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DEPARTMENT OF ELECTRICAL ENGINEERING

Govt. Polytechnic, Balasore

LESSON PLANFOR ACADEMIC SESSION - 2025-26

TH:3- AC Machines and Special Electrical Machines (Course Code EEPC206).

Course Code : EEPC206 **(TH:3)**	**Semester : 4th**
Total Periods : 45 Hours	**Examination : 3 Hours**
Theory Periods : 3 P/Week	**Progressive Assessment: 30 Marks**
Maximum Marks : 100	**End Semester Examination : 70 Marks**
Semester From Date : 22/12/2025	**To Date :**
Name of the Teaching Faculty: Er. ANITA SHIAL	

WEEK	PERIOD	TOPIC
1st	1st	**Unit-I**: Working principle of 3-Phase Induction Motor; Production of Rotating Magnetic Field.
	2nd	Concepts of Synchronous speed, rotor speed, and Slip.
	3rd	Construction of 3-Phase Induction Motors: Squirrel cage and Slip ring types.
2nd	1st	Rotor quantities: Frequency, induced EMF, and power factor (Starting/Running).
	2nd	Torque-Slip characteristics: Starting, full load, and maximum torque.
	3rd	Numerical problems on Torque-Slip relations and Slip calculations.
3rd	1st	Induction motor as a generalized transformer; Phasor diagram.
	2nd	Power flow diagram and Four-quadrant operation.
	3rd	Numerical problems on Power flow and efficiency of Induction Motors.
4th	1st	Starters: Need for starters and Stator Resistance starter.
	2nd	Auto transformer and Star-Delta starters.
	3rd	Rotor resistance and Soft starters.
5th	1st	Speed control: Stator voltage control and Pole changing methods.
	2nd	Speed control: Rotor resistance and VVVF (Variable Voltage Variable Frequency).
	3rd	Motor selection for applications; Maintenance of 3-Phase Induction motors.
6th	1st	**Unit-II:** Double field revolving theory for 1-Phase Induction Motors.
	2nd	Principle of making 1-Phase induction motors self-starting.

	3rd	Construction & Working: Resistance start and Capacitor start induction run motors.
7th	1st	Capacitor start capacitor run and Shaded pole motors.
	2nd	Repulsion type, Series motor, and Universal motor.
	3rd	Hysteresis motor; Torque-speed characteristics of 1-Phase motors.
8th	1st	Motor selection for domestic/industrial loads; Maintenance of 1-Phase motors.
	2nd	**Unit-III:**3-Phase Alternators: Principle of working; Moving vs. Stationary armature.
	3rd	Constructional details: Parts, functions, and Rotor types (Salient/Cylindrical).
9th	1st	Windings: Single and Double layer; EMF equation of an Alternator.
	2nd	Pitch factor (Kp) and Distribution factor (Kd); Numerical on EMF equation.
	3rd	Alternator loading: Factors affecting terminal voltage; Armature resistance.
10th	1st	Armature Leakage Reactance; Armature Reaction at various power factors.
	2nd	Synchronous Impedance (Zs) concept; Vector diagrams.
	3rd	Voltage regulation: Direct loading and Synchronous Impedance methods.
11th	1st	Maintenance of Alternators.
	2nd	**Unit-IV:** Synchronous Motors: Principle of operation and Load Angle (delta).
	3rd	Torques: Starting, running, pull-in, and pull-out torques.
12th	1st	Synchronous motor on load with constant excitation; Numerical problems.
	2nd	Effect of excitation at constant load; Numerical problems.
	3rd	V-Curves and Inverted V-Curves of Synchronous motor.
13th	1st	Hunting and Phase swinging: Causes and remedies.
	2nd	Methods of Starting Synchronous Motors (Damper winding, etc.).
	3rd	Losses, Efficiency, and Application areas of Synchronous motors.
14th	1st	**Unit-V:** FHP Motors: Synchronous Reluctance and Switched Reluctance Motors.
	2nd	BLDC (Brushless DC) Motors: Construction and working.
	3rd	Permanent Magnet Synchronous Motors (PMSM).
15th	1st	Stepper motors and AC/DC Servomotors.
	2nd	Torque-speed characteristics and Applications of FHP motors.
	3rd	Final Revision and discussion of previous year exam questions.

22/12/25

Lect. Stage-II, Elect Dept.
Government Polytechnic, BLS
Teaching Faculty

22/12/25

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