Programme : B. Tech - Electrical & Electronics Engineering Semester: III
Course Code : V18EET06
Course Name : Electrical and Electronic Measurements **[L: 3; T: 1; P: 0 (4 credits)]**
Course Outcomes

After successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
C205.1	Identify the proper instrument for measurement of AC or DC voltage and current	K2
C205.2	Choose the suitable instrument for the measurement of power and energy.	K3
C205.3	Understand the operation of potentiometer.	K2
C205.4	Compute the electrical parameters by using appropriate bridge.	K3
C205.5	Calculate different magnetic parameters by using magnetic instruments and illustrate the instrument transformers.	K3
C205.6	Understand the operation of various digital instruments.	K2

Unit-I: Electromechanical Indicating Instruments
Classification of measuring instruments; Construction and principle of operation of PMMC Galvanometer, MI instruments; Extension of instrument ranges using shunts, multipliers; Numerical Problems.
Unit-II: Power and Energy Measurement
Single phase dynamometer wattmeter (LPF and UPF), expression for deflecting and control torques; Dynamometer type power factor meter; Single phase induction type energy meter, Driving and braking torques, errors and compensations, testing by phantom loading using R.S.S. meter; Numerical Problems.
Unit-III: Potentiometers
Principle and operation of D.C. Crompton's potentiometer and their applications; Types of AC Potentiometers and their Applications.
Unit-IV: Measurement of Parameters

I. Measurement of Resistance: Wheat stone's bridge and its Sensitivity; Ohm meter; Kelvin's double bridge; Loss of charge method; Earth resistance measurement by fall of potential method and megger;
II. Measurement of inductance & Q-Factor: Maxwell's bridge; Hay's bridge; Anderson's bridge.
III. Measurement of capacitance and loss angle: Desauty's Bridge; Schering Bridge.

Unit-V: Magnetic Measurements & Instrument Transformers
Magnetic Measurements: Constructional details of Flux meter; Determination of B–H Loop: Methods of reversals and Step-by-Step method; Core loss measurements by Maxwell's and Campbell's Bridges.
Instrument Transformers: Ratio and Phase angle errors (Derivation & Phasor Diagram) and their applications in the extension of instrument ranges.
Unit-VI: Electronic Instruments
Introduction; Digital Voltmeters (DVM): Ramp type DVM; Integrating type DVM; Successive-approximation DVM; Digital frequency meter, Digital Tachometer; Measurement of phase difference & Frequency by using Lissajous patterns in CRO; Electronic Multi meter.

Text Books:
1. A course in Electrical & Electronic Measurement and Instrumentation by A.K.Sawhney, Dhanpat Rai & Co.
2. Electronic Instruments by H.S. Kalsi, Tata Mc-Graw hill.
Reference Books:
1. Electrical and Electronic Measurements and instrumentation by R.K. Rajput, S. Chand.
2. Digital Instrumentation by A.J. Bouwens, Tata Mc-Graw hill.
3. Modern Electronic instrumentation & Measuring instruments by A.D. Heltric & W.C. Copper, Wheeler Publication.
4. Instrument transducers by H.K.P. Neubert, Oxford University press.
5. Electrical Measurements by Forest K. Harris, John Wiley and Sons.