UEI403 ELECTRICAL AND ELECTRONIC MEASUREMENTS

L	T	P	Cr
3	1	2	4.5

Units, Systems and Standards: Review of system of units, SI units, Classification of standards, Time and frequency standards, Electrical standards: Standards of emf and resistance, Frequency dependence of resistance, Inductance and Capacitance.

Electromechanical Indicating Instruments: PMMC galvanometer, Ohmmeter, Electrodynamometer, Moving iron meter, Rectifier and thermo-instruments, Comparison of various types of indicating instruments.

Power and Energy Measurement: Electrodynamometer type of wattmeter and power factor meter, Power in poly phase system: two wattmeter method, Single-phase induction and Electronic energy meters.

Bridge Measurements: Wheatstone bridge and its sensitivity analysis, Kelvin double bridge, AC bridges: Applications and conditions for balance, Maxwell's bridge, Hay's bridge, Schering bridge, Wien's bridge, De Sauty's bridge, Insulation testing, Ground resistance measurement, Varley and Murray loop test.

Instrument Transformers: Current and Voltage transformers, Constructional features, Ratio and Phase angle errors.

Magnetic Measurements: Determination of B–H curve and hysteresis loop, Measurement of iron losses with Llyod Fisher square.

Electronic Instruments: Basic principle and advantages, D.C. voltmeter with direct coupled amplifier, Chopper stabilized amplifier, Electronic multimeter, Digital voltmeters, General characteristics ramp type voltmeter, Quantization error, Digital frequency meter/Timer, Q meter and its applications, Distortion meter, Wavemeter and Spectrum Analyzer, Oscilloscopes: Block diagram, CRT, Electrostatic deflection, CRT circuits, Multi–beam and Multitrace oscilloscopes, Applications of oscilloscopes, Storage type digital oscilloscopes.

Laboratory Work:
Experiments around sensitivity of wheat stone bridge, Comparison of various types of indicating instruments, Single–phase induction type energy meter, Kelvin double bridge, AC bridges, Measurement of iron losses with Llyod Fisher square, Storage type digital oscilloscopes.

Text Book:

1. *Golding, E.W., and Widdis, F.C., Electrical Measurements and Measuring Instruments, Pitman (2003).*
2. *Helfrick, A.D., and Cooper, W.D., Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall of India (2007).*

Reference Books:

1. *Kalsi, H.S., Electronic Instrumentation, Tata McGraw–Hill (2007).*
2. *Nakra, B.C., Chaudhry, K.K., Instrumentation Measurement and Analysis, Tata McGraw–Hill (2003).*

COURSE LEARNING OUTCOME (CLO): The student will be able to

1. Compare various electromechanical indicating instruments
2. Measure power and energy
3. Design various ac bridges
4. Analyze various waveform with the help of storage oscilloscope

Evaluation Scheme:

Sr. No.	Evaluation Elements	Weightage (%)
1	MST	25
2	EST	35
3	Sessionals (May include Assignments/Projects/Tutorials/Quizzes/Lab Evaluations)	40