

ELECTRICAL MACHINES AND INSTRUMENTS LAB

(Core Subject)

Course Code:	10B17EC371	Semester:	3 rd Semester, B. Tech (ECE, CE)
Credits:	1	Contact Hours:	L-0, T-0,P-2

Course Objectives

The objectives are to study

1. To enable, train and evaluate the ability of the students to perform the analysis of any electromechanical system.
2. To empower students to determine the parameters of AC, DC machines and transformers by performing experiments on these machines.
3. To enable students to identify and solve AC, DC machine and Transformer related problems.
4. The ability to select a suitable measuring instrument for a given application.

Course Outcomes

After studying this course the students would gain enough knowledge

1. The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.
2. The ability to troubleshoot the operation of an electrical machine.
3. The ability to conduct testing and experimental procedures on different types of electrical machines.
4. The ability to select a suitable measuring instrument for measuring electrical and non electrical quantities for a given application.

List of Experiments

1. To perform Ratio, Polarity and Load test on a single phase transformer.
2. To perform open circuit and Short circuit test on a single phase transformer and hence determine its equivalent circuit parameters.
3. To perform parallel operation on two single phase transformers.
4. To perform Sumpner's test on two single-phase transformers
5. To connect three single-phase transformers in different configurations (star-delta, delta-star etc.) to form a three-phase transformer and to determine its transformation ratio.
6. To perform No load and blocked rotor test on a three-phase Induction Motor, and hence determine its equivalent circuit parameters.
7. To perform the load test on a three phase Induction motor, and hence obtain the following characteristics –
 - (i) Torque vs Slip
 - (ii) Stator Current vs Power Output
 - (iii) Efficiency vs Power Output
 - (iv) Power factor vs Power Output
8. To plot "V" curves of a three phase Synchronous machine.
9. To find the relation between open circuit voltage and field current of –

- a. Separately excited DC generator.
 - b. Self excited DC shunt generator.
10. To plot the load characteristic of –
- a. DC shunt generator.
 - b. DC cumulative compound generator.
11. Speed control of DC shunt motor –
- a. By varying field current with armature voltage constant.
 - b. By varying armature voltage with field current kept constant.
12. To perform No Load and Blocked Rotor Test on a Single-phase induction motor, and hence determine its equivalent circuit parameters.
13. To measure 3-phase power using two wattmeter method.
14. Study of bridges: (i) Hay's bridge, (ii) Maxwell bridge, (iii) Wein bridge

Evaluation Scheme

1. Mid Sem Evaluation	20 Marks
2. End Sem Evaluation	20 Marks
3. Attendance	15 Marks
4. Class response	30 Marks
5. File	15 Marks
Total Marks	100 Marks

Text Books

1. D. C. Kulshrestha, Basic Electrical Engineering.
2. V. N. Mittle & Arvind Mittal, Basic Electrical Engineering.