



Orissa School of Mining Engineering Keonjhar

Department of Electrical Engineering

Lesson Plan(Energy conversion-II)

VISION OF OUR DEPARTMENT:

To provide excellent knowledge and enrich the problem solving skills of the students in the field of Electrical Engineering with a focus to prepare the students for industry need, recognized as innovative leader, responsible citizen and improve the environment.

MISSION OF OUR DEPARTMENT:

1. Prepare the students with strong fundamental concepts, analytical capability, and problem solving skills. Create an ambience of education through faculty training, self-learning, sound academic practices and research endeavors.
2. Provide opportunities to promote organizational and leadership skills in students through various extra- curricular and co-curricular events.
3. To make the students as far as possible industry ready to enhance their employability in the industries.
4. To improve department industry collaboration and to maintain effective operational environment.

Program Educational Objectives

The Program Educational Objectives (PEOs) of the Electrical Engineering Department are given below:

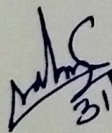
1. PEO1- To engage in Design of Systems, tools and applications in the field of electrical Engineering and allied engineering Industries.
2. PEO2- To apply the knowledge of electrical engineering to solve problems of social relevance and/or pursue higher education
3. PEO3- To work effectively as individuals and as team members in multidisciplinary projects by exhibit leadership capability, triggering social and economic commitment and inculcate community services and protect environment
4. PEO4- Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

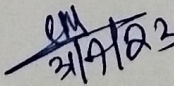
Subject : ENERGY CONVERSION II (01/08/2023- 30/11/2023)			
Discipline: Electrical Engineering		Name of the Faculty: Suchismita Sahoo	
Course Code:	TH-2	Semester:	5th
Total Periods:	60	Examination:	2023(Winter)
Theory Periods:	4P/W	Class Test:	20
Maximum Marks:	100	End Semester Examination:	80

Week	Class/period with date		Theory Topics
1 st	1 st	01/08/23 1p	INTRODUCTION Briefing Syllabus discussion
	2 nd	02/08/2023 1p	1.ALTERNATOR: 1.1 Types of alternator and their constructional features
	3 rd	04/08/2023 1p	1.2 Basic working principle of alternator and the relation between speed and frequency
2 nd	1 st	07/08/2023 1p	1.3 Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	2 nd	08/08/2023 1p	1.4 Explain harmonics, its causes and impact on winding factor.
	3 rd	09/08/2023 1p	1.5 E.M.F equation of alternator. (Solve numerical problems).
	4 th		1.6 Explain Armature reaction and its effect on emf at different power factor of load.
3 rd	1 st	14/08/2023 1p	1.7 The vector diagram of loaded alternator. (Solve numerical problems)
	2 nd	16/08/2023 1p	1.8 Testing of alternator (Solve numerical problems) 1.8.1 Open circuit test. 1.8.2 Short circuit test
	3 rd	18/08/2023 1p	1.9 Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	4 th	21/08/2023 1p	1.10 Parallel operation of alternator using synchro-scope and dark & bright lamp method. 1.11 Explain distribution of load by parallel connected alternators.
4 th	2 nd	22/08/2023 1p	REVISION
	3 rd	23/08/2023 1p	2. SYNCHRONOUS MOTOR: 2.1 Constructional feature of Synchronous Motor.
	4 th	25/08/2023 1p	2.2 Principles of operation, concept of load angle 2.3 Derive torque, power developed.
	1 st	28/08/2023 1p	2.4 Effect of varying load with constant excitation. 2.5 Effect of varying excitation with constant load.
	2 nd	29/08/2023 1p	2.6 Power angle characteristics of cylindrical rotor motor. 2.7 Explain effect of excitation on Armature current and power factor.
	3 rd	01/09/2023 1p	2.8 Hunting in Synchronous Motor. 2.9 Function of Damper Bars in synchronous motor and generator.
	4 th	04/09/2023 1p	2.10 Describe method of starting of Synchronous motor. 2.11 State application of synchronous motor.
5 th	2 nd	05/09/2023 1p	1 st class test
	3 rd	08/09/2023 1p	REVISION AND DOUBT CLEARING

