

DHABALESWAR INSTITUTE OF POLYTECHNIC

LESSON PLAN

Discipline <u>Diploma in Engineering</u>	Semester - <u>5th</u>	Name of the Teaching Faculty <u>Ajay Kumar Pradhan</u>
Subject - <u>EC-11</u>	No. of days per Week Class Allotted <u>05</u>	Semester from Dt. <u>01.10.2021</u> To Dt. <u>08.01.2022</u> No. of Weeks: <u>14</u>
Week	Class Day	Theory / Practical Topics
1st	1st day	<u>Theory.</u> <u>Alternator: - Types of Alternator and their constructional features.</u>
	2nd day	<u>Working principle of alternator</u>
	3rd day	<u>Relation between speed & frequency.</u>
	4th day	<u>Armature winding and Armature winding of alternator</u>
	5th day.	<u>Pitch factor and distribution factor (winding factor).</u>
2nd.	1st day	<u>Harmonics, its causes and impact on winding factor.</u>
3rd	2nd day	<u>Emf Equation of alternator.</u>
	3rd day.	<u>Numerical Problems.</u>
4th.	1st day.	<u>Armature reaction.</u>
	2nd day	<u>Effect of armature reaction on emf at different power factors.</u>
	3rd day.	<u>Vector diagram of loaded alternator</u>
	4th day.	<u>Numerical Problems.</u>
	5th day.	<u>Testing of alternator.</u>
5th	1st day	<u>Open circuit test and short circuit test.</u>
	2nd day.	<u>Voltage regulation of alternator by direct loading and synchronous impedance method.</u>
	3rd day	<u>Parallel operation of alternator using synchroscope and dark & bright lamp method.</u>
	4th day.	<u>Distribution of load by parallel connected alternator.</u>
	5th day.	<u>3 phase Induction motor.</u>
6th.	1st day	<u>Production of rotating magnetic field in 2 phase supply.</u>
	2nd day.	<u>Production of rotating magnetic field in 3 phase supply.</u>
		<u>Constructional features of sq. cage and slip ring Induction motor.</u>
		<u>Working principles of operation of 3 phase Induction motor.</u>

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Week	Class Day	Theory / Practical Topics
	3rd day.	Slip, Speed and relation of slip with rotor quantities.
	4th day.	Derivation for expression for torque during starting period and condition for maximum torque.
	5th day	Derivation for expression for torque during running period and condition for max torque during running period.
7th.	1st day.	Numerical problems, torque-slip characteristics.
	2nd day	Relation between full load torque and starting torque etc.
	3rd day	Numerical Problems.
	4th day.	Relation between Rotor Copper loss, Rotor output and cross torque and relationship of slip with rotor copper loss.
8th	1st day.	Numerical problems.
	2nd day.	Methods of starting, DOL starter
	3rd day	Star-Delta starter Autotransformer starter
	4th day	Rotor resistance starter speed control by voltage control.
	5th day.	Speed control by rotor resistance, pole changing, frequency control method.
9th.	1st day.	plugging of 3 ph Ind. motor.
	2nd day.	Induction generator Application of induction generator and diff types of motor enclosures.
	3rd day.	<u>Synchronous motor</u> :- constructional features of Synchronous motor.
	4th day.	Principle of operation.
	5th day.	Concept of load angle, torque and Power developed.

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Week	Class Day	Theory / Practical Topics
10th.	1st day.	Effect of Varying load with constant excitation.
	2nd day	Effect of varying excitation with constant load.
	3rd day	Power angle characteristics of cylindrical rotor motor.
	4th day	Effect of excitation on Armature current and power factor.
	5th day	Hunting in Synchronous motor and function of damper bars in Synchronous motor and generator.
11th	1st day.	Method of starting of Syn. motor and application of Syn. motor.
	2nd day.	<u>Single phase Induction motor:-</u> Explain Ferraris principle.
	3rd day	Double revolving field theory and cross field theory to analyze starting torque of 1-phase Ind. motor.
	4th day.	Working principle Torque speed characteristics, performance characteristics and application of split phase motor
	5th day	Working principle Torque speed characteristics performance application of capacitor start motor capacitor start capacitor run motor.
12th	1st day	permanent capacitor motor.
	2nd day	Shaded pole motor and method of change of direction of rotation of single phase Induction motor.
	3rd day	<u>Commutator motors:-</u> Construction working principle, running characteristics and application of single phase series motor.
	4th day.	Working principle of Repulsion start motor, Repulsion start induction run motor.
	5th	Repulsion Induction motor

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13th.	1st day	<u>Special Electrical machine:-</u> principle of stepper motor.
	2nd day	and classification of stepper motor. principle of variable reluctance stepper motor and permanent magnet stepper motor.
	3rd day	principle of hybrid stepper motor and its applications.
	4th day	<u>3 phase transformer:-</u> Grouping of windings and advantages.
	5th day	parallel operation of 3 phase transformers.
14th.	1st day	tap changer on load / off load tap changing and maintenance of power transformer.
	2nd day	Revision and question discussion.
	3rd day	Revision and question discussion.
	4th day	Revision and question discussion.
	5th day	Revision and question discussion.