INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad – 500043
Electrical and Electronics Engineering
List of Laboratory Experiments

DC MACHINES LABORATORY							
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**	

Course Code	**Category**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AEED09	**Core**	0	0	2	1	40	60	100

Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**	**Total Classes:45**
Branch: EEE	**Semester: III**	**Academic Year: 2023-24**	**Regulation: BT23**

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.

Course objectives:

The students will try to learn:

I. The elementary experimental and modelling 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 analyze the performance leading to design of electric machines by conducting various tests and calculate the performance parameters.

Course outcomes:

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

CO1: Analyze the performance characteristics of dc machine under various loading conditions.

CO2: Determine the critical field resistance and speed of dc shunt generator characteristics using open circuit characteristics.

CO3: Examine the performance of DC shunt machine with different speed control techniques and predetermine the efficiency.

CO4: Estimate and separate the core losses in dc machine by conducting a suitable test.

CO5: Examine the performance and speed control of dc machines using simulation tools.

CO6: Determine load test on dc compound generator by conducting Load test.

WEEK NO	EXPERIMENT NAME	CO
WEEK – I	**OPEN CIRCUIT CHARACTERISTICS OF DC SHUNT GENERATOR**	**CO1**
	Develop the circuit for analyzing the characteristics of DC shunt generator	
WEEK – II	**LOAD TEST ON DC SHUNT GENERATOR**	**CO1**
	Design the DC shunt generator circuit under full, 3/4th, half and 1/4th load conditions for analyzing the performance of the machine	

WEEK – III	**LOAD TEST ON DC SERIES GENERATOR**	CO1
	Design the DC series generator circuit under full, $3/4^{th}$, half and $1/4^{th}$ load conditions for analyzing the performance of the machine	
WEEK – IV	**LOAD TEST ON DC COMPOUND GENERATOR**	CO2
	Design the DC compound generator circuit under full, $3/4^{th}$, half and $1/4^{th}$ load conditions for analyzing the performance of the machine.	
WEEK – V	**HOPKINSON'S TEST**	CO2
	Develop a method of testing for two identical dc shunt machines which are mechanically coupled and also electrically connected in parallel.	
WEEK – VI	**FIELD'S TEST**	CO2
	Develop a method of testing for two similar dc series machines depend on the accuracy with which the motor input and generator output are measured.	
WEEK – VII	**SWINBURNE'S TEST AND SPEED CONTROL OF DC SHUNT MOTOR**	CO3
	Design the suitable test under no load conditions to measure no load losses in Dc shunt machines and speed control of DC shunt motor.	
WEEK –VIII	**BRAKE TEST ON DC COMPOUND MOTOR**	CO3
	Develop the circuit for conducting brake test on DC compound motor	
WEEK - IX	**BRAKE TEST ON DC SHUNT MOTOR**	CO4
	Develop the circuit for conducting brake test on DC shunt motor.	
WEEK - X	**RETARDATION TEST**	CO4
	Develop the test for separating the mechanical losses of the DC shunt machine.	
WEEK - XI	**SEPARATION OF LOSSES IN DC SHUNT MOTOR**	CO5
	Design the circuit for separating the iron losses in DC shunt motor	
WEEK - XII	**MAGNETIZATION CHARACTERISTICS OF DC SHUNT GENERATOR USIG DIGITAL SIMULATION**	CO6
	Develop the circuit for analyzing the magnetization characteristics of DC shunt generator using MATLAB	
WEEK - XIII	**LOAD TEST ON DC SHUNT GENERATOR USING DIGITAL SIMULATION**	CO4
	Design the DC shunt generator circuit under full, $3/4^{th}$, half and $1/4^{th}$ load conditions for analyzing the performance of the machine using MATLAB	
WEEK - XIV	**SPEED CONTROL OF DC SHUNT MOTOR USING DIGITAL SIMULATION**	CO4
	Design the suitable test for speed control of DC shunt motor using MATAB	