

**2EC18: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION  
LABORATORY  
CREDITS - 1 (LTP:0,0,1)**

**Course Objective:**

The students will be familiar with the basics of Electronics measurements and Instruments. The fundamentals of signal conditioning circuits for the use of the various sensors are also to be understood.

**Teaching and Assessment Scheme:**

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
L	T	P		C	Theory Marks		Practical Marks	
			ESE		CE	ESE	CE	
0	0	2	1	00	00	40	60	100

**List of Experiments:**

At Least 10 Experiments based on available Trainer kits:

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 study and design Instrumentation amplifier using Op-amp.
5. To study and design active filters using Op-amp.
6. To extend the range of given voltmeter and ammeter.
7. Measurement of frequency using Lissajous method.
8. To study and verify characteristic of variable resistor transducer (strain gauge).
9. To study and verify characteristic of LVDT
10. To study and verify characteristic of Thermocouple/RTD.
11. To study the front panel controls of storage CRO
12. To analyze analog and digital multi meter for various measurements
13. To demonstrate the functionality of function generator and its use as a test and measurement equipment.
14. Measurement of LCRQ meter.
15. Fourier series analysis of a square wave using spectrum analyzer.

**List of References:**

1. Johnson, Curtis D. "*Process control instrumentation technology*". Prentice Hall PTR, 1999.
2. Ramakant Gayakwad. "*Op-amps and linear integrated circuits*". Prentice-Hall, Inc., 1993.
3. Kalsi H. S. "*Electronic Instrumentation*", Tata McGraw-Hill Education, 2nd Ed., 2004.
4. Rangan C. S., Sarma G. R. and Mani V. S. V., "*Instrumentation devices and systems*", Tata McGraw-Hill, 2nd Ed., 2004.

**Course Outcomes (COs):**

By learning this course students will be able to ...

1. Recollect the basic knowledge of measurement units, standards and definitions.
2. Study and Measure the characteristics of the various control systems and sensor responses.
3. Understand & Analyze important of analog signal conditioning using Op-amp.
4. Understand & analyze important of Digital signal conditioning and data acquisition systems.
5. Categorize the different sensors and transducers its characteristics.
6. Study and measure parameters of various Isolation techniques.