

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B. E. SEMESTER: V

### Electrical & Electronics Engineering/Electronics Engg./Electronics & Communication Engg./Electronics & Telecommunication

Subject Name: **Electronics Measurements & Instrumentation Laboratory**

Subject Code: **151005**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Internal Assessment (I)
0	0	2	2	0	0	100

#### Note:

The laboratory work in “Electronics Measurements & Instrumentation Laboratory” is divided into two parts: (1) Practical performance (II) Seminar Presentation. The practical performance should include understanding of the operational features of various analog and digital test and measurement equipments, practicals on basic measurement parameters and measuring devices, analysis of various standard bridges for measurement of unknown resistance, inductance and capacitance, Q factor, study of characteristics of different types of transducers, generation of waveforms, simulation of simple system using LABVIEW and Seminar presentation by students on topics pertaining to electronic measurements and instrumentation including high-end equipments and calibration procedures.

#### Part 1: List of Experiments

**Note:** \*Students will have to perform **at least 10** experiments from the following.

Sr. No	List of Experiments
1.	To find the value of unknown resistor using Wheatstone bridge.
2.	To find the value of unknown capacitance and inductance using Maxwell's bridge.
3.	To find the value of unknown capacitance using Wein's series and parallel bridge.
4.	To extend the range of given voltmeter and ammeter.
5.	Measurement of frequency using Lissajous method.
6.	To study and verify characteristic of variable resistor transducer (strain gauge).
7.	To study and verify characteristic of LVDT

8.	To study and verify characteristic of Thermocouple/RTD.
9.	To study the front panel controls of storage CRO
10.	To analyze analog and digital multi meter for various measurements
11.	To verify the performance characteristics of compensated attenuator.
12.	To demonstrate the functionality of function generator and its use as a test and measurement equipment.
13.	Measurement of LCRQ meter.
14.	To demonstrate the functionality of IC tester and test various ICs.
15.	Fourier series analysis of a square wave using spectrum analyzer.
16.	To study and simulate any two measurement system using LAB VIEW
17.	To generate various signals using arbitrary waveform generator
18.	To demonstrate the functionality of distortion meter.

## Part II: Topics for Seminar

**Note:** \*Students will have to give **minimum five** seminars from the following topics.

Sr. No	Topics
1.	Detailed study of CRO and its types
2.	Digital measurement methods for measurement of time, period, frequency, phase, voltage, current, etc.
3.	Detailed study of measurement lab equipments like function generator, frequency counter, synthesized function generator, spectrum analyzer, arbitrary waveform generator, wave analyzer, logic analyzer etc.
4.	Study of Data Acquisition System and data loggers.
5.	Study of various recorders
6.	Study of various types of electrical transducers.
7.	Various display devices and printers.
8.	Virtual Instrumentation
9.	Smart sensors

10.	White paper on (SEM) Scanning Electron Microscope, AFM(Atomic Force Microscope)
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