7th	1 st	11/09/2023 1p	3 THREE PHASE INDUCTION MOTOR: 3.1 Production of rotating magnetic field.
	2 nd	12/09/2023 1p	3.2 Working principles of operation of 3-phase Induction motor.
	3 rd	13/09/2023 1p	3.3 Constructional feature of Squirrel cage and Slip ring induction motors.
	4 th	15/09/2023 1p	3.4 Define slip speed, slip and establish the relation of slip with rotor quantities.
8 th	1 st	18/09/2023 1p	3.5 Derive expression for torque during starting and running conditions and derive conditions for maximum torque.
	2 nd	22/09/2023 1p	(solve numerical problems)
9 th	1 st	25/09/2023 1p	3.6 Torque-slip characteristics.
	2 nd	26/09/2023 ^{1p}	3.7 Derive relation between full load torque and starting torque etc. (solve numerical problems)
	3 rd	27/09/2023 1p	3.8 Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss.
10 th	1 st	03/10/2023 1p	3.9 Methods of starting and different types of starters used for three phase Induction motor
	2 nd	04/10/2023 1p	3.10 Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	3 rd	06/10/2023 1p	3.11 Plugging as applicable to three phase induction motor.
11 th	1 st	09/10/2023 1p	3.12 Describe different types of motor enclosures.
	2 nd	10/10/2023 1p	3.13 Explain principle of Induction Generator and state its applications
	3 rd	11/10/2023 1p	REVISION AND DOUBT CLEARING
	4 th	13/10/2023 1p	INTERNAL ASSESMENT
12 th	1 st	16/10/2023 1p	4. SINGLE PHASE INDUCTION MOTOR 4.1 Explain Ferrari's principle
	2 nd	17/10/2023 1p	4.2 Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor
	3 rd	18/10/2023 1p	4.3 Explain Working principle, Torque speed characteristics, performance characteristics and application of single phase motors. 4.3.1 Split phase motor.
	4 th	20/10/2023	4.3.2 Capacitor Start motor
13 th	1 st	25/10/2023 1p	4.3.3 Capacitor start, capacitor run motor.
	2 nd	27/10/2023 1p	4.3.4 Permanent capacitor type motor.
14 th	1 st	30/10/2023 1p	4.3.5 Shaded pole motor. 4.4 Explain the method to change the direction of rotation of above motors.
	2 nd	31/10/2023 1p	5. COMMUTATOR MOTORS: 5.1 Construction, working principle, Running characteristic and application of single phase series motor.

	3rd	01/11/2023 1p	5.2 Construction, working principle and application of Universal motors
	4th	03/11/2023 1p	5.3 Working principle of Repulsion start Motor.
15th	1st	06/11/2023 1p	Repulsion start Induction run motor, Repulsion Induction motor.
	2nd	07/11/2023 1p	REVISION AND DOUBT CLEARING
	3rd	08/11/2023 1p	6.SPECIAL ELECTRICAL MACHINE: 6.1 Principle of Stepper motor. 6.2 Classification of Stepper motor
	4th	10/11/2023 1p	6.3 Principle of variable reluctant stepper motor.
16th	1st	13/11/2023 1p	6.4 Principle of Permanent magnet stepper motor.
	2nd	14/11/2023 1p	6.5 Principle of hybrid stepper motor. 6.6 Applications of Stepper motor.
	3rd	15/11/2023 1p	7.THREE PHASE TRANSFORMERS: 7.1 Explain Grouping of winding, Advantages
	4th	17/11/2023 1p	7.2 Explain parallel operation of the three phase transformers
17th	1st	20/11/2023 1p	7.3 Explain tap changer (On/Off load tap changing)
	2nd	21/11/2023 1p	7.4 Maintenance Schedule of Power Transformers .
	3rd	22/11/2023 1p	REVISION AND DOUBT CLEARING
	4th	24/11/2023 1p	2nd class test
18th	1st	28/11/2023 1p	VST 1
	2nd	29/11/2023 1p	VST 2


31/7/23
LECTURER


21/8/23
HOD


3.8.23
PRINCIPAL