

Branch Name:	Electrical Engineering
Program Code	ET403
Course Name:	A.C MACHINES
Course Code:	2ET4030401
Pre-requisiteCourse:	

COURSE OBJECTIVE:

1. Understand about the Three phase Induction motors & Three Phase Transformers
2. Understand about the Synchronous motor & Characteristics & Different types of single-phase Induction motors
3. Understand the Concept by Calculation on Transformer & Induction motors.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
04	00	04	06	60	40	40	60

DETAILS OF COURSE CONTENTS:

Sr. No	Topic and Subtopic	Total Hours	Weightage %
1	POLY PHASE INDUCTION MOTORS Construction, types - Squirrel cage - Single and double cage, Woundrotor, Working principle with Torque-slip curve, equivalent circuit and phasor diagram, Torque equation, Starting, running and condition for the maximum torque Necessary and types of starters-DOL, Star delta, autotransformer type and rotor resistance starter. No load test and Blocked rotor test, Losses and efficiency, Power stages, Speed control of squirrel cage and slip-ring induction motor Maintenance of different types of induction motors	16	30
2	ALTERNATOR Principle, working and construction of Alternator, e.m.f. equation, Equivalent circuit and phasor diagram, Voltage regulation by synchronous impedance method, OC, SC characteristics, Synchronization of alternator with bus infinite busbar, Cooling system of alternator, Maintenance of different types of alternators	12	20
3	SYNCHRONOUS MOTOR Principle of working of synchronous motor, starting methods of synchronous motor, Equivalent circuit and phasor diagram, Effect of change in excitation, 'V'-curves, Synchronous condenser, Hunting and its prevention, Differentiate between synchronous motor & Induction motor, Maintenance of synchronous motors	10	15

4	SINGLE PHASE INDUCTION MOTORS Why single phase I.M. is not self-starting, two field rotating theory, Working of different types of single- phase induction motors, Speed torque characteristics Maintenance of different types of single- phase motors	08	15
5	SPECIAL MOTORS & APPLICATIONS Fractional horsepower (FHP) motor & Applications, Hysteresis motor & Applications, Permanent magnet motor & Applications, Reluctance motor & Applications Stepper motor and its types & Applications. Brushless DC motors & Applications, Servomotors	10	20

REFERENCES BOOKS:

A text book of Electrical Technology vol.II	B. L. Theraja	S.Chand Publication, New Delhi
Electrical Machines-II	J. B. Gupta	S. K. Kataria & Sons, New Delhi

LIST OF PRACTICAL:

SR NO	PRACTICALS/EXPERIMENTS
1	To identify different parts of three phase dismantled transformer.
2	To Perform the parallel operation of two 3 phase Transformer.
3	To perform direct load test on three phase induction motor and find its efficiency at Various load condition.
4	To perform no load test and blocked rotor test on three phase induction motor and Construct its circle diagram and find out its various performance parameters.
5	To study about different type of three phase Induction Motor Starter.
6	To perform direct loading test on alternator and find out voltage regulation of it.
7	To find out voltage regulation of alternator by synchronous impedance method for Unity, lagging and leading power factor.
8	Find out voltage regulation of alternator by ampere turn method for Unity, lagging and leading power factor.
9	To study about Synchronizing of Alternator with Bus-Bar.
10	To list & explain various starting methods of synchronous motor & applying one of them to start the synchronous motor.
11	Construct V-curves of synchronous motor at different load conditions to see the effect of variation of excitation

Course Learning Outcomes (CLO):

CLO	Description	Bloom's Taxonomy Level
CLO1	Discuss the knowledge on fundamentals of Three phase Transformers	2 Understanding
CLO2	Evaluate the various experimental studies on Transformers	6 Creating 5 Evaluate
CLO3	Analyze & solve the Different case studies on Transformers, induction motors	5,3, 4 Evaluate,Applying, Analyze
CLO4	Able to understand all the fundamentals terminology related to Three phase Induction motors	2 Understanding
CLO5	Able to understand about Alternators theory	1 Understanding 1 Remembering
CLO6	Able to understand about Single-phase induction motors theory	2 Understanding 1 Remembering

Mapping of CLOs with Pos & PSOs

Course	Program Outcomes(POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H	L	L		M		L	L		L			H	L	L
CLO2	L			H	M	L					L	L	H	M	L
CLO3	L		L				M		L	H			L		M
CLO4				H	L			L					M		M
CLO5		L			L	M				L			M		
CLO6	H		M			M		M					L	L	

H:High, M:Medium, L:Low