DEPARTMENT OF ELECTRICAL ENGINEERING

Govt. Polytechnic, Balasore

LESSON PLAN FOR ACADEMIC SESSION - 2023-24
ENERGY CONVERSION-I

Course Code : Th.1	**Semester : 4th**
Total Periods : 75 Periods	**Examination : 3 Hours**
Lecture Periods : 4 P/Week	**Internal Assessment : 20 Marks**
Tutorial : -1P/week	**End Semester Examination : 80 Marks**
Maximum Marks : 100	
Semester From Date : 16/01/2024	**To Date : 8/05/2024**
Name of Teaching Faculty: Sri Biswajit Mallik (Sr. Lect. Electrical)	

WEEK	PERIOD	TOPIC
1st	1st	Introduction to electrical machine D.C Generator
	2nd	Explain principle of operation Explain Constructional feature
	3rd	Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
	4th	Simple Lap and wave winding (problems on winding diagram)
	5th	Explain Different types of D.C. machines i.e. Shunt, Series machine with problem solving methods.
2nd	1st	Explain Different types of D.C. machines i.e. Compound machine with problem solving methods.
	2nd	Derive EMF equation of DC generators. (Solve problems)
	3rd	Explain Armature reaction in D.C. machine.
	4th	Explain commutation in D.C. machine.
	5th	Explain Methods of improving commutation (Resistance and emf commutation)
3rd	1st	Explain role of inter poles and compensating winding. (solve problems)
	2nd	Characteristics of D.C. Generators with problem solving methods
	3rd	Characteristics of D.C. Generators with problem solving methods
	4th	State application of different types of D.C. Generators.
	5th	Concept of critical resistance causes of failure of

		development of emf.
4th	1st	Explain losses of D.C. machines & numerical problems.
	2nd	Explain efficiency of D.C. machines, condition for maximum efficiency and numerical problems.
	3rd	Explain parallel operation of D.C. Generators.
	4th	Explain parallel operation of D.C. Generators.
	5th	Introduction to D. C. MOTORS
5th	1st	Explain basic working principle of DC motor
	2nd	State Significance of back emf in D.C. Motor.
	3rd	Derive voltage equation of Motor
	4th	Derive torque (Equation of Armature Torque and shaft Torque) (solve problems)
	5th	Explain performance characteristics of shunt motors and their application. (Solve problems)
6th	1st	Explain performance characteristics of series motors and their application. (Solve problems)
	2nd	Explain performance characteristics of compound motors and their application. (Solve problems)
	3rd	Explain methods of starting shunt, series and compound motors, (solve problems)
	4th	Solve problems on dc motors.
	5th	Explain speed control of D.C shunt motors by Flux control method
7th	1st	Armature voltage (rheostatic) Control method.
	2nd	Solve problems on speed control of D.C shunt motors .
	3rd	Explain speed control of series motors by Flux control method.
	4th	Explain speed control of series motors by series parallel method.
	5th	Explain determination of efficiency of D.C. Machine by break test method.
8th	1st	Explain determination of efficiency of D.C. Machine by Swinburne's Test method.
	2nd	Explain Losses & efficiency
	3rd	Explain condition for maximum power.
	4th	Solve numerical problems on losses, efficiency and maximum power.
	5th	**SINGLE PHASE TRANSFORMER** Explain working principle of transformer.
9th	1st	Explains Transformer Construction – Arrangement of core & winding in different types of transformer
	2nd	Brief ideas about transformer accessories such as conservator, tank, breather explosion vent etc.
	3rd	Explain types of cooling methods
	4th	State the procedures for Care and maintenance
	5th	Derive EMF equation
10th	1st	Ideal transformer voltage transformation ratio
	2nd	Explain Transformer on no load and on load phasor diagrams.
	3rd	Explain phasor diagram of transformer with winding Resistance and Magnetic leakage. Phasor diagram on load using upf, leading pf and lagging pf.
	4th	Explain Equivalent circuit and solve numerical problems.

	5th	Calculate Approximate & exact voltage drop of a Transformer.
11th	1st	Calculate Regulation of various loads and power factor.
	2nd	Explain Different types of losses in a Transformer.
	3rd	Solve problems on losses of transformer.
	4th	Explain Open circuit test.
	5th	Explain Short circuit test.
12th	1st	Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	2nd	Explain All Day Efficiency
	3rd	Solve problems on all day efficiency.
	4th	Explain determination of load corresponding to Maximum efficiency.
	5th	Explain parallel operation of single phase transformer
13th	1st	**AUTO TRANSFORMER** Explain constructional features
	2nd	Explain Working principle of single phase Auto Transformer.
	3rd	State Comparison of Auto transformer with an two winding transformer (saving of Copper)
	4th	State Comparison of Auto transformer with an two winding transformer (saving of Copper)
	5th	State Uses of Auto transformer.
14th	1st	Explain Tap changer with transformer (on load and off load condition)
	2nd	**INSTRUMENT TRANSFORMERS** Explain Current Transformer
	3rd	Potential Transformer
	4th	Define Ratio error, Phase angle error, Burden
	5th	Define Ratio error, Phase angle error, Burden
15th	1st	Uses of C.T. and P.T.
	2nd	Tutorial
	3rd	Tutorial
	4th	Tutorial
	5th	Tutorial