



Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology Second Year Bachelor of Engineering (EE) – Semester III With effect from: Academic Year 2018-19

EE305-N	Electrical Measurement and Measuring Instruments
Pre-requisite	

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					Total
L	T	P	Total		Theory		IE Marks	CIA Marks	Pract. Marks	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks				
04	00	02	06	05	03	70	30	20	30	150

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- To present a problem oriented introductory knowledge of Electrical measurement techniques.
- To focus on the study of electrical measurements.

Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	Concepts of Measurements & Measurement Systems:	10
2	Analog Electromechanical and Miscellaneous Measuring Instruments	12
3	Measurement of Power and Energy	12
4	Measurement of Resistance	12
5	Measurement of Inductance and Capacitance	15
	Total	6

Total hours (Theory): 61

Total hours (Lab): 30

Total hours: 91



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DETAILED SYLLABUS

Sr. No	Title	Lecture Hours	Weightage (%)
1	Concepts of Measurements & Measurement Systems: Introduction to measurement and instrumentation, S. I. system, methods of measurement, static and dynamic characteristics of instruments, definitions – true value, accuracy, error, precision, sensitivity, resolution etc.	10	10%
2	Analog Electromechanical and Miscellaneous Measuring Instruments : Classification of analog instruments, principle of operation, operating forces, errors in ammeters and voltmeters, permanent magnet moving coil, moving iron, dynamometer type, induction type, electrostatic type instruments. Maximum demand indicator, tri-vector meter, power factor meter, frequency meters, synchroscope.	12	25%
3	Measurement of Power and Energy : Electrodynamometer type wattmeter, measurement of power in three phase circuits, three phase wattmeter, measurement of reactive power, energy meter for A.C. circuits, induction type energy meter.	12	20%
4	Measurement of Resistance : Introduction, classification of resistances, Measurement of low resistances, measurement of medium resistances & measurement high resistances, insulation resistance measurement, localization of cable fault, Loop tests.	12	20%
5	Measurement of Inductance and Capacitance Introduction, Types of bridges, A. C. bridges for inductance measurement- Maxwell, Hays, anderson and owen bridges, capacitance measurement – Desauty and Schering Bridge. measurement of frequency by Wien's bridge.	15	25 %



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INSTRUCTIONAL METHOD AND PEDAGOGY:

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weight age should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.

LEARNING OUTCOME:

- The student can be acquired the basic knowledge of electric circuits, electrical fundamentals, thus being prepared to pursue any area of engineering spectrum in depth as desired.
- The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for their use.

Text/References books:

1. A. K. Sawhney - A course in Electrical Measurement and Measuring Instruments.
2. J. B. Gupta - A course in Electronic and Electrical measurements and Instrumentation, S. K.Kataria Publication
3. R.K.Rajput - Electrical and Electronic Measurements and Instrumentation



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List of experiments:

Sr. No.	Name of experiment
1.	To Study Electrical Measuring Instruments.
2.	Find out resistance to using Ammeter- Voltmeter method.
3.	Find out power in 3-phase system using 2-wattmeter method.
4.	Find power factor in 1-phase circuit using P.F meter.
5.	Calibration of the single phase induction type energy meter
6.	To Extend The Range For Ammeter And Voltmeter
7.	Measurement of unknown Capacitance and Inductance by Maxwell's L/C Bridge
8.	To Measure The Unknown Capacitance And It's Dissipation Factor Using Schering Bridge.
9.	Measurement of the unknown inductance by using Hay's bridge method
10	Measurement of High Resistance By loss of Charge Method.