II Year II Semester **L T P C**

Code: 20EE4105 **0 0 3 1.5**

SYNCHRONOUS AND ASYNCHRONOUS MACHINES LABORATORY

Preamble: Synchronous and asynchronous machines Laboratory provide the essential facilities to the students to augment their concepts about the fundamentals of synchronous and asynchronous machines. The lab is equipped with Single Phase and Three Phase asynchronous machines and Three Phase synchronous Machines. The lab is equipped with various tests and monitoring equipment also.

Course Objectives

1. To enable, train and evaluate the ability of the students to perform the analysis of any electromechanical energy conversion system
2. To empower students to determine the parameters of Synchronous and Asynchronous Machines by performing experiments.
3. To enable students to identify and solve Synchronous and Asynchronous Machines related problems
4. The ability to select a suitable measuring instrument for a given application.

Course Outcomes

1. Student will be able to acquire hands on experience of conducting various tests on Induction Motors and Three Phase Alternators.
2. Student will be able to compute losses and Efficiency of Single Phase and Three Phase Induction Motors at different load conditions.
3. Student will be able to compute losses, Efficiency and Voltage Regulation of Three Phase Alternators at different load conditions and power factors.
4. Student will be able to verify the characteristics of Synchronous and Asynchronous Machines and predict specific applications of those machines accordingly.
5. Student will be able to control the speed of Three Phase Induction Motors by V/F method.

CO – PO/ CO – PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
CO1			2	2					1	1			2		
CO2	1	1	2	2					1	1			2		
CO3	1	1	2	2					1	1			2		
CO4	1	1	2	2					1	1			2		
CO5			2	2					1	1			2		

1 – Weak, 2 – Moderate and 3 – Strong

S. No **List of Experiments (Compulsory)**

1. Power factor improvement of Single Phase Induction Motor by using Capacitors.
2. No-Load and Blocked Rotor Tests on Single Phase Induction Motor
3. Brake Test on Single Phase Induction Motor
4. Speed control of Three Phase Induction Motor by V/F Method
5. No-Load and Blocked Rotor Tests on Three Phase Induction Motor
6. Brake Test on Three Phase Squirrel Cage Induction Motor
7. Brake Test on Three Phase Slip Ring Induction Motor
8. Determination of Efficiency of A Three Phase Alternator by loading with Three Phase Induction Motor
9. V and Inverted Curves of a Three Phase Synchronous Motor
10. Regulation of Three Phase Alternator by MMF Method
11. Regulation of Three Phase Alternator by ZPF Method

S. No **List of Experiments (Optional)**

12. Determination of Xd and Xq of a Salient Pole Synchronous Generator by Slip Test
13. Open Circuit Test and Short Circuit Test on 3 Phase Alternator

Text Books:

1. Electrical Machinery by Dr. P.S. Bhimbra, Khanna Publishers
2. A Text Book of Electrical Technology, Volume-II, AC and DC Machines by B.L. Theraja and A.K.Theraja.S.Chand Publications

Reference Books:

1. Laboratory Manual for Electrical Machines by D.P .Kotari and BS Umre, IK International Publishing House Pvt. Ltd.
2. Laboratory Manual for DC Machines and Transformers prepared by Department of Electrical and Electronics Engineering, Raghu Engineering College (Autonomous).