B.P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY
137, VIP Road, PoddarVihar, Kolkata: 7000052
Department of Electrical Engineering
Academic Year -2025-26 (Even Semester)
LESSON PLAN

Program : Electrical Engineering Credit: 3 Contact: 3L
Course Name : Electrical and Electronic Measurement
Course Code : PC EE 403
Course Coordinator: Dr. Argha Kamal Pal

Lecture Number	Topics to be covered	Text Books / Reference	Teaching Pedagogies
L1	**Measurements** • Method of measurement • Measurement system • Classification of instruments	T1, T2	Lecture Online video lectures Quiz
L2	**Measurement Characteristics** • Accuracy • Precision • Resolution • Speed of response	T1, T2	Lecture Quiz
L3	**Errors in Measurement** • Error in measurement • Classification of errors • Loading effect due to shunt and series connected instruments	T1, T2	Lecture Power Point Presentation Flipped Class
L4	**Moving Coil Instruments** • General features • Construction • Principle of operation • Torque equation	T1, T2	Lecture Power Point Presentation Flipped Class
L5	**Moving Iron Instruments** • Construction • Principle of operation • Torque equation • Applications	T1, T2	Lecture Online video lectures Quiz Power Point Presentation Flipped Class
L6	**Electrodynamometer Instruments** • Construction • Principle of operation • Torque equation • Advantages and disadvantages	T1, T2	Lecture Online video lectures Quiz Flipped Class
L7	**Induction Instruments**	T1, T2	Lecture Online video lectures

Lecture Number	Topics to be covered	Text Books / Reference	Teaching Pedagogies
	• Construction • Principle of operation • Torque equation • Applications		Quiz Power Point Presentation Flipped Class
L8	**Special Purpose Instruments** • Electrostatic instruments • Thermoelectric instruments • Rectifier type instruments	T1, T2	Lecture Online video lectures Quiz Power Point Presentation Flipped Class
L9	**Extension of Instrument Range** • Multipliers • Shunts • Extension of instrument ranges	T1, T2	Lecture Online video lectures Quiz Power Point Presentation Flipped Class
L10	**Instrument Transformers** • Disadvantages of shunts and multipliers • Advantages of instrument transformers	T1, T2	Lecture Online video lectures
L11	**Current Transformer (CT)** • Principle of operation • Construction • Applications	T1, R1	Lecture Online video lectures Quiz Flipped Class
L12	**Potential Transformer (PT)** • Principle of operation • Construction • Applications	T1, T2	Lecture Online video lectures Flipped Class
L13	**Errors in Instrument Transformers** • Ratio error • Phase angle error	T1, T2	Lecture Power Point Presentation Flipped Class
L14	**Measurement of Power** • Electrodynamic wattmeter • Principle of operation • Construction	T1, T2	Lecture Online video lectures
L15	**Induction Type Wattmeter** • Principle of operation • Construction • Wattmeter errors	T1, T2	Lecture Quiz Flipped Class
L16	**Measurement of Energy** • Construction of AC energy meter • Theory of operation • Applications	T1, T2	Lecture Online video lectures Quiz Power Point Presentation Flipped Class

Lecture Number	Topics to be covered	Text Books / Reference	Teaching Pedagogies
L17	**Testing of Energy Meters** • Testing methods • Calibration • Error analysis	T1, T2	Lecture Quiz Power Point Presentation
L18	**Measurement of Resistance** • Measurement of medium resistance • Ammeter-voltmeter method	T1, T2	Lecture Quiz Power Point Presentation
L19	**Measurement of Low and High Resistance** • Kelvin double bridge • Loss of charge method • Megger	T1, T2	Lecture Online video lectures Quiz
L20	**DC Potentiometer** • Crompton's DC potentiometer • Principle of operation • Applications	T1, T2	Lecture Online video lectures Quiz Power Point Presentation
L21	**AC Potentiometers** • Polar type AC potentiometer • Coordinate type AC potentiometer • Applications	T1, T2	Lecture Flipped Class
L22	**AC Bridges** • Measurement of inductance by AC bridges • Maxwell bridge • Hay's bridge	T1, T2	Lecture Online video lectures Quiz Power Point Presentation
L23	**Measurement using AC Bridges** • Measurement of capacitance • Schering bridge • Frequency measurement	T1, T2	Lecture Online video lectures Quiz
L24	**Cathode Ray Oscilloscope (CRO)** • Construction • Principle of operation • Applications	T1, R1	Lecture Online video lectures Quiz
L25	**Measurement using CRO** • Measurement of voltage • Current • Frequency and phase	T1, R1	Lecture Online video lectures Quiz Power Point Presentation
L26	**Advanced CRO** • Frequency limitation of CRO • Sampling oscilloscope	T1, R1	Lecture Power Point Presentation Flipped Class

Lecture Number	Topics to be covered	Text Books / Reference	Teaching Pedagogies
	• Double beam CRO		
L27	**Electronic Instruments** • Advantages of digital meter over analog meters • Digital voltmeter • Resolution and sensitivity	T1, R1	Lecture Power Point Presentation
L28	**Digital Measuring Instruments** • Digital multimeter • Digital frequency meter • Signal generator	T1, R1	Lecture Power Point Presentation
L29	**Sensors and Transducers** • Introduction to sensors and transducers • Classification • Applications	T3, R2	Lecture Online video lectures
L30	**Strain Gauge and LVDT** • Principle of operation of strain gauge • Construction and applications of LVDT	T3, R2	Lecture Online video lectures Flipped Class
L31	**Temperature and Flow Measurement** • Temperature transducers • Flow measurement using magnetic flow measurement	T3, R2	Lecture Flipped Class

Text books:

1. A course in Electrical & Electronic Measurements & Instrumentation, A.K. Sawhney, Dhanpat Rai & sons.
2. Electrical Measurement & Measuring Instruments, E.W. Golding & F.C. Wides, Wheeler Publishing
3. Sensors & Transducers, D. Patranabis, PHI, 2nd edition.

Reference books:

1. Electronic Instruments, H.S. Kalsi, Tata Mc-Graw hill, 2nd Edition.
2. Digital Instrumentation, A.J. Bouwens, Tata Mc-Graw hill.
3. Modern Electronic instrumentation & Measuring instruments, A.D. Heltric & W.C. Copper, Wheeler Publication
4. Instrument transducers, H.K.P. Neubert, Oxford University press.
5. All-in One Electronics Simplified, A.K. Maini, Khanna Book Publishing Co. (2018)

…….
Course coordinator
Dr. Argha Kamal Pal
Assistant Professor, Electrical Engineering