

LESSON PLAN

Discipline: Elect. Engg.	Semester: Fifth (5 th)	Name of the Faculty: Er R.K.Jena
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
1 st	1 st	Types of alternator and their constructional features.
	2 nd	Basic working principle of alternator and the relation between speed and frequency
	3 rd	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	4 th	Explain harmonics, its causes and impact on winding factor
	5 th	E.M.F equation of alternator.
	6 th	Solve the problems
2 nd	1 st	Explain Armature reaction and its effect on emf at different power factor of load.
	2 nd	The vector diagram of loaded alternator. (Solve numerical problems)
	3 rd	Testing of alternator (Solve numerical problems) , Open Ckt Test Short Ckt Test
	4 th	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method
	5 th	Solve numerical problems
	6 th	Parallel operation of alternator using synchro-scope and dark & bright lamp method

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

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

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

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

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