	GOVERNMENT POLYTECHNIC, PURI	
	DEPARTMENT OF ELECTRICAL ENGINEERING	
Discipline: **ELECTRICAL ENGG**	Semester:4TH	Name of the Teaching Faculty: **MRS LAXMIPRIYA KHUNTIA , SR. LECTURER IN ELECTRICAL ENGG.**
Subject: ELECTRICAL MEASUREMENT AND INSTRUMENT	No. of days/per week class allotted: **05**	Semester From date: 10. 02 .2022 To Date: 01. 07 .2022 No. of weeks:15
PRE- REQUISITE	Basic knowledge of DC & AC analysis Theory, Phasor Diagram, engineering mathematics. Working principle of DC and AC motors and generators. Basic knowledge about engineering materials.	
COURSE OUTCOMES	**CO1.**Describe the acquired knowledge for selecting various types of instruments for measurement of voltage, current, power-factor, frequency etc. **CO2.**Learn the connection and adjustment of different types of electrical measuring instruments. **CO3.**Develop an understanding of working principle, construction, characteristics and applications of electrical instruments with problem analysis. **CO4.**Develop an understanding of working principle, construction, characteristics and applications of electronics measuring instruments with problem analysis. **CO5.**Acquire knowledge of the construction, characteristics and methods of usage of sensors and transducers.	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1st	1st	1.Introduction to measuring instruments	whiteboard
	2nd	1.1 Define Accuracy, precision, Errors,	whiteboard
	3rd	Resolutions Sensitivity and tolerance.	whiteboard
	4th	1.2 Classification of measuring instruments	whiteboard
	5th	Tutorial	whiteboard
2nd	1st	1.3 Explain Deflecting, controlling and damping arrangements in indicating type of instruments.	whiteboard
	2nd	1.3 Explain Deflecting, controlling and damping arrangements in indicating type of instruments.(Contd..)	whiteboard
	3rd	1.4 Calibration of instruments.	whiteboard
	4th	2. ANALOG AMMETERS AND VOLTMETERS 2.1Describe Construction, principle of operation	whiteboard
	5th	Tutorial	whiteboard
3rd	1st	2.1Errors, ranges merits and demerits of 2.1 Moving iron type instruments.	whiteboard
	2nd	2.2 Permanent Magnet Moving coil type instruments	whiteboard
	3rd	2.3 Dynamometer type instruments	whiteboard
	4th	2.3 Dynamometer type instruments (Contd..)	whiteboard
	5th	Tutorial	whiteboard
4th	1st	2.4 Rectifier type instruments	whiteboard
	2nd	2.5 Induction type instruments	whiteboard
	3rd	2.5 Induction type instruments (Contd..)	whiteboard
	4th	2.6 Extend the range of instruments by use of shunts and Multipliers.	whiteboard
	5th	Tutorial	whiteboard
5th	1st	2.7 Solve Numerical	whiteboard
	2nd	3. WATTMETERS AND MEASUREMENT OF POWER	whiteboard
	3rd	3.1 Describe Construction, principle of working of Dynamometer type wattmeter	whiteboard
	4th	3.2 What are the Errors in Dynamometer type wattmeter and methods of their correction	whiteboard
	5th	Tutorial	whiteboard
6th	1st	3.3 Discuss L P F Electro – Dynamometer type wattmeter	whiteboard
	2nd	3.4 Discuss Induction type watt meters	whiteboard
	3rd	3.5 Measurement of Power in Single Phase and Three Phase Circuit	whiteboard
	4th	3.5 Measurement of Power in Single Phase and Three Phase Circuit	whiteboard
	5th	Tutorial	whiteboard
7th	1st	4. ENERGYMETERS AND MEASUREMENT OF ENERGY 4.1 Introduction	whiteboard
	2nd	4.2 Single Phase and poly phase Induction type Energy meters	whiteboard
	3rd	4.2Construction, working principle and their compensation and adjustments.	whiteboard
	4th	4.2Their compensation and adjustments.	whiteboard
	5th	Tutorial	whiteboard
	1st	4.3 Testing of Energy Meters	whiteboard
	2nd	4.3 Testing of Energy Meters (Contd..)	whiteboard

