

Course 7C: ELECTRONIC INSTRUMENTATION

UNIT-I INTRODUCTION TO INSTRUMENTS (10 hrs)

Types of electronic Instruments- Analog instruments & Digital Instruments, DC Voltmeter and AC Voltmeter, Construction and working of an Analog Multimeter and Digital Multimeter (Block diagram approach), Sensitivity, $3\frac{1}{2}$ display and $4\frac{1}{2}$ display Digital multimeters, Basic ideas on Function generator

UNIT-II OSCILLOSCOPE (10 hrs)

Cathode Ray Oscilloscope-Introduction, Block diagram of basic CRO, Cathode ray tube, Electron gun assembly, Screen for CRT, Time base operation, Vertical deflection system, Horizontal deflection system, Use of CRO for the measurement of voltage (DC and AC), frequency, phase difference, Different types of oscilloscopes and their uses, Digital storage Oscilloscope

UNIT-III TRANSDUCERS (10 hrs)

Classification of transducers, Selection of transducers, Resistive, capacitive & inductive transducers, Resistive and capacitive touch screen transducer used in mobiles, Displacement transducer-LVDT, Piezoelectric transducer, Photo transducer, Digital transducer, Fibre optic sensors

UNIT-IV DISPLAY INSTRUMENTS (10 hrs)

Introduction to Display devices, LED Displays, Seven Segment Displays, Construction and operation (Display of numbers), Types of SSDs (Common Anode & Common Cathode type), Limitations of SSDs, Liquid Crystal Displays, Principle and working of 2x16 display and 4x16 LCD modules, Applications of LCD modules.

UNIT-V BIOMEDICAL INSTRUMENTS (10 hrs)

Basic operating principles and uses of (i) Clinical thermometer (ii) Stethoscope (iii) Sphygmomanometer (iv) ECG machine (v) Radiography (vi) Ophthalmoscope (vii) Ultrasound scanning (viii) Ventilator (ix) Pulse oxymeter (x) Glucometer, Basic ideas of CT scan and MRI scan

Course 7C: Electronic Instrumentation– PRACTICAL SYLLABUS

Practical (Laboratory) Syllabus: *(30 hrs. Max marks: 50)*

1. Familiarization of digital multimeter and its usage in the measurements of (i) resistance (ii) current, (iii) AC & DC voltages and for (i) continuity test (ii) diode test and (iii) transistor test
2. Measure the AC and DC voltages, frequency using a CRO and compare the values Measured with other instruments like Digital multimeter.
3. Formation of Sine, Square wave signals on the CRO using Function Generator and measure their frequencies. Compare the measured values with actual values.
4. Display the numbers from 0 to 9 on a single Seven Segment Display module by Applying voltages.
5. Display the letters **a** to **h** on a single Seven Segment Display module by applying voltages.
6. Measurement of body temperature using a digital thermometer and list out the error and corrections.
7. Measurement of Blood Pressure of a person using a B.P. meter and record your values and analyze them.
8. Get acquainted with an available ECG machine and study the ECG pattern to understand the meaning of various peaks
9. Observe and understand the operation of a Digital Pulse oxymeter and measure the pulse rate of different people and understand the working of the meter.