

**ACADEMIC LESSON PLAN OF WINTER 2021**

Discipline: ELECTRICAL	Semester: 5 <sup>th</sup> Sem. (1 <sup>st</sup> Shift)	Name of the Teaching Faculty: <b>AMIT KUMAR BISOYI</b>
Subject: ENERGY CONVERSION-II	No. of days/per week class allotted:4p/week	Semester From: 1 <sup>ST</sup> OCTOBER 2021 to 8 <sup>th</sup> JANUARY 2022 No. of weeks:13 weeks
<b>Week</b>	<b>Class Day</b>	<b>Theory Topics</b>
1 <sup>st</sup>	5/10/2021	<b>1. ALTERNATOR:</b> 1.1. Types of alternator and their constructional features.
	9/10/2021	1.2. Basic working principle of alternator and the relation between speed and frequency.
2 <sup>nd</sup>	23/10/2021	1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
3 <sup>rd</sup>	26/10/2021	1.4. Explain harmonics, its causes and impact on winding factor.
	27/10/2021	1.5. E.M.F equation of alternator. (Solve numerical problems).
	27/10/2021	1.5. E.M.F equation of alternator. (Solve numerical problems).
	30/10/2021	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
4 <sup>th</sup>	2/11/2021	1.7. The vector diagram of loaded alternator. (Solve numerical problems)
	3/11/2021	1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test.
	3/11/2021	1.8.2. Short circuit test.
	5/11/2021	1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	5/11/2021	1.9. Determination of voltage regulation of Alternator by direct loading and Synchronous impedance method. (Solve numerical problems)
	6/11/2021	1.10. Parallel operation of alternator using synchro-scope and dark & Brightlamp method.
5 <sup>th</sup>	9/11/2021	1.11. Explain distribution of load by parallel connected alternators.
	10/11/2021	<b>2. SYNCHRONOUS MOTOR:</b> 2.1. Constructional feature of Synchronous Motor. 2.2. Principles of operation, concept of load angle
	10/11/2021	2.3. Derive torque, power developed.
	12/11/2021	2.4. Effect of varying load with constant excitation. 2.5. Effect of varying excitation with constant load.
	13/11/2021	2.6. Power angle characteristics of cylindrical rotor motor.
6 <sup>th</sup>	16/11/2021	2.7. Explain effect of excitation on Armature current and power factor.
	17/11/2021	2.8. Hunting in Synchronous Motor. 2.9. Function of Damper Bars in synchronous motor and generator.

	18/11/2021	2.10. Describe method of starting of Synchronous motor.
	18/11/2021	2.11. State application of synchronous motor.
7 <sup>th</sup>	23/11/2021	<b>3. THREE PHASE INDUCTION MOTOR:</b> 3.1. Production of rotating magnetic field.
	24/11/2021	3.2. Constructional feature of Squirrel cage and Slip ring induction motors.
	25/11/2021	3.3. Working principles of operation of 3-phase Induction motor.
	25/11/2021	3.4. Define fine slip speed, slip and establish the relation of slip with rotor quantities.
	26/11/2021	3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
8 <sup>th</sup>	30/11/2021	3.6. Torque-slip characteristics.
	1/12/2021	3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems)
	2/12/2021	3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
	2/12/2021	3.9. Methods of starting and different types of starters used for three phase Induction motor.
9 <sup>th</sup>	3/12/2021	3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	7/12/2021	3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	8/12/2021	3.11. Plugging as applicable to three phase induction motor.
	9/12/2021	3.12. Describe different types of motor enclosures.
	9/12/2021	3.13. Explain principle of Induction Generator and state its applications.
	10/12/2021	<b>4. SINGLE PHASE INDUCTION MOTOR:</b> 4.1. Introduction and Explain Ferrari's principle.
10 <sup>th</sup>	11/12/2021	4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
	14/12/2021	4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
	15/12/2021	4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. 4.3.1. Split phase motor.
	16/12/2021	4.3.2. Capacitor Start motor. 4.3.3. Capacitor start, capacitor run motor.
	16/12/2021	4.3.4. Permanent capacitor type motor. 4.3.5. Shaded pole motor.

	17/12/2021	4.4. Explain the method to change the direction of rotation of above motors.
	18/12/2021	4.4. Explain the method to change the direction of rotation of above motors.
	18/12/2021	<b>5. COMMUTATOR MOTORS:</b> 5.1. Construction, working principle, running characteristic and application of single phase series motor.
11 <sup>th</sup>	21/12/2021	5.1. Construction, working principle, running characteristic and application of single phase series motor.
	22/12/2021	5.2. Construction, working principle and application of Universal motors.
	23/12/2021	5.2. Construction, working principle and application of Universal motors.
	23/12/2021	5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	24/12/2021	5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
12 <sup>th</sup>	28/12/2021	<b>6. SPECIAL ELECTRICAL MACHINE:</b> 6.1. Principle of Stepper motor. 6.2. Classification of Stepper motor.
	29/12/2021	6.3. Principle of variable reluctant stepper motor.
	30/12/2021	6.4. Principle of Permanent magnet stepper motor.
	30/12/2021	6.5. Principle of hybrid stepper motor.
	31/12/2021	6.6. Applications of Stepper motor.
13 <sup>th</sup>	4/1/2022	<b>7. THREE PHASE TRANSFORMERS:</b> 7.1. Explain Grouping of winding, Advantages.
	5/1/2022	7.2. Explain parallel operation of the three phase transformers.
	6/1/2022	7.2. Explain parallel operation of the three phase transformers.
	6/1/2022	7.3. Explain tap changer (On/Off load tap changing)
	7/1/2022	7.4. Maintenance Schedule of Power Transformers

Signature of Teaching Faculty

## ACADEMIC LESSON PLAN OF WINTER 2021

Discipline: ELECTRICAL	Semester: 5 <sup>th</sup> Sem. (2 <sup>nd</sup> Shift)	Name of the Teaching Faculty: <b>AMIT KUMAR BISOYI</b>
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4 <sup>th</sup>	1/11/2021	1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test.
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5 <sup>th</sup>	8/11/2021	1.10. Parallel operation of alternator using synchro-scope and dark & Brightlamp method.
	9/11/2021	1.11. Explain distribution of load by parallel connected alternators.
	10/11/2021	<b>2. SYNCHRONOUS MOTOR:</b> 2.1. Constructional feature of Synchronous Motor. 2.2. Principles of operation, concept of load angle
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	9 <sup>th</sup>	6/12/2021
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