

**UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY, RAYAGADA**  
**DEPARTMENT OF ELECTRICAL ENGINEERING**

**Academic Lesson Plan for 5<sup>th</sup> Semester - 2022 (Winter)**

**Subject: ENERGY CONVERSION -II(TH 2)**

**Name of the teaching faculty- SRI ARBIND PRADHAN ( SR. LECTURER)**

<b>SEMESTER FROM</b> <b>DATE:15/09/2022 TO</b> <b>DATE:22/12/2022</b>	<b>No. of periods per week: 4</b> <b>NO.OF WEEKS:15</b> <b>Total periods: 60</b>	<b>Internal Exam. : 20 Marks</b> <b>End Semester Exam.: 80 Marks</b> <b>Total Marks: 100 Marks</b>
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WEEK	CLASS DAY	UNIT	THEORY/PRACTICAL TOPICS	REMARK
1ST	1ST	ALTERNATOR	Types of alternator and their constructional features.	
	2ND	ALTERNATOR	Basic working principle of alternator and the relation between speed and frequency.	
	3RD	ALTERNATOR	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).	
	4TH	ALTERNATOR		
2ND	1ST	ALTERNATOR	Explain harmonics, its causes and impact on winding factor.	
	2ND	ALTERNATOR	E.M.F equation of alternator. (Solve numerical problems).	
	3RD	ALTERNATOR	Explain Armature reaction and its effect on emf at different power factor of load.	
	4TH	ALTERNATOR	The vector diagram of loaded alternator. (Solve numerical problems)	
3RD	1ST	ALTERNATOR	The vector diagram of loaded alternator. (Solve numerical problems)	
	2ND	ALTERNATOR	Testing of alternator (Solve numerical problems) 1. Open circuit test. 2. Short circuit test.	
	3RD	ALTERNATOR	Testing of alternator (Solve numerical problems) 1. Open circuit test. 2. Short circuit test.	
	4TH	ALTERNATOR	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)	
4TH	1ST	ALTERNATOR	Parallel operation of alternator using synchroscope and dark & bright lamp method.	
	2ND	ALTERNATOR	Explain distribution of load by parallel connected alternators	
	3RD	SYNCHRONOUS MOTOR	Constructional feature of Synchronous Motor. Principles of operation, concept of load angle	
	4TH	SYNCHRONOUS MOTOR	Derive torque, power developed.	
5TH	1ST	SYNCHRONOUS MOTOR	Effect of varying load with constant excitation. 2 Effect of varying excitation with constant load. Power angle characteristics of cylindrical rotor motor.	
	2ND	SYNCHRONOUS MOTOR		
	3RD	SYNCHRONOUS MOTOR	Explain effect of excitation on Armature current and power factor.	
	4TH	SYNCHRONOUS	Hunting in Synchronous Motor.	

		MOTOR	
6TH	1ST	SYNCHRONOUS MOTOR	Function of Damper Bars in synchronous motor and generator.
	2ND	SYNCHRONOUS MOTOR	Describe method of starting of Synchronous motor. State application of synchronous motor.
	3RD	THREE PHASE INDUCTION MOTOR	Production of rotating magnetic field. Constructional feature of Squirrel cage and Slip ring induction motors.
	4TH	THREE PHASE INDUCTION MOTOR	Working principles of operation of 3-phase Induction motor
7TH	1ST	THREE PHASE INDUCTION MOTOR	Define slip speed, slip and establish the relation of slip with rotor quantities.
	2ND	THREE PHASE INDUCTION MOTOR	Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
	3RD	THREE PHASE INDUCTION MOTOR	Torque-slip characteristics
	4TH	THREE PHASE INDUCTION MOTOR	Derive relation between full load torque and starting torque etc. (solve numerical problems)
8TH	1ST	THREE PHASE INDUCTION MOTOR	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
	2ND	THREE PHASE INDUCTION MOTOR	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
	3RD	THREE PHASE INDUCTION MOTOR	Methods of starting and different types of starters used for three phase Induction motor.
	4TH	THREE PHASE INDUCTION MOTOR	Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
9TH	1ST	THREE PHASE INDUCTION MOTOR	Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	2ND	THREE PHASE INDUCTION MOTOR	Plugging as applicable to three phase induction motor.
	3RD	THREE PHASE INDUCTION MOTOR	Describe different types of motor enclosures.
	4TH	THREE PHASE INDUCTION MOTOR	Explain principle of Induction Generator and state its applications.
10TH	1ST	SINGLE PHASE INDUCTION	Explain Ferrari's principle. 4.2. Explain double revolving field theory and Cross-field theory to

		MOTOR	analyze starting torque of 1-phase induction motor.	
	2ND	SINGLE PHASE INDUCTION MOTOR		
	3RD	SINGLE PHASE INDUCTION MOTOR	Explain Working principle, Torque speed characteristics, performance characteristics and application of Split phase motor	
	4TH	SINGLE PHASE INDUCTION MOTOR	Explain Working principle, Torque speed characteristics, performance characteristics and application of Capacitor start, capacitor run motor.	
11TH	1ST	SINGLE PHASE INDUCTION MOTOR	Explain Working principle, Torque speed characteristics, performance characteristics and application of Capacitor start motor.	
	2ND	SINGLE PHASE INDUCTION MOTOR	Explain Working principle, Torque speed characteristics, performance characteristics and application of Permanent capacitor type motor.	
	3RD	SINGLE PHASE INDUCTION MOTOR	Explain Working principle, Torque speed characteristics, performance characteristics and application of Shaded pole motor.	
	4TH	SINGLE PHASE INDUCTION MOTOR	Explain the method to change the direction of rotation of above motors.	
12TH	1ST	COMMUTATOR MOTORS	Construction, working principle, running characteristic and application of single phase series motor.	
	2ND	COMMUTATOR MOTORS		
	3RD	COMMUTATOR MOTORS	Construction, working principle and application of Universal motors.	
	4TH	COMMUTATOR MOTORS	Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.	
13TH	1ST	COMMUTATOR MOTORS		
	2ND	COMMUTATOR MOTORS		
	3RD	SPECIAL ELECTRICAL MACHINE	Principle of Stepper motor.	
	4TH	SPECIAL ELECTRICAL MACHINE	Classification of Stepper motor. Principle of variable reluctant stepper motor.	
14TH	1ST	SPECIAL ELECTRICAL MACHINE	Principle of Permanent magnet stepper motor.	
	2ND	SPECIAL ELECTRICAL MACHINE	Principle of hybrid stepper motor.	
	3RD	SPECIAL ELECTRICAL MACHINE	Applications of Stepper motor	
	4TH	THREE PHASE	Explain Grouping of winding, Advantages.	

		TRANSFORMERS		
15 <sup>TH</sup>	1 <sup>ST</sup>	THREE PHASE TRANSFORMERS	Explain parallel operation of the three phase transformers.	
	2 <sup>ND</sup>	THREE PHASE TRANSFORMERS		
	3 <sup>RD</sup>	THREE PHASE TRANSFORMERS	Explain tap changer (On/Off load tap changing)	
	4 <sup>TH</sup>	THREE PHASE TRANSFORMERS	Maintenance Schedule of Power Transformers.	