ELECTRICAL MACHINES LABORATORY - I

III Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEEB13	Core	-	-	3	1.5	30	70	100
Contact Classes: NIL	Tutorial Classes: NIL	Practical Classes: 36				Total Classes: 36		

I. COURSE OVERVIEW:

This laboratory course is to meet the requirements of practical work meant for basic operation, analysis and design of electrical machines. It provides hands-on experience by examining the electrical and mechanical characteristics of various DC machines. Analyze the characteristics of DC machines and separate the various losses in electrical machines by conducting different tests..

II. OBJECTIVES:

The course should enable the students to:

I The elementary experimental and modeling skills for handling problems with electrical machines in the industries and domestic applications to excel in professional career.

II The operation of DC Machines and its role in power transmission and distribution.

III The intuitive knowledge needed to test and analyse the performance leading to design of electric machines by conducting various tests and calculate the performance parameters.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Formulate** and then analyze the working of any electrical machine to using mathematical model under loaded and unloaded conditions. .	Understand
CO 2	**Interpret** the load sharing capabilities and reliability of DC generators using parallel operation under various loading conditions.	Apply
CO 3	**Apply** magnetization characteristics of dc shunt generator for necessary to do mechanical work in a proper way.	Apply
CO 4	**Demonstrate** the starting and speed control of various DC motors for necessary to do mechanical work in a proper way of DC motors.	Understand
CO 5	**Estimate** the core losses of DC shunt machines for dividing the setlosses.	Apply
CO 6	**Apply** digital simulation techniques for speed control methods and load test of DC motors.	Apply

IV. SYLLABUS:

Expt.1	**OPEN CIRCUIT CHARACTERISTICS OF DC SHUNT GENERATOR**
Magnetization characteristics of DC shunt generator	
Expt.2	**LOAD TEST ON DC SHUNT GENERATOR**
Determination of efficiency by load test in DC shunt generator	
Expt.3	**LOAD TEST ON DC SERIES GENERATOR**
Determination of efficiency by load test on DC series generator.	
Expt.4	**LOAD TEST ON DC COMPOUND GENERATOR**
Determination of efficiency by load test on DC compound generator.	

Expt.5	**HOPKINSON'S TEST**
Study the performance characteristics of two identical DC shunts machines.	
Expt.6	**FIELD'S TEST**
Study the performance characteristics of two identical DC series machines	
Expt.7	**SWINBURNE'S TEST AND SPEED CONTROL OF DC SHUNT MOTOR**
Predetermine the efficiency and study the characteristics of DC shunt machine with different speed control techniques.	
Expt. 8	**BRAKE TEST ON DC COMPOUND MOTOR**
Study the performance characteristics of DC compound motor	
Expt. 9	**BRAKE TEST ON DC SHUNT MOTOR**
Study the performance characteristics of DC shunt motor by brake test	
Expt. 10	**RETARDATION TEST**
Study the performance characteristics by using retardation test on DC shunt motor	
Expt. 11	**SEPARATION OF LOSSES IN DC SHUNT MOTOR**
Study the method used for separation of losses in DC shunt motor	
Expt. 12	**MAGNETIZATION CHARACTERISTICS OF DC SHUNT GENERATOR**
Study the magnetization characteristics of DC shunt generator using digital simulation.	
Expt. 13	**LOAD TEST ON DC SHUNT GENERATOR USING DIGITAL SIMULATION**
Perform the load test on DC shunt generator using digital simulation	
Expt. 14	**SPEED CONTROL OF DC SHUNT MOTOR USING DIGITAL SIMULATION**
Verify the speed control techniques of DC motor using digital simulation	

Reference Books:

1. P S Bimbhra, "Electrical Machines", Khanna Publishers, 2nd Edition, 2008.
2. M G Say, E O Taylor, "Direct Current Machines", Longman Higher Education, 1st Edition, 1985.
3. Hughes, "Electrical Technology", Prentice Hall, 10th Edition, 2015.
4. Nesimi Ertugrul, "LabVIEW for Electric Circuits, Machines, Drives, and Laboratories", Prentice Hall, 1 st Edition, 2002.
5. Gupta, Gupta & John, "Virtual Instrumentation Using LabVIEW", Tata McGraw-Hill, 1st Edition, 2005

Web References:

1. https://www.ee.iitkgp.ac.in
2. https://www.citchennai.edu.in
3. https://www.iare.ac.in