

BHUBANANANDA ORISSA SCHOOL OF  
ENGINEERING, CUTTACK  
ELECTRICAL ENGG.DEPARTMENT

LESSON PLAN

SEMESTER: 5<sup>TH</sup> (C)

SESSION – winter (2021-22)

SUBJECT: EC-II (ENERGY CONVERSION-II)

NAME OF FACULTY: Mr. SRIKANTA THAKUR



Discipline: <b>Electrical Engg.</b>	Semester: <b>5<sup>th</sup> (C)</b>	Name of the teaching faculty: <b>Mr. SRIKANTA THAKUR</b>
Subject- <b>EC-II</b>	No. of Days/per week class allotted: <b>04 PERIODS /WEEK (MON, TUES, WED, THUR-1 period each)</b>	Semester: From Date: <b>1/10/2021</b> To Date: <b>08/01/2022</b> No. of weeks: <b>15 WEEKS</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory/Practical Topics</b>
1 <sup>st</sup> (04/10/2021-09/10/2021)	4/10/2021	<b>1. ALTERNATOR :</b>  1.1. Types of alternator and their constructional features.
	5/10/2021	1.2. Basic working principle of alternator and the relation
	7/10/2021	1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
2 <sup>nd</sup> (11/10/2021-16/10/2021)		<b>PUJA HOLIDAY</b>
3 <sup>rd</sup> (18/10/2021-23/10/2021)	21/10/2021	1.4. Explain harmonics, its causes and impact on winding factor.
4 <sup>th</sup> (25/10/2021-30/10/2021)	25/10/2021	1.5. E.M.F equation of alternator. (Solve numerical problems).
	26/10/2021	1.6. Explain Armature reaction and its effect on emf at different power factor of load.
	27/10/2021	1.7. The vector diagram of loaded alternator. (Solve

		numerical problems
	28/10/2021	1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test. 1.8.2. Short circuit test.
5 <sup>TH</sup> (01/11/2021-06/11/2021)	01/10/2021	1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	02/11/2021	1.10. Parallel operation of alternator using synchroscope and dark & bright lamp method.
	03/11/2021	1.11. Explain distribution of load by parallel connected alternators
6 <sup>TH</sup> (08/11/2021-13/11/2021)	08/11/2021	<b>Class test 1</b>
	09/11/2021	<b>2. SYNCHRONOUS MOTOR:</b>
	10/11/2021	2.1. Constructional feature of Synchronous Motor.
	11/11/2021	2.2. Principles of operation, concept of load angle 2.3. Derive torque, power developed
	11/11/2021	2.4. Effect of varying load with constant excitation.
7 <sup>th</sup> (15/11/2021-20/11/2021)	15/11/2021	2.5. Effect of varying excitation with constant load.
	16/11/2021	2.6. Power angle characteristics of cylindrical rotor motor
	17/11/2021	2.7. Explain effect of excitation on Armature current and power factor
	18/11/2021	2.8. Hunting in Synchronous Motor. 2.9. Function of Damper Bars in synchronous motor and generator.

8 <sup>th</sup> (22/11/2021-27/11/2021)	22/11/2021	<b>Class test 2</b>
	23/11/2021	2.10. Describe method of starting of Synchronous motor. 2.11. State application of synchronous motor.
	24/11/2021	<b>3. THREE PHASE INDUCTION MOTOR:</b>
	25/11/2021	3.1. Production of rotating magnetic field 3.2 Constructional feature of Squirrel cage and Slip ring induction motors. 3.3 Working principles of operation of 3-phase Induction motor.
9 <sup>th</sup> (29/11/2021-04/12/2021)	29/11/2021	3.4 Define slip speed, slip and establish the relation of slip with rotor quantities. 3.5 Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
	30/11/2021	3.6 Torque-slip characteristics.
	01/12/2021	3.7 Derive relation between full load torque and starting torque etc. (solve numerical problems)
	02/12/2021	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)
10 <sup>th</sup> (06/12/2021-11/12/2021)	06/12/2021	3.9 Methods of starting and different types of starters used for three phase Induction motor.
	07/12/2021	3.10 Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.

	08/12/2021	<b>INTERNAL ASSESSMENT</b>
	09/12/2021	3.11 Plugging as applicable to three phase induction motor. 3.12 Describe different types of motor enclosures 3.13 Explain principle of Induction Generator and state its applications.
11 <sup>th</sup> (13/12/2021-18/12/2021)	13/12/2021	<b>4. SINGLE PHASE INDUCTION MOTOR:</b>
		4.1 Explain Ferrari's principle.
	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.
12 <sup>th</sup> (20/12/2021-25/12/2021)	20/12/2021	4.3.4 Permanent capacitor type motor. 4.3.5 Shaded pole motor.
	21/12/2021	4.4 Explain the method to change the direction of rotation of above motors.
	22/12/2021	<b>Class Test-3</b>
	23/12/2021	<b>5. COMMUTATOR MOTORS:</b>

		5.1. Construction, working principle, running characteristic and application of single phase series motor.
13 <sup>th</sup> (27/12/2021-01/01/2022)	27/12/2021	5.2 Construction, working principle and application of Universal motors.
	28/12/2021	5.3 Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	29/12/2021	<b>6. SPECIAL ELECTRICAL MACHINE:</b>  6.1. Principle of Stepper motor. 6.2 Classification of Stepper motor
	30/12/2021	6.3 Principle of variable reluctant stepper motor. 6.4 Principle of Permanent magnet stepper motor.
14 <sup>th</sup> (03/1/2022-08/01/2022)	03/01/2022	6.5 Principle of hybrid stepper motor. 6.6 Applications of Stepper motor.
	04/01/2022	<b>7. THREE PHASE TRANSFORMERS:</b>  7.1. Explain Grouping of winding, Advantages. 7.2. Explain parallel operation of the three phase transformers.
	05/01/2022	7.3 Explain tap changer (On/Off load tap changing) 7.4 Maintenance Schedule of Power Transformers.
	06/01/2022	<b>Class Test-4</b>