

10EE35 ELECTRICAL and ELECTRONIC MEASUREMENTS and INSTRUMENTATION

Subject Code	:	10EE35	IA Marks	:	25
No. of Lecture Hrs./ Week	:	04	Exam Hours	:	03
Total No. of Lecture Hrs.	:	52	Exam Marks	:	100

PART – A

UNIT 1:

1-(a) Units and Dimensions: Review of fundamental and derived units. S.I. units. Dimensional equations, problems. **3 Hours**

1-(b) Measurement of Resistance: Wheatstone's bridge, sensitivity, limitations. Kelvin's double bridge. Earth resistance, measurement by fall of potential method and by using Megger. **3 Hours**

UNIT 2:

Measurement of Inductance and Capacitance: Sources and detectors, Maxwell's inductance bridge, Maxwell's inductance & capacitance bridge, Hay's bridge, Anderson's bridge, Desauty's bridge, Schering bridge. Shielding of bridges. Problems. **07 Hours**

UNIT 3:

Extension of Instrument Ranges: Shunts and multipliers. Construction and theory of instrument transformers, Equations for ratio and phase angle errors of C.T. and P.T (derivations excluded). Turns compensation, illustrative examples (excluding problems on turns compensation), Silsbees's method of testing CT. **07 Hours**

UNIT 4:

Measurement of Power and Energy: Dynamometer wattmeter. UPF and LPF wattmeters, Measurement of real and reactive power in three-phase circuits. Induction type energy meter — construction, theory, errors, adjustments and calibration. Principle of working of electronic energy meter. **06 Hours**

PART – B

UNIT 5:

(a) Construction and operation of electro-dynamometer single-phase power factor meter. Weston frequency meter and phase sequence indicator. **04 Hours**

(b) Electronic Instruments: Introduction. True RMS responding voltmeter. Electronic multimeters. Digital voltmeters. Q meter. **04 Hours**

UNIT 6:

Dual trace oscilloscope — front panel details of a typical dual trace oscilloscope. Method of measuring voltage, current, phase, frequency and period. Use of Lissajous patterns. Working of a digital storage oscilloscope. Brief note on current probes. **06 Hours**

UNIT 7:

Transducers: Classification and selection of transducers. Strain gauges. LVDT. Measurement of temperature and pressure. Photo-conductive and photo-voltaic cells. **06 Hours**

UNIT 8:

(a) Interfacing resistive transducers to electronic circuits. Introduction to data acquisition systems. **2 Hours**

(b) Display Devices and Signal Generators:

X-Y recorders. Nixie tubes. LCD and LED display. Signal generators and function generators. **04 Hours**

Text Books

- Electrical and Electronic Measurements and Instrumentation**, A. K. Sawhney, Dhanpatrai and Sons, New Delhi.
- Modern Electronic Instrumentation and Measuring Techniques**, Cooper D. and A.D. Heifrick, PHI, 2009 Edition.

References

- Electronic Instrumentation and Measurement**, David A. Bell, oxford Publication, 2nd Edition, 2009.
- Electrical Measurements and Measuring Instruments**, Golding and Widdies, Pitman