8th	3rd	5. MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR 5.1 Tachometers, types and working principles	whiteboard
	4th	5.2 Principle of operation and construction of Mechanical and Electrical resonance Type frequency meters	whiteboard
	5th	Tutorial	whiteboard
9th	1st	5.3 Principle of operation and working of Dynamometer type single phase and three phase power factor meters	whiteboard
	2nd	5.4 Synchroscopes – objectives and working.	whiteboard
	3rd	5.5 Phase Sequence Indicators and its working	whiteboard
	4th	6. INSTRUMENT TRANSFORMER 6.1 Explain Current Transformer and Potential Transformer.	whiteboard
	5th	Tutorial	whiteboard
10th	1st	6.1 Explain Current Transformer and Potential Transformer. (Contd..)	whiteboard
	2nd	6.2 Explain Ratio error, Phase Angle error and Burden	whiteboard
	3rd	6.2 Explain Ratio error, Phase Angle error and Burden (Contd..)	whiteboard
	4th	6.3 Clamp – On Ammeters	whiteboard
	5th	Tutorial	whiteboard
11th	1st	6.3 Clamp – On Ammeters(Contd..)	whiteboard
	2nd	6.4 State Use of CT and PT	whiteboard
	3rd	6.4 State Use of CT and PT(Contd..)	whiteboard
	4th	7. MEASUREMENT OF RESISTANCE	whiteboard
	5th	7.1 Classification of resistance	whiteboard
12th	1st	7.2 Explain Measurement of low resistance by voltage drop and potentiometer method & its use to Measure resistance	whiteboard
	2nd	7.3 Explain Measurement of medium resistance by wheat Stone bridge method and substitution Method.	whiteboard
	3rd	7.4 Explain Measurement of high resistance by loss of charge method.	whiteboard
	4th	7.5 Explain construction & principle of operations (meggers) insulation resistance & Earth resistance megger.	whiteboard
	5th	Tutorial	whiteboard
13th	1st	7.6 Explain construction and principles of Multimeter	whiteboard
	2nd	8.MEASUREMEN OF INDUCTANCEAnd CAPACITANCE	whiteboard
	3rd	Explain measurement of inductance by 8.1 Maxewell's Bridge method.	whiteboard
	4th	8.2 Owen Bridge method	whiteboard
	5th	Tutorial	whiteboard
14th	1st	Explain measurement of capacitance by 8.3 De Sauty Bridge method	whiteboard
	2nd	8.4 Schering Bridge method	whiteboard
	3rd	8.5 LCR Bridge method	whiteboard
	4th	9. DIGITAL INSTRUMENTS 9.1 Digital Voltmeters (DVM)	whiteboard
	5th	Tutorial	whiteboard
15th	1st	9.1 Digital Voltmeters (DVM) (Contd..)	whiteboard
	2nd	9.2 Characteristic of Digital Meters	whiteboard
	3rd	9.3 Digital Multimeters	whiteboard
	4th	9.3 Digital Multimeters(Contd.)	whiteboard
	5th	Tutorial	whiteboard

2. Electric Measurement and Measuring instruments A.K. Sawhney Dhanpat Rai & Co
3. Electrical and Electronics Measuring instruments and Measurement J. B. Gupta S K Kataria & Sons
4. Electrical Measurement and Measuring instruments E.W. Golding & H Widdis Wheeler Publishing
5. Industrial Instrumentation and Control S K Singh TMH Ltd.

WEBSITE RESOURCES:

1.https://www.youtube.com/watch?v=3eYmFjHnQjY&list=PLbRMhDVUMngcoKrA4sH-zvbNVSE6IpEio (NPTCL)
2.https://www.youtube.com/watch?v=lgZJohjjs10&list=PLgMDNELGJ1CYKDzKdGcM1-kuH_a1NCfQA(NPTCL)

10/3/22

Sign. of Faculty concerned

17/5/22

Principal
G.P Puri

17/5/22

Sign. of HOD i/c