INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad – 500043

Electrical and Electronics Engineering

List of Laboratory Experiments

AC MACHINES LABORATORY								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AEED13	**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 course is intended to train the students on alternating current machines. It provides hands-on experience by conducting various direct and indirect tests on transformers, synchronous and asynchronous machines to analyze the characteristics of ac machines and separate various losses. This course also enables to develop skills to select, install, operate, and maintain various types of ac machines and transformers tests.

Course objectives:

The students will try to learn:

I. The elementary experimental and modeling skills for handling problems with electrical machines in industries and domestic applications
II. The operation of AC machines and its role in power transmission and generating stations
III. The automation concepts through programmable logic controllers to control the speed and starting current.

Course outcomes:

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

CO1: Select suitable testing strategies for evaluating the performance characteristics of transformers.

CO2: Determine the performance parameters of induction motor by conducting direct and indirect tests

CO3: Explain the parallel operation of alternators for load sharing under various loading conditions.

CO4: Distinguish EMF and MMF methods for the computation of voltage regulation of an alternator.

CO5: Estimate voltage and current swings in salient pole alternator for determination of direct and quadrature axis reactance.

CO6: Apply programmable logic controllers for limiting the starting current of poly phase induction motors.

WEEK NO	EXPERIMENT NAME	CO
WEEK – I	OC AND SC TEST ON SINGLE PHASE TRANSFORMER Determine the equivalent circuit parameters; predetermine the efficiency and regulation by open circuit and short circuit test on a single-phase transformer	CO1
WEEK – II	SUMPNER'STEST Predetermine the efficiency and regulation of two identical single-phase transformers	CO1

WEEK – III	**LOADTESTON SINGLE PHASE TRANSFORMERS**	**CO1**
	Determination of efficiency by load test on a single phase transformer	
WEEK – IV	**SCOTTCONNECTIONOFTRANSFORMERS**	**CO2**
	Conversion of three phase to two phase using single phase transformers	
WEEK – V	**SEPERATION OF CORE LOSSES IN SINGLE PHASE TRANSFORMER**	**CO2**
	Find out the eddy current and hysteresis losses in single Phase Transformers	
WEEK – VI	**HEAT RUN TEST ON SINGLE PHASE TRANSFORMERS**	**CO2**
	Determine the temperature rise in three single phase transformers set.	
WEEK – VII	**BRAKE TEST ON THREE PHASE SQUIRREL CAGE INDUCTION MOTOR**	**CO3**
	Plot the performance characteristics of three phase Induction Motor	
WEEK –VIII	**CIRCLE DIAGRAM OF THREE PHASE SQUIRREL CAGE INDUCTION MOTOR**	**CO3**
	Plot the circle diagram and predetermine the efficiency and losses of three phase squirrel cage Induction Motor	
WEEK - IX	**REGULATION OF ALTERNATOR BY EMF METHOD**	**CO4**
	Determine the regulation of alternator using synchronous impedance method	
WEEK - X	**REGULATION OF ALTERNATOR BY MMF METHOD**	**CO4**
	Determine the regulation of alternator using amperes turns method	
WEEK - XI	**SLIP TEST ON THREE PHASE SALIENT POLE SYNCHRONOUS MOTOR**	**CO5**
	Determination of Xd and Xq in a three-phase salient pole synchronous motor	
WEEK - XII	**'V' AND INVERTED 'V' CURVES OF SYNCHRONOUS MOTOR**	**CO6**
	Plot V and inverted V curves to study the effect of power factor in synchronous motor	
WEEK - XIII	**EQUIVALENT CIRCUIT PARAMETERS OF SINGLE-PHASE INDUCTION MOTOR**	**CO4**
	Determine the equivalent circuit parameters of a single-phase induction motor	
WEEK - XIV	**STARTING AND SPEED CONTROL OF INDUCTION MOTOR USING PLC**	**CO4**
	Implementation of star-delta starter using PLC; Speed control of three phase slip ring induction motor with rotor resistance cutting using PLC	