

B.Tech IV Year I Semester

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

19AEC75b-ELECTRONIC INSTRUMENTATION*(Open Elective-III)*

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Course Objectives: The objectives of the course are to make the students learn about

- To know about the performance characteristics of instruments and measurement of electrical quantities.
- To understand the construction, working and applications of different types of CRO's.
- To analyze the working of different types of bridges.
- To study the working of signal & function generators.
- To analyze the working of transducers in measuring physical parameters

UNIT – I:

Measuring Instruments: Introduction, Errors in Measurement, Accuracy, Precision, Resolution and Significant figures. Basic PMMC Meter- construction and working, DC and AC Voltmeters- Multirange, Range extension, DC Ammeter, Multimeter for Voltage, Current and resistance measurements.

Digital Instruments: Digital Voltmeters – Introduction, DVM's based on V-T, V-F and Successive approximation principles, Resolution and sensitivity, General specifications, Digital Multimeters, Digital frequency meters, Digital measurement of time.

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn about the performance characteristics of the instruments. L1
- Understand the working of different types of ammeters, voltmeters and multimeters. L2

UNIT – II:

Oscilloscopes: Introduction, Block diagram of CRO, Basic principle of CRT, CRT Construction and features, vertical amplifiers, horizontal deflection system- sweep, trigger pulse, delay line, sync selector circuits. Dual beam and dual trace CROs, Sampling and Digital storage oscilloscopes.

Learning Outcomes:

At the end of this unit, the student will be able to

- Grasp the construction and working of different types of oscilloscopes. L1
- Use CRO to measure the amplitude, frequency, phase and time period of given signals. L3

UNIT – III:

Bridges: DC Bridges for Measurement of resistance - Wheat stone bridge, Kelvin's Bridge, AC Bridges for Measurement of inductance- Maxwell's bridge, Hay's Bridge, Anderson bridge, Measurement of capacitance - Schering Bridge, Wien Bridge, Errors and precautions in using bridges.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the construction and working of different types of bridges. L2
- Measure parameters like resistance, capacitance, and inductance using bridges. L3

UNIT – IV:

Signal Generators: Introduction, Fixed and variable AF oscillator, Standard signal generator, Laboratory type signal generator, AF sine and Square wave generator, Function generator, Square and Pulse generator, Sweep frequency generator.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the working and applications of signal generators. L2
- Gain knowledge on the working and applications of function generators. L1

UNIT – V:

Transducers: Introduction, Types of Transducers, Electrical transducers, Selecting a transducer, Resistive transducer, Strain gauges, Piezoelectric transducer, Photoelectric transducer, Photovoltaic transducer, Temperature transducers-RTD, LVDT.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the basic working principle and applications of transducers. L2
- Measure physical parameters using different types transducers. L3

Text Books:

1. H.S.Kalsi, “Electronic Instrumentation”, Third edition, Tata McGraw Hill, 2010.
2. A.D. Helfrick and W.D. Cooper, “Modern Electronic Instrumentation and Measurement Techniques”, PHI, 6th Edition, 2010.

Reference Books:

1. A.K. Sawhney, Dhanpat Rai & Co., “A course in Electrical and Electronic Measurements and Instrumentation”, 9th Edition, 2010.
2. David A. Bell, “Electronic Instrumentation & Measurements”, PHI, 2nd Edition, 2006.

Course Outcomes:

At the end of this Course the student will be able to

- Know about the performance characteristics of instruments and measurement of electrical quantities. L1
- Understand the construction, working and applications of different types of CRO’s. L2
- Compare the working of different types of bridges. L2
- Learn the working of signal & function generators. L1
- Analyze the working of transducers in measuring physical parameters. L4

