LESSION PLAN FOR ACADEMIC SESSION:- 2024-25

Discipline:- Electrical Engineering	Semester:- 5th	Name of the teaching faculty:- TUKURAJ SOREN
Subject:-Th.2 ENERGY CONVERSION II	No. of days/ per week class allotted:-4	Semester from:-01-07-2024 TO 16-12-2024 No. of weeks:15
Week	Class day	Theory
1st	1st	**1. ALTERNATOR:** 1.1. Types of alternator and their constructional features
	2nd	1.2. Basic working principle of alternator and the relation between speed and frequency.
	3rd	continue
	4th	1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
2nd	1st	continue
	2nd	1.4. Explain harmonics, its causes and impact on winding factor. 1.5. E.M.F equation of alternator. (Solve numerical problems).
	3rd	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
	4th	1.7. The vector diagram of loaded alternator. (Solve numerical problems)
3rd	1st	1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test. 1.8.2. Short circuit test.
	2nd	1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	3rd	1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method.
	4th	1.11. Explain distribution of load by parallel connected alternators.
4th	1st	**2. SYNCHRONOUS MOTOR:** 2.1. Constructional feature of Synchronous Motor 2.2. Principles of operation, concept of load angle
	2nd	2.3. Derive torque, power developed.
	3rd	2.4. Effect of varying load with constant excitation. 2.5. Effect of varying excitation with constant load.
	4th	2.6. Power angle characteristics of cylindrical rotor motor.
5th	1st	2.7. Explain effect of excitation on Armature current and power factor.
	2nd	2.8. Hunting in Synchronous Motor. 2.9. Function of Damper Bars in synchronous motor and generator.
	3rd	2.10. Describe method of starting of Synchronous motor.

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	4th	2.11. State application of synchronous motor.
6th	1st	**3. THREE PHASE INDUCTION MOTOR:** 3.1. Production of rotating magnetic field 3.2. Constructional feature of Squirrel cage and Slip ring induction motors.
	2nd	3.3. Working principles of operation of 3-phase Induction motor. 3.4. Define slip speed, slip and establish the relation of slip with rotor quantities.
	3rd	3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
	4th	3.6. Torque-slip characteristics.
7th	1st	3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems)
	2nd	3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
	3rd	3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
	4th	3.9. Methods of starting and different types of starters used for three phase Induction motor
8th	1st	3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	2nd	3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	3rd	3.11. Plugging as applicable to three phase induction motor.
	4th	3.12. Describe different types of motor enclosures.
9th	1st	3.13. Explain principle of Induction Generator and state its applications.
	2nd	**4. SINGLE PHASE INDUCTION MOTOR:** 4.1. Explain Ferrari's principle.
	3rd	4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor
	4th	4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. 4.3.1. Split phase motor. 4.3.2. Capacitor Start motor.
10th	1st	4.3.3. Capacitor start, capacitor run motor. 4.3.4. Permanent capacitor type motor.
	2nd	4.3.5. Shaded pole motor.