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

LESSION PLAN

SUBJECT: ENERGY CONVERSION-I (TH-1)

Name Of The Faculty :- ER NIRANJAN BARIK
Branch :- ELECTRICAL ENGINEERING **Semester :- 4TH**
Session :- 2024-25 **Examination :-** 2025(E)

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	DC GENERATORS	17	25
2	DC MOTORS	15	16
3	SINGLE PHASE TRANSFORMER	20	22
4	AUTO TRANSFORMER	3	8
5	INSTRUMENT TRANSFORMER	5	4
	Total Period:	60	75

Sign of Faculty

Sign of H.O.D.

Discipline: ELECTRICAL ENGINEERING	Semester: 3rd	**Name of the Teaching Faculty:** Er. NIRANJAN BARIK
		SESSION : 2024-25 **EXAMINATION :** 2024 (S)
Week	**Class Day**	**Topics to be Covered**
1st	1st	1.1. Operating principle of generator
	2nd	1.2. Constructional features of DC machine. 1.2.1. Yoke, Pole & field winding, Armature, Commutator.
	3rd	1.2.2. Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
	4th	1.2.3. Simple Lap and wave winding, Dummy coils.
	5th	Tutorial
2nd	1st	1.3. Different types of D.C. machines (Shunt, Series and Compound)
	2nd	1.4. Derivation of EMF equation of DC generators. (Solve problems)
	3rd	1.5. Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
	4th	1.5. Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
	5th	Tutorial
3rd	1st	1.6. Armature reaction in D.C. machine
	2nd	1.7. Commutation and methods of improving commutation. 1.7.1. Role of inter poles and compensating winding in commutation.
	3rd	1.8. Characteristics of D.C. Generators
	4th	1.9. Application of different types of D.C. Generators. 1.10. Concept of critical resistance and critical speed of DC shunt generator
	5th	Tutorial
4th	1st	1.11. Conditions of Build-up of emf of DC generator. 1.12. Parallel operation of D.C. Generators
	2nd	1.13. Uses of D.C generators.
	3rd	D. C. MOTORS 2.1. Basic working principle of DC motor 2.2. Significance of back emf in D.C. Motor.
	4th	2.3. Voltage equation of D.C. Motor and condition for maximum power output(simple problems)
	5th	Tutorial

Week	Class Day	Topics to be Covered
5th	1st	2.4. Derive torque equation (solve problems)
	2nd	2.5. Characteristics of shunt, series and compound motors and their application.
	3rd	2.5. Characteristics of shunt, series and compound motors and their application.
	4th	2.6. Starting method of shunt, series and compound motors.
	5th	Tutorial
6th	1st	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems
Week	**Class Day**	**Topics to be Covered**
6th	2nd	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems
	3rd	2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
	4th	2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
	5th	Tutorial
7th	1st	2.9. Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems)
	2nd	2.9. Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems)
	3rd	2.11. Losses, efficiency and power stages of D.C. motor(solve numerical problems) 2.12. Uses of D.C. motors
	4th	2.11. Losses, efficiency and power stages of D.C. motor(solve numerical problems) 2.12. Uses of D.C. motors
	5th	Tutorial
8th	1st	3.1 Working principle of transformer. 3.2 Constructional feature of Transformer.
	2nd	3.2 Constructional feature of Transformer.
	3rd	3.2.1 Arrangement of core & winding in different types of transformer.
	4th	3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
	5th	Tutorial

Week	Class Day	Topics to be Covered
9th	1st	3.2.3 Explain types of cooling methods
	2nd	3.3 State the procedures for Care and maintenance.
	3rd	3.4 EMF equation of transformer.
	4th	3.4 EMF equation of transformer.
	5th	Tutorial
10th	1st	3.5 Ideal transformer voltage transformation ratio
	2nd	3.5 Ideal transformer voltage transformation ratio
	3rd	3.6 Operation of Transformer at no load, on load with phasor diagrams
	4th	3.6 Operation of Transformer at no load, on load with phasor diagrams
	5th	Tutorial
11th	1st	3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer
	2nd	3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer
	3rd	3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
	4th	3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
	5th	Tutorial
12th	1st	3.9 To explain Equivalent circuit and solve numerical problems.
	2nd	3.9 To explain Equivalent circuit and solve numerical problems.
	3rd	3.10 Approximate & exact voltage drop calculation of a Transformer.
	4th	3.11 Regulation of transformer.
	5th	Tutorial
13th	1st	3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)
	2nd	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	3rd	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	4th	3.14 Explain All Day Efficiency (solve problems)
	5th	Tutorial

Week	Class Day	Topics to be Covered
14th	1st	3.14 Explain All Day Efficiency (solve problems)
	2nd	3.15 Determination of load corresponding to Maximum efficiency
	3rd	3.15 Determination of load corresponding to Maximum efficiency
	4th	3.14 Explain All Day Efficiency (solve problems)
	5th	3.15 Determination of load corresponding to Maximum efficiency
15th	1st	3.15 Determination of load corresponding to Maximum efficiency
	2nd	3.16 Parallel operation of single phase transformer.
	3rd	3.16 Parallel operation of single phase transformer.
	4th	3.16 Parallel operation of single phase transformer.
	5th	Tutorial
16th	1st	1. Constructional features of Auto transformer
	2nd	4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper).
	3rd	4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper).
	4th	4.4. Uses of Auto transformer
	5th	4.5. Explain Tap changer with transformer (on load and off load condition)
17th	1st	4.5. Explain Tap changer with transformer (on load and off load condition)
	2nd	4.5. Explain Tap changer with transformer (on load and off load condition)
	3rd	1.1 Explain Current Transformer and Potential Transformer
	4th	1.1 Explain Current Transformer and Potential Transformer
	5th	1.1 Explain Current Transformer and Potential Transformer
18th	1st	1.2 Define Ratio error, Phase angle error, Burden.
	2nd	1.2 Define Ratio error, Phase angle error, Burden.
	3rd	1.3 Uses of C.T. and P.T
	4th	1.3 Uses of C.T. and P.T
	5th	Tutorial

Sign of Faculty

Sign of H.O.D.