Course Type	Course Code	Name of Course	L	T	P	Credit
DC	EEC205	Electrical Measurements	3	0	0	9

Course Objective

The course will gives basic concept of modern electrical measurement practice for industrial applications. The course will give clear idea about working principles along with mathematical background of different electrical measuring instruments.

Learning Outcomes

Upon successful completion of this course, students will:
- learn basic concept of electrical measurement practice
- understand the basic principle of operations of different analog and digital electrical measuring instruments
- understand the performance measure of different electrical measuring instruments
- learn the applications of electrical measuring instruments.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	General features of Indicating Instruments; Systematic and Random Errors, Error Analysis	5	Understand the basic concept of electrical measurements.
2	Principle of Permanent Magnet Moving Coil (PMMC), D'Arsonval Galvanometers; Principle of Electro-thermal, Rectifier, Moving Iron, Electrodynamic, Electrostatic and Induction Type Instruments for the Measurement of Voltage, Current, Power, Energy, Frequency, Power Factor.	12	Understand the basic principles of operations of different analog electrical measuring instruments.
3	Shunt and Multiplier, Instrument Transformers.	4	Understand the principles of range extension of electrical measuring instruments.
4	Measurement of Low, Medium and High Resistances.	4	Understand the measurement practice of different type of resistances.
5	Measurement of Inductances and Capacitances by AC Bridges, Potentiometers (DC and AC).	6	Familiarization of precision electrical measurement technique.
6	Measurement of magnetic flux with Ballistic Galvanometer; Hall Effect.	2	Understand the magnetic measurement technique.
7	CRO and oscilloscopic measurements, signal Generators.	4	Understand basic electronic measurement principles useful for industrial applications.
8	Data acquisition system – A/D and D/A conversions (ladder and weighted resistor type DACs, successive Approximation and Dual Slope Integrating type ADCs), Sample and Hold circuit.	5	Understand the basic principles of digital measurement system useful for industrial applications

Text Books:

1. Electrical Measurements and measuring instruments -- E. W. Golding, F C Widdis

Reference Books:

2. Modern Electronic Instrumentation and Measurement Techniques --Helfrick , Cooper
3. Elements of Electronic Instrumentation and Measurement Technique -- J J Carr