LESSON PLAN

Discipline: Elect. Engg.	Semester: Fifth (5th)	Name of the Faculty: KRUSHNA K BARAL
Subject: Energy conversion (II)	No. of days/week class allotted: six (6)	Semester from Date: 15.09.22 to Date: 22.12.22 No. of Weeks: 15
WEEK	**CLASS DAY**	**THEORY TOPICS**
1st	1st	Types of alternator and their constructional features.
	2nd	Basic working principle of alternator and the relation between speed and frequency
	3rd	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	4th	Explain harmonics, its causes and impact on winding factor
	5th	E.M.F equation of alternator.
	6th	Solve the problems
2nd	1st	Explain Armature reaction and its effect on emf at different power factor of load.
	2nd	The vector diagram of loaded alternator. (Solve numerical problems)
	3rd	Testing of alternator (Solve numerical problems) , Open Ckt Test Short Ckt Test
	4th	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method
	5th	Solve numerical problems
	6th	Parallel operation of alternator using synchro-scope and dark & bright lamp method

3rd	1st		Explain distribution of load by parallel connected alternators.
	2nd		Solve the problem
	3rd		**Review Class**
	4th		Introduction ,Definition & Construction of **synchronous motor**
	5th		3-ph synchronous motor Concept of load angle & working
	6th		Derive Torque, Power Developed
4th	1st		Effect of varying load with constant excitation
	2nd		Effect of varying excitation with constant load.
	3rd		Power angle characteristics of cylindrical rotor motor
	4th		Explain effect of excitation on Armature current and power factor
	5th		Hunting in Synchronous Motor
	6th		**Monthly test**
5th	1st		Function of Damper Bars in synchronous motor and generator.
	2nd		Torque equation & solution of 1st problem
	3rd		Solution of 2nd & 3rd numerical problems
	4th		Describe Method of starting of SM.
	5th		State application of synchronous motor
	6th		**Review Class**

6th	1st	Introduction & Definition. Principle of operation of 3-phase induction motor
	2nd	Constructional features of Sq. cage rotor & Slip ring type rotor
	3rd	Terms used in I.M :Synchronous Speed, Actual Speed, Slip Speed, Absolute Slip with relation
	4th	Rotor frequency, Rotor emf, Rotor reactance etc.
	5th	Solution of numerical problems
	6th	Production of Rotating Magnetic Field
7th	1st	Derivation of running torque starting torque ,condition for max staring torque , Condition for max. Running torque.
	2nd	Torque slip characteristics
	3rd	Torque relationship: T_{st}/T_{fl}, T_{fl}/T_{max} (Solve numerical problems)
	4th	Derivation of rotor power & Standard formula of rotor power relation , Losses & Power stage diagram & Efficiency of the motor
	5th	**Monthly test**
	6th	numerical problem related to losses & torque ratios
8th	1st	Numerical problems
	2nd	Numerical problems
	3rd	Methods of starting: Types of the starters
	4th	DOL starter , Star/Delta Starter

	5th	Auto T/F starter , Rotor resistance starter
	6th	Introduction of Speed control of 3- ph I.M., Speed control by changing supply frequency
9th	1st	Speed control by changing no. of poles & slip or rotor resistance control
	2nd	Plugging of a 3-phase Induction motor
	3rd	& Different type of motor enclosures.
	4th	Induction generators
	5th	Applications of an Induction motor
	6th	**Review Class**
10th	1st	**Review Class**
	2nd	Introduction, Definition, Ferraris principle , Explanation of double revolving field theory & Cross filed theory.
	3rd	Working of 1-ph induction motor & it's Type. (i)Split Phase motor
	4th	(ii) Capacitor start I.M. & (iii) Capacitor start-run motor
	5th	**Monthly test**
	6th	(iv) Permanent capacitor type I.M.
11th	1st	Shaded pole type I.M.
	2nd	Speed torque characteristic
	3rd	Explain the method to change the direction of rotation of the above motors

	4th	**Review Class**
	5th	**Review Class**
	6th	Construction, working principle, running characteristics & application of 1-ph series motor
12th	1st	Construction, working principle & application of Universal motor & Repulsion motors
	2nd	Working principle of Repulsion start motor, Repulsion start induction run motor, Repulsion induction motor.
	3rd	**Review Class**
	4th	Introduction of Stepper motor & Working of stepper motor
	5th	Classification of stepper motor
	6th	Principle of variable reluctant stepper motor , permanent magnet stepper motor, hybrid stepper motor, Application of stepper motor
13th	1st	**Review Class**
	2nd	Definition, principle &construction of 3-ph T/F Grouping of windings
	3rd	Advantages of Transformer , Parallel operation of 3-ph T/F , Numerical problem
	4th	Tap changer: On load tap changer ,
	5th	Off load tap changer
	6th	Maintenance Schedule of Power Transformer
	1st	**Review Class**
	2nd	**Review Class**

14th	3rd	**Monthly test**
	4th	Revision
	5th	Revision
	6th	Revision
15th	1st	Revision
	2nd	Revision
	3rd	Revision
	4th	Revision
	5th	Revision
	6th	Revision