



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



## **LESSON PLAN**

**SUBJECT: Th-1 (ENERGY CONVERSION-I)**

### **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

<b>Discipline:</b> ELECTRICAL ENGG.	<b>Semester:</b> 4TH	<b>Name of the Teaching Faculty:</b> Er Dharmapada Ojha
<b>WEEK</b>	<b>CLASS DAY</b>	<b>TOPIC</b>
<b>1st</b>	1	1.1. Operating principle of generator
	2	1.2. Constructional features of DC machine. 1.2.1. Yoke, Pole & field winding, Armature, Commutator.
	3	1.2.2. Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
	4	1.2.3. Simple Lap and wave winding, Dummy coils.
	5	TUTORIAL
<b>2nd</b>	1	1.3. Different types of D.C. machines (Shunt, Series and Compound)
	2	1.4. Derivation of EMF equation of DC generators. (Solve problems)
	3	Solve problems
	4	1.5. Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
	5	TUTORIAL

<b>3rd</b>	1	numerical problems.
	2	1.6. Armature reaction in D.C. machine
	3	1.7. Commutation and methods of improving commutation
	4	1.7.1. Role of inter poles and compensating winding in commutation.
	5	TUTORIAL
<b>4th</b>	1	1.8. Characteristics of D.C. Generators
	2	1.9. Application of different types of D.C. Generators.
	3	1.10. Concept of critical resistance and critical speed of DC shunt generator
	4	numerical problems.
	5	TUTORIAL
<b>5th</b>	1	1.11. Conditions of Build-up of emf of DC generator.
	2	1.12. Parallel operation of D.C. Generators.
	3	1.13. Uses of D.C generators.
	4	CLASS TEST
	5	TUTORIAL

<b>6th</b>	1	2.1. Basic working principle of DC motor
	2	2.2. Significance of back emf in D.C. Motor.
	3	2.3. Voltage equation of D.C. Motor and condition for maximum power output
	4	simple problems
	5	TUTORIAL
<b>7th</b>	1	2.4. Derive torque equation (solve problems)
	2	2.5. Characteristics of shunt, series and compound motors and their application.
	3	2.6. Starting method of shunt, series and compound motors.
	4	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method.
	5	TUTORIAL
<b>8th</b>	1	2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
	2	2.9. Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems)
	3	2.10. Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems)
	4	2.11. Losses, efficiency and power stages of D.C. motor(solve numerical problems)
	5	TUTORIAL

<b>9th</b>	1	2.12. Uses of D.C. motors
	2	3.1 Working principle of transformer.
	3	3.2 Constructional feature of Transformer. 3.2.1 Arrangement of core & winding in different types of transformer.
	4	3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
	5	TUTORIAL
<b>10th</b>	1	3.2.3 Explain types of cooling methods
	2	3.3 State the procedures for Care and maintenance.
	3	3.4 EMF equation of transformer.
	4	3.5 Ideal transformer voltage transformation ratio
	5	TUTORIAL
<b>11th</b>	1	3.6 Operation of Transformer at no load, on load with phasor diagrams
	2	3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer.
	3	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.
	4	3.9 To explain Equivalent circuit and solve numerical problems.
	5	TUTORIAL

<b>12th</b>	1	3.10 Approximate & exact voltage drop calculation of a Transformer.
	2	3.11 Regulation of transformer.
	3	3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)
	4	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	5	TUTORIAL
<b>13th</b>	1	3.14 Explain All Day Efficiency (solve problems)
	2	3.15 Determination of load corresponding to Maximum efficiency.
	3	3.16 Parallel operation of single phase transformer.
	4	4.1. Constructional features of Auto transformer
	5	TUTORIAL
<b>14th</b>	1	4.2. Working principle of single phase Auto Transformer.
	2	4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper).
	3	4.4. Uses of Auto transformer
	4	CLASS TEST
	5	TUTORIAL

<b>15th</b>	1	4.5. Explain Tap changer with transformer (on load and off load condition)
	2	1.1 Explain Current Transformer and Potential Transformer
	3	1.2 Define Ratio error, Phase angle error, Burden.
	4	1.3 Uses of C.T. and P.T.
	5	TUTORIAL