DEPARTMENT OF ELECTRICAL ENGINEERING

VISION:

To produce Electrical Engineer professionals who can contribute for socio-economic and technological development to meet global needs.

MISSION:

M1 - To strengthen academic infrastructure leading to quality professional by using modern technical tools and technologies.

M2 - To impart innovative knowledge among the students and make more industry-institution programs to make them successful professionals for serving the society.

M3 - To provide a learning environment to improve problem solving abilities, leadership abilities, ethical responsibilities and lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Apply electrical engineering knowledge and practical skills to solve well-defined engineering problems using modern tools and techniques.

PEO2: Perform effectively in industry and society as competent junior engineer, supervisors, or entrepreneurs with ethical and sustainable engineering practices.

PEO3: Demonstrate teamwork, communication, leadership, and project management skills in professional engineering activities.

PEO4: Engage in lifelong learning and adapt to emerging technologies for career growth and higher education.

PROGRAM SPECIFIC OUTCOMES

The electrical diploma engineers will be able to:

PSO1:-Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate engineering problems of electric circuits, analog and digital electronics, control system, electrical machines and power system.

PSO2:- Apply the appropriate techniques and modern engineering hardware and software tools in electrical engineering to engage in life-long learning and to successfully adapt in multidisciplinary environments.

PSO3:-Work professionally in power systems engineering, Electrical machinery and electrical circuit.

LESSON PLAN OF ENERGY CONVERSION-II		
Discipline: - ELECTRICAL ENGG	**Semester: -** 5TH SEMESTER (WINTER)	**Name of the Teaching Faculty:** Shri NITESH KUMAR ACHARYA, LECTURER IN ELECTRICAL, G.P BARGARH
Subject: - ENERGY CONVERSION-II	**No. of Days/week Class Allotted:** 04 (4L)	
week	**Class Day**	**Theory Topics**
1st	1st	**ALTERNATOR:** Types of alternators and their constructional features.
	2nd	Basic working principle of alternator and the Relation between speed and frequency.
	3rd	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	4th	Explain harmonics, its causes and impact on winding factor.
2nd	1st	E.M.F equation of alternator. (Solve numerical problems).
	2nd	Explain Armature reaction and its effect on emf at different power factor of load.
	3rd	The vector diagram of loaded alternator. (Solve numerical problems.)
	4th	Testing of alternator (Solve numerical problems) Open circuit test. Short circuit test.
3rd	1st	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	2nd	Parallel operation of alternator using synchro- scope method.
	3rd	Parallel operation of alternator using dark & bright lamp method.
	4th	Explain distribution of load by parallel connected alternators.
4th	1st	**SYNCHRONOUS MOTOR:** Constructional feature of Synchronous Motor.
	2nd	Principles of operation, concept of load angle. Derive torque, power developed.
	3rd	Effect of varying load with constant excitation.
	4th	Effect of varying excitation with constant load.

5th	1st	Power angle characteristics of cylindrical rotor motor
	2nd	Explain effect of excitation on Armature current and power factor
	3rd	Hunting in Synchronous Motor.
	4th	Function of Damper Bars in synchronous motor and generator.
6th	1st	Describe method of starting of Synchronous motor. State application of synchronous motor.
	2nd	**THREE PHASE INDUCTION MOTOR:** Production of rotating magnetic field
	3rd	Constructional feature of Squirrel cage and Slip ring induction motors. Working principles of operation of 3-phase Induction motor.
	4th	Define slip speed, slip and establish the relation of slip with rotor quantities.
7th	1st	Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (Solve numerical problems)
	2nd	Torque-slip characteristics.
	3rd	Derive relation between full load torque and starting torque etc. (solve numerical problems)
	4th	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (Solve numerical problems)
8th	1st	Methods of starting and different types of starters used for three phase Induction motor.
	2nd	Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	3rd	Plugging as applicable to three phase induction motor.
	4th	Describe different types of motor enclosures.
9th	1st	Explain principle of Induction generator and state its application.
	2nd	**SINGLE PHASE INDUCTION MOTOR:** Explain Ferrari's principle.
	3rd	Explain double revolving field theory and Cross- field theory to analyze starting torque of 1- phase induction motor.
	4th	Explain working principle, Torque-speed characteristics, performance characteristics of single-phase induction motor

10th	1st	Split phase Induction motor, Capacitor Start Induction motor
	2nd	Permanent Capacitor motor, Shaded Pole motor
	3rd	Explain the method to change the direction of rotation of above motor.
	4th	**COMMUTATOR MOTOR:** Construction, working principle, Running characteristic and application of single series motor.
11th	1st	Construction, working principle and application of Universal motors.
	2nd	Working principle of Repulsion start Motor.
	3rd	Repulsion start Induction run motor, Repulsion Induction motor
	4th	**SPECIAL ELECTRICAL MACHINE:** Principle of Stepper motor. Classification of Stepper motor
12th	1st	Principle of variable reluctant stepper motor.
	2nd	Principle of Permanent magnet stepper motor.
	3rd	Principle of hybrid stepper motor.
	4th	Applications of Stepper motor.
13th	1st	**THREE PHASE TRANSFORMERS:** Explain Grouping of winding, Advantages
	2nd	Explain parallel operation of the three phase transformers.
	3rd	Explain tap changer (On/Off load tap changing)
	4th	Maintenance Schedule of Power Transformers.
14th	1st	Numerical discussion of Alternator.
	2nd	Numerical discussion of Alternator.
	3rd	Numerical discussion of Three phase Induction motor.
	4th	Numerical discussion of Three phase Induction motor.
15th	1st	Previous year question discussion
	2nd	Previous year question discussion
	3rd	Previous year question discussion
	4th	Previous year question discussion