

# LESSON PLAN

SUB: ENERGY CONVERSION - II

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 5<sup>th</sup>

NAME OF FACULTY: NIBEDITA HO



**GOVERNMENT POLYTECHNIC,  
BHADRAK**

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Hod Electrical

**HOD (ELECT.)  
G.P. BHADRAK**

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Principal  
Govt. Polytechnic Bhadrak

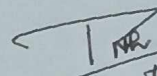
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Principal  
Govt. Polytechnic  
Bhadrak

Discipline: Electrical Engg.	Semester: 5 <sup>th</sup>	Name of the Teaching Faculty : Nibedita Ho
Subject: Energy Conversion - II	No. of Days/per week class allotted:4	Semester from date: 01.08.2023 To Date: 30.11.2023  No. of Weeks:15
Week	Class Day	Theory
1 <sup>st</sup>	1 <sup>st</sup>	Basic working principle of alternator and the relation between speed and frequency
	2 <sup>nd</sup>	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	3 <sup>rd</sup>	Explain harmonics, its causes and impact on winding factor.
	4 <sup>th</sup>	E.M.F equation of alternator. (Solve numerical problems).
2 <sup>nd</sup>	1 <sup>st</sup>	Armature reaction and its effect on emf at different power factor of load.
	2 <sup>nd</sup>	The vector diagram of loaded alternator. (numerical problems)
	3 <sup>rd</sup>	Open circuit test of alternator
	4 <sup>th</sup>	Short circuit test of alternator
3 <sup>rd</sup>	1 <sup>st</sup>	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	2 <sup>nd</sup>	Parallel operation of alternator using synchro-scope and dark & bright lamp method.
	3 <sup>rd</sup>	Distribution of load by parallel connected alternators.
	4 <sup>th</sup>	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
4 <sup>th</sup>	1 <sup>st</sup>	Parallel operation of alternator using synchro-scope and dark & bright lamp method.
	2 <sup>nd</sup>	Distribution of load by parallel connected alternators.
	3 <sup>rd</sup>	Constructional feature of Synchronous Motor
	4 <sup>th</sup>	Principles of operation, concept of load angle
5 <sup>th</sup>	1 <sup>st</sup>	Derive torque, power developed.
	2 <sup>nd</sup>	Effect of varying load with constant excitation.
	3 <sup>rd</sup>	Effect of varying excitation with constant load.
	4 <sup>th</sup>	Power angle characteristics of cylindrical rotor motor.
6 <sup>th</sup>	1 <sup>st</sup>	Explain effect of excitation on Armature current and power factor.

	2 <sup>nd</sup>	Hunting in Synchronous Motor
	3 <sup>rd</sup>	Function of Damper Bars in synchronous motor and generator.
	4 <sup>th</sup>	Describe method of starting of Synchronous motor.
	1 <sup>st</sup>	State application of synchronous motor.
7 <sup>th</sup>	2 <sup>nd</sup>	Production of rotating magnetic field.
	3 <sup>rd</sup>	Constructional feature of Squirrel cage and Slipring induction motors.
	4 <sup>th</sup>	Working principles of operation of 3-phase Induction motor.
8 <sup>th</sup>	1 <sup>st</sup>	Define slip speed, slip and establish the relation of slip with rotor quantities.
	2 <sup>nd</sup>	Derive expression for torque during starting and running conditions and derive conditions for maximum torque. ((numerical problems)
	3 <sup>rd</sup>	Torque-slip characteristics. relation between full load torque and starting torque (numerical problems)
	4 <sup>th</sup>	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (numerical problems)
9 <sup>th</sup>	1 <sup>st</sup>	Methods of starting and different types of starters used for three phase Induction motor.
	2 <sup>nd</sup>	Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	3 <sup>rd</sup>	Plugging as applicable to three phase induction motor.
	4 <sup>th</sup>	Describe different types of motor enclosures.
10 <sup>th</sup>	1 <sup>st</sup>	Explain principle of Induction Generator and state its applications
	2 <sup>nd</sup>	Ferrari's principle.
	3 <sup>rd</sup>	Double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
	4 <sup>th</sup>	Working principle, Torque speed characteristics, performance characteristics and application of Split phase motor
11 <sup>th</sup>	1 <sup>st</sup>	Working principle, Torque speed characteristics, performance characteristics and application of Capacitor Start motor
	2 <sup>nd</sup>	Working principle, Torque speed characteristics, performance characteristics and application of Capacitor start, capacitor run motor.
	3 <sup>rd</sup>	Working principle, Torque speed characteristics,



		performance characteristics and application of Permanent capacitor type motor.
	4 <sup>th</sup>	Working principle, Torque speed characteristics, performance characteristics and application of Shaded pole motor.
12 <sup>th</sup>	1 <sup>st</sup>	Method to change the direction of rotation of above motors.
	2 <sup>nd</sup>	Construction, working principle, running characteristic and application of single phase series motor.
	3 <sup>rd</sup>	Construction, working principle and application of Universal motors.
	4 <sup>th</sup>	Working principle of Repulsion start Motor,
13 <sup>th</sup>	1 <sup>st</sup>	Working principle of Repulsion start Induction run motor.
	2 <sup>nd</sup>	Working principle of Repulsion Induction motor.
	3 <sup>rd</sup>	Principle of Stepper motor. Classification of Stepper motor.
	4 <sup>th</sup>	Principle of variable reluctance stepper motor.
14 <sup>th</sup>	1 <sup>st</sup>	Principle of Permanent magnet stepper motor.
	2 <sup>nd</sup>	Principle of hybrid stepper motor.
	3 <sup>rd</sup>	Applications of Stepper motor.
	4 <sup>th</sup>	Construction of Core type, shell type transformer
15 <sup>th</sup>	1 <sup>st</sup>	Grouping of winding, Advantages
	2 <sup>nd</sup>	parallel operation of the three phase transformers.
	3 <sup>rd</sup>	tap changer (On/Off load tap changing)
	4 <sup>th</sup>	Maintenance Schedule of Power Transformers.

  
 31.07.2023  
 Lect. in Elect. Engg.  
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