Course No	Title of the Course	Course Structure	Pre-Requisite
ICICC01	Electrical Measurements	3L-0T-2P	None

COURSE OUTCOMES (COs):

1. Learn the units and standards of fundamental circuit's elements and emf.
2. Learn the various types of DC and AC bridges.
3. Understand the working of potentiometers.
4. Acquire fair knowledge on construction and working of various measuring circuit and instruments.
5. Understand instrument transformers.

COURSE CONTENT	Approximate No. of Lectures
Unit I Units & Errors SI units, Definitions, Accuracy, Precision, Resolution, Sensitivity, Relative Error, Absolute Error, Types of Errors.	**05**
Unit II Bridges Measurement of R, C, L, M, f etc. by Wheatstone, Kelvin, Maxwell, Hay's, Anderson, Heaviside, Campbell, Schering, Wien bridges. Bridge Sensitivity, detectors, shielding & grounding.	**09**
Unit III Potentiometers DC potentiometers – Vernier potentiometer, slide wire potentiometer, standard reference voltage source, principle of operation, construction, phantom loading, range extension and applications of DC potentiometers. AC potentiometers - polar and Cartesian co-ordinate types.	**06**
Unit IV Measuring Instruments Classification, operating torques, torque/weight ratio, pointers and scales. Principle of operation, construction, errors and areas of application of the following types of instruments: (a) PMMC (b) Dynamometer type wattmeter (c) Moving Iron type (d) Induction type energy meter	**08**

Measurement of voltage, current, power and energy in single & three circuits.	
Unit V Instrument transformer Instrument transformer (CT and PT): construction, phasor diagram, errors, testing.	**07**

SUGGESTED READINGS:

TEXT BOOK:

1. Electrical Measurements And Measuring Instruments by Rajendra Prasad ,KHANNA PUBLISHERS
2. Sawhney A.K, "A course in Electrical and electronic Measurement and Instrumentation", Dhanpat Rai & Sons, New Delhi.
3. Electrical Measurements and Measuring Instruments, E.W Golding, F.C Widdis
4. Electronic Instrumentation – H.S. Kalsi, Mc Graw Hill

List of Experiments for Electrical Measurement Lab:

1. Kelvin Double Bridge for measurement of low resistance.
2. Wein's Bridge for the measurement of frequency.
3. Schering's Bridge for measurement of Capacitance.
4. Anderson's Bridge for measurement of Self inductance.
5. Vernier D.C potentiometer for measurement of D.C voltage.
6. Co-ordinate type A.C. potentiometer for measurement of A.C. voltage V_x+V_y.
7. Drysdale Polar type A.C. potentiometer for measurement of A.C. voltage $V\angle\surd$
8. Three phase A.C power measurement by two wattmeter method.
9. Megger for measurement of resistance.
10. Varley Loop test for locating a fault in electrical cable.
11. Calibration of Wattmeter.