

**GOVERNMENT POLYTECHNIC, VAISHALI**  
**ELECTRONICS ENGINEERING, SEMESTER – 3<sup>rd</sup>**  
**LECTURE PLAN FOR SYLLABUS EFFECTIVE FROM 1-8-2020**  
**SUBJECT:- Electronics Measurement-I ,subject code- 1621305**  
**SUBJECT TEACHER –ASHISH VERMA**  
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**1. COURSE OVERVIEW**

The scope of instrumentation engineering is vast, and appears to be growing, in part due to the increased use of automatic control in manufacturing and process plants. Growth is also tied to the development of more accurate and more robust sensors, which allow us to detect phenomena of interest.

**2. COURSE OBJECTIVE:**

1	To introduce the basic principles of all measuring instruments
2	To deal with the measurement of voltage, current, Power factor, power, energy and Magnetic measurements.

**2. COURSE OUTCOMES:** At the end of the course the student will be in a position to –

- 1: Apply knowledge and skills to provide solutions to Electrical and Electronics Engineering problems in industry and governmental organizations or to enhance student learning in educational institutions
- 2: Work as a team with a sense of ethics and professionalism, and communicate effectively to manage cross-cultural and multidisciplinary teams
- 3: Update their knowledge continuously through lifelong learning that contributes to personal, global and organizational growth

UNIT	TOPIC TO BE COVERED	NO. OF PERIOD	BOOK
1	Over view of course	L1	Power point presentation(PPP)/ video,
	Characteristics of Instruments and possible errors: Introduction to value, accuracy, precision, sensitivity, resolution, noise, repeatability, instrument efficiency, scale ,range, linearity, dynamic systems, dynamic response, and loading. Types of errors.	L1,L2,  L3	PPP/video/ Hand written Pdf notes. T2,T3,
2	Galvanometers: D'Arranvol galvanometer, Torque equation, Dynamic behaviour, under damped, over damped and critically damped motion of galvanometer. Sensitivity, choice of galvanometer, Flux meter.	L4,L5,  L6,L7	PPP/video/ Hand written Pdf notes T2,T3,
3	Ammeters, Voltmeters and Ohm meters: Types of instruments  03.01 Permanent Magnet Moving Cell Instruments: Torque equation, Multi-range Ammeter, Voltmeters, Sensitivity, Loading effects, Advantages and Disadvantages. 03.02 Ohm Meters: Series and Shunt type Multimeter, Ratio meter, Megger,	L8,  L9,L10, L11	PPP/video/ Hand written Pdf notes. T2,T3,

	03.03 Moving Iron Instruments: Operating Principle, Torque equation, Electro-dynamometer, ammeter and voltmeters. Errors. Use an AC and DC. Use of these at high frequency. 03.04 Introduction to Electrostatics. Induction type and Rectifier type Instruments.	L12,L13, L14  L15,L16, L17,L18  L19,L20	
4.	Instrument Transformer: Introduction to Instrument Transformer, Current Transformer and Potential Transformer in light of instrumentation.	L21,L22, L23,L24	PPP/video/ Hand written Pdf notes. T2,T3,
5	Power Measurement: Power Measurement using instrument transformer. Watt Meters of different types. 3-phase Watt Meters. Summation metering. Energy meters for DC and AC circuits.	L25,L26, L27,L28	PPP/video/ Hand written Pdf notes T2,T3,
6	Phase and Frequency Measurement: Moving iron, Rotating field, Alternating field, Power Factor Meters. Types of Frequency Meters.	L29,L30, L31,L32, L33	PPP/video/ Hand written Pdf notes T2,T3,
7.	07 Resistance Measurement: Classification of Resistance, Measurement of medium resistance using ammeter, voltmeter, substitution and bridges. Construction of low resistance, Methods for measurement of low resistance using ammeter and voltmeter, Kelvin double bridge Measurement of high resistances: Difficulties and measurement, guard circuits, Direct deflection, loss of charge and mega ohm bridges methods of measurement.	L34,L35, L36,L37, L38	PPP/video/ Hand written Pdf notes T2,T3,
8.	08 Potentiometers: Classification, basic potentiometer, multi-range potentiometer, , Application of potentiometers.	L39,L40, L41,L42	PPP/video/ Hand written Pdf notes. T2,T3,
9	09 DC and AC Bridges: Basic principle of bridges. Wheatstone Kelvin Bridge, Maxwell bridges, Hay's bridges, Anderson's bridge. Measurement of inductance and capacitance using bridges. Wien's bridge, Universal bridge, Bridge circuits for measurement of mutual inductance.	L43,L44, L45,L46,	PPP/video/ Hand written Pdf notes T2,T3,
10	Cathode Ray Oscilloscope: CRT, Deflection Systems, Synchronization, Time base circuits, Measurement of voltage, current, phase angle, frequency Lissajous pattern, etc.	L47,L48, L49,L50	PPP/video/ Hand written Pdf notes. T2,T3,

**Text /Reference Books:**

Titles of the Book	Name of Authors	Name of the Publisher
T1:- Electronic Instrument and Measurement Techniques	<b>Cooper</b>	Prentice hall by India private limited
T2:- Course in Electrical and Electronic Measurement and Instrumentation	<b>A. K. Sawhney</b>	DHANPAT RAI & SONS EDUCATIONAL AND TECHNICAL PUBLISHERS
T3:- Electrical and Electronic Measurements and Instrumentation	R.K.Rajput	S.CHAND & COMPANY PVT.LTD.
T4: 3. Electric and Electronics	<b>Golding</b>	

Measurement		
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