

SARDAR PATEL UNIVERSITY
B.Sc. FIRST SEMESTER
Core Course – Instrumentation (Vocational)
US01CINV21 (T) Instrumentation System - I
Effective from June 2018
4 Credits, 4 periods per week

Total Marks 100, Internal -30 Marks, External-70 Marks, exam duration: 3 hours

Unit: I

Resistors: General Information, Symbol, Colour code, Types such as Carbon, Metal film, Thin film, Thick film, Wire wound variable potentiometer, Logarithmic, Linear. Thermistor, Light Dependent (LDR), resistor temperature detector (RTD), Resistors in Series & Parallel connected.

Inductors: General Information, Symbol, Types of inductor - Air core, Iron core, Ferrite Core, Choke, Variable inductors.

Capacitors: General Information, Symbol, Colour code, Types of capacitor - Paper, Electrolytic, Mica, Tantalum, Polystyrene, and Variable Capacitors.

Series and Parallel Connection of Inductors and Capacitors

Unit: II

Electronic instruments: Introduction, Multimeter, Basic meter movement, characteristics of moving coil meter movement, The d'Arsonval movement, voltage measurement, current measurement, resistance measurement, Meter sensitivity, Digital Multimeter(DMM), cathode ray oscilloscope (CRO) Block diagram, application of CRO, frequency determination with lissajous figures.

Unit: III

Introduction to Instruments: Typical applications of instrument systems, Functional elements of measurement systems, Classifications of Instruments – Null and Deflection types, Manually operated and Automatic types, Analog and Digital types, Self Generating and Power operated types. Measurements and Errors: Definition, Accuracy and Precision, Types of errors – Gross errors, Systematic errors, Random errors, Statistical analysis – Arithmetic mean, Deviation from mean, Average deviation

Unit: IV

Systems of Units of Measurement – Fundamental and derived Units, System of Units, Electrical & Magnetic Units, International System of Units, Other Systems of Units, Conversion of Units, Standards of Measurements – Classification of Standards and calibration, Standards for Mass, Length and Volume, Time and Frequency standards, Electrical standards.

Scope of Syllabus:

1. Basic electronics(solid state) by B.L. Theraja
2. Basic Electronics and Linear Circuits by Bhargava, Kulshrestha, Gupta.
3. Modern Electronics Instrumentation & Measurement Techniques by A. D. Helfrick, W. D. Cooper.
4. Instrumentation Measurement and Analysis by B. C. Nakra, K. K. Chaudhary.
5. Basic Electronics by Grob (TMH).