	5 <sup>th</sup>	8.4. Measurement of AC Voltage, current, phase & frequency.