EE

Lesson plan

Name of Faculty	**K.K.Bisla & Sandeep**
Discipline	**EE**
Semester	**Third Sem (3rd sem)**
Subject	**Electrical Machines-I**
Lesson Plan Duration	**04.08.2025 to 17.11.2025 (17 Weeks)**
Work load [Theory + Practical] Per Week	**[04+06]**

Week	Day	Theory Topic/ Assignment/ Test	No.	Practical
1st	1	Unit 1: Introduction to Electrical Machines	1	To measure the angular displacement of rotor of the three-phase synchronous machine with respect to the stator on application of DC to the field winding and simultaneously to each phase-winding in sequence. OR Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding.
	2	Definition of motor and generator		
	3	Torque development due to alignment of two fields and the concept of torque angle.		
	4	Electro-magnetically induced emf, Elementary concept of an electrical machine.		
2nd	1	Comparison of generator and motor, Generalized theory of electrical machines	2	Speed control of DC shunt motor (i) Armature control method (ii) Field control method.
	2	Revision, Test/ Assignment		
	3	Unit 2: DC Machines - Main constructional features, Types of armature winding.		
	4	Function of the commutator for motoring and generation action.		
3rd	1	Factors determining induced emf,	3	Study of DC series motor with starter (to operate the motor on no load for a moment.
	2	Factors determining the electromagnetic torque.		
	3	Various types of DC generators		
	4	Significance of back e.m.f		
4th	1	the relation between back emf and terminal voltage.	4	Determine efficiency of DC motor by Swinburne's Test at (i) rated capacity (ii) half full load.
	2	Armature Reaction		
	3	Methods to improve commutation		

	4	Performance and characteristics of different types of DC motors		
5th	1	Speed control of dc shunt/series motors	5	To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and (iii) efficiency of a transformer from the data obtained from open circuit and short circuit test at full load.
	2	Need of starter		
	3	three-point dc shunt motor starter and 4-point starter		
	4	Electric Braking		
6th	1	Applications of DC motors	6	To find the efficiency and regulation of single-phase transformer by actually loading it.
	2	Faults in dc machines and their retrospective.		
	3	Losses in a DC machine		
	4	Determination of losses by Swinburne's test		
7th	1	Rating and Specifications of DC machines	7	Checking the polarity of the windings of a three-phase transformer and connecting the windings in various configurations.
	2	Revision,		
	3	Test/Assignment		
	4	Unit 3: Single Phase Transformer- Introduction.		
8th	1	Constructional features of a transformer and parts of transformer	8	Finding the voltage and current relationships of primary and secondary of a three-phase transformer under balanced load in various configurations conditions such as (a) Star-star (b) Star-delta (c) Delta-star (d) Delta - Delta configuring conditions.
	2	Working principle of a transformer		
	3	EMF equation		
	4	Transformer on no-load and its phasor diagram		
9th	1	Transformer – neglecting voltage drop in the windings – Ampere turn balance – its phasor diagram.		
	2	Mutual and leakage fluxes, leakage reactance.		
	3	Transformer on load, voltage drops and its phasor diagram.		
	4	Equivalent circuit diagram		
10th	1	Relation between induced emf and terminal voltage, voltage regulation of a transformer- mathematical relation		

	2	**Losses in a transformer**		
	3	**Open circuit and short circuit test.**		
	4	**Calculation of efficiency, condition for maximum efficiency-maintenance of Transformer, scheduled Maintenance.**		
11th	**1**	**Auto transformer construction, working and applications**		
	2	**Different types of transformers including dry type transformer**		
	3	**Rating and Specifications of single-phase transformer**		
	4	**Revision**		
12th	**1**	**Test/ Assignment**		
	2	**Unit 4: Three Phase Transformer- 1 Construction of three phase transformers and accessories of transformers such as Conservator, breather, Buchholtz Relay, Tap Changer (off load and on load) (Brief idea).**		
	3	**Types of three phase transformer i.e. delta-delta, delta-star, star-delta and star-star.**		
	4	**Star delta connections (relationship between phase and line voltage, phase and line current)**		
13th	**1**	**Conditions for parallel operation (only conditions are to be studied)**		
	2	**Difference between power and distribution transformer**		
	3	**Cooling of transformer**		
	4	**Rating and Specifications of three phase transformers**		