EE-602: Electrical & Electronics Instrumentation

Credit	L	T	P
3	**2**	**1**	**-**

UNIT-I

Classification of resistance and measurement challenges. Measurement of medium resistance- voltmeter ammeter method, substitution, Wheatstone bridge methods and Ohmmeters. Measurement of low resistance voltage drop method, potentiometer method, Kelvin double bridge method, necessary precautions for precision and accuracy.
Measurement of high resistance- direct deflection method, loss of charge method and Meg-ohm bridge.

UNIT-II

Maxwell's bridge, Hay's bridge, Anderson bridge, De Sauty's bridge, Modified De Sauty's bridge, Schering bridge and Wien bridge. Application of ac bridges in measurement of resistance, capacitance, inductance, mutual inductance and frequency

UNIT-III

Classification of transducers, Transducers: RTD, thermistor, thermocouple, strain gauge, LVDT, Piezoelectric transducer. Application of transducers in measurement of pressure, force, temperature, speed and other industrial parameters.
Signal conditioning issues; Signal level and bias adjustment, linearization, conversions, filtering and impedance matching, and concept of loading. Basic instrumentation amplifier.

UNIT-IV

Magnetic measurements, magnetometer, ballistic galvanometer, fluxmeter, Hall-effect devices (flux measurement). Separation of iron losses, methods of iron loss measurement. Working and construction, application in measurement voltage and current (ac and dc), significance of lissajous figures in measurement of frequency and phase angle. Other measurement applications of oscilloscope.

UNIT-V

Electronic voltmeters, digital volt meter (DVM), multimeters, Q-meter, spectrum analyzer, ultrasonic measurements, introduction to data acquisition

TEXT/REFFERENCE BOOKS

1. Golding and Widdis: Electrical measurements & measuring instruments, Wheeler Books.
2. D. Helfrick and W. D. Cooper, Modern Electronic Instrumentation and Measurement Techniques.
3. A. K. Sawhney , Electrical & Electronic Measurements and instrumentation, Dhanpat Rai & Sons, 2009.
4. H S Kalsi, Electronic Instrumentation, TMH Publications, 2012