NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT: TH-2(ENERGY CONVERSION-II)

Name Of The Faculty :- Er. Shraddha Priyadarshini
Branch :- Electrical Engineering **Semester :-** 5th
Academic Year : 2025-26 **Examination :-** 2025 (W)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Alternator (Synchronous Generator)	14	14
2	Synchronous Motor	8	8
3	Induction motor	14	14
4	Single Phase induction motor	8	8
5	Commutator motors	6	6
6	Special Electric Machine	5	5
7	Three phase transformers	5	5
Total Period:		60	60

Shraddha 10-07-2025
Sign of Faculty

10/07/25
Sign of H.O.D.

Name of the programme: Diploma in Electrical Engineering	Semester: 5th	**Name of the Teaching Faculty:** Er. Shraddha Priyadarshini	
		Academic Year : 2025-26 **Examination :** 2025 (W)	
Course Code: TH-2	**Course Year:** 3rd Year	**No. of Classes Alloted Per Week :**	4
		Planned Classes Required to Complete the Course	60

Week	Class Day	Topics to be Covered
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	1.2. Basic working principle of alternator and the relation between speed and frequency.
	4th	1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
2nd	1st	1.4. Explain harmonics, its causes and impact on winding factor
	2nd	1.4. Explain harmonics, its causes and impact on winding factor
	3rd	1.5. E.M.F equation of alternator. (Solve numerical problems).
	4th	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
3rd	1st	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
	2nd	1.7. The vector diagram of loaded alternator. (Solve numerical problems)
	3rd	1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test.
	4th	1.8.2. Short circuit test.
4th	1st	1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	2nd	1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method.
	3rd	1.11. Explain distribution of load by parallel connected alternators.
	4th	1.11. Explain distribution of load by parallel connected alternators.
5th	1st	SYNCHRONOUS MOTOR: 2.1. Constructional feature of Synchronous Motor
	2nd	2.2. Principles of operation, concept of load angle
	3rd	2.3. Derive torque, power developed.
	4th	2.4. Effect of varying load with constant excitation. 2.5. Effect of varying excitation with constant load.

Week	Class Day	Topics to be Covered
6th	1st	2.6. Power angle characteristics of cylindrical rotor motor.
	2nd	2.7. Explain effect of excitation on Armature current and power factor.
	3rd	2.8. Hunting in Synchronous Motor.
	4th	2.9. Function of Damper Bars in synchronous motor and generator.
7th	1st	2.10. Describe method of starting of Synchronous motor.
	2nd	2.11. State application of synchronous motor.
	3rd	THREE PHASE INDUCTION MOTOR: 3.1. Production of rotating magnetic field.
	4th	3.2. Constructional feature of Squirrel cage and Slip ring induction motors
8th	1st	3.3. Working principles of operation of 3-phase Induction motor.
	2nd	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
9th	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.
10th	1st	3.10. Explain speed control by voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	2nd	3.11. Plugging as applicable to three phase induction motor
	3rd	3.12. Describe different types of motor enclosures . 3.13. Explain principle of Induction Generator and state its applications.
	4th	SINGLE PHASE INDUCTION MOTOR: 4.1. Explain Ferrari's principle
11th	1st	4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
	2nd	4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors.
	3rd	4.3.1. Split phase motor

Week	Class Day	Topics to be Covered
11th	4th	4.3.2. Capacitor Start motor. 4.3.3. Capacitor start, capacitor run motor
12th	1st	4.4. Explain the method to change the direction of rotation of above motors.
	2nd	5.1. Construction, working principle, running characteristic and application of single phase series motor.
	3rd	5.1. Construction, working principle, running characteristic and application of single phase series motor.
	4th	5.2. Construction, working principle and application of Universal motors.
13th	1st	5.2. Construction, working principle and application of Universal motors.
	2nd	5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	3rd	5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	4th	6. SPECIAL ELECTRICAL MACHINE: 6.1. Principle of Stepper motor. 6.2. Classification of Stepper motor.
14th	1st	6.3. Principle of variable reluctant stepper motor. 6.6. Applications of Stepper motor.
	2nd	THREE PHASE TRANSFORMERS: 7.1. Explain Grouping of winding, Advantages.
	3rd	7.2. Explain parallel operation of the three phase transformers.
	4th	7.2. Explain parallel operation of the three phase transformers.
15th	1st	7.3. Explain tap changer (On/Off load tap changing)
	2nd	7.3. Explain tap changer (On/Off load tap changing)
	3rd	7.4. Maintenance Schedule of Power Transformers.
	4th	7.4. Maintenance Schedule of Power Transformers.

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