



SYNERGY SCHOOL OF ENGINEERING, DHENKANAL

LESSONPLAN Session(2025-2026)

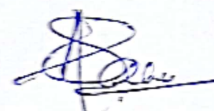
Discipline: Electrical Engineering	Semester: 4 th , Summer/2025-26	Name of the Faculty: AMARENDRA BEHERA
Subject: AC MACHINES AND SPECIAL ELECTRICAL MACHINES	No. of Days/week: 04	Start Date: 22/12/2025 End Date:

Week	Class Day	Theory Topics
1st	1st	Three Phase Induction Motor 1.1 Working principle: production of rotating magnetic field, Synchronous speed, rotor speed and slip
	2nd	Constructional details of 3 phase induction motors: Squirrel cage induction motor and Slip ring induction motor
	3rd	Rotor quantities: frequency, induced emf, power factor at starting and running condition Characteristics of torque versus slip (speed), Torques: starting, full load and maximum with relations among them(numerical)
2nd	1st	Induction motor as a generalized transformer with phasor diagram
	2nd	Four quadrant operation, Power flow diagram(numerical)
	3rd	Starters: need and types; stator resistance, auto transformer, star delta, rotor resistance and soft starters Speed control methods: stator voltage, pole changing, rotor resistance and VVVF
3rd	1st	Motor selection for different applications as per the load torque speed requirements
	2nd	Maintenance of three phase induction motors
	3rd	Single phase Induction Motors 2.1 Double field revolving theory Principle of making single phase induction motors self-start
4th	1st	Construction and working of single-phase induction motors
	2nd	Resistance start induction run
	3rd	Capacitor start induction run, Capacitor start capacitor run
5 th	1st	Shaded pole
	2nd	Repulsion type
	3rd	Series motor, Universal motor
6 th	1st	Hysteresis motor
	2nd	Torque-speed characteristics for all the above motors.
	3rd	Motor selection for different applications as per the load torque- speed requirements Maintenance of single-phase induction motors

7 th	1st	Three phase Alternators 3.1 Principle of working, moving and stationary armatures
	2nd	Constructional details: parts and their functions
	3rd	Rotor constructions, Windings: Single and Double layer
8 th	1st	E.M.F. equation of an Alternator with numerical by considering short pitch factor and distribution factor
	2nd	Alternator loading
	3rd	Factors affecting the terminal voltage of alternator Armature resistance and leakage reactance drops.
9 th	1st	Armature reaction at various power factors and synchronous impedance
	2nd	Voltage regulation: direct loading and synchronous impedance methods
	3rd	Maintenance of alternators Synchronous Motors 4.1 Principle of working /operation, significance of load angle.
10 th	1st	Torques: starting torque, running torque, pull in torque, pull out torque
	2nd	Synchronous motor on load with constant excitation (numerical), effect of excitation at constant load (numerical).
	3rd	Curves and Inverted V-Curves. Hunting and Phase swinging.
11 th	1st	Methods of Starting of Synchronous Motor
	2nd	Losses in synchronous motors and efficiency (no numerical).
	3rd	Applications areas Fractional horsepower (FHP) Motors 5.1 Construction and working
12 th	1st	Synchronous Reluctance Motor
	2nd	Switched Reluctance Motor
	3rd	BLDC Permanent Magnet Synchronous Motors
13 th	1st	Stepper motors
	2nd	AC and DC servomotors
	3rd	Torque speed characteristics of above motors, Applications of above motors
14 th	1st	Doubt Clearing class
	2nd	Doubt Clearing class
	3rd	Doubt Clearing class, Assignment Evaluation
15 th	1st	Discussion of Previous year questions
	2nd	Discussion of Previous year questions
	3rd	Discussion of Previous year questions

Anurendra Bohery

Name of faculty



Name of HOD Electrical