BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

DEPARTMENT OF ELECTRICAL ENGINEERING

LESSON PLAN

SUBJECT : POWER ELECTRONICS AND PLC

FACULTY NAME : ABHIJIT DAS

ACADEMIC SESSION: 2024-25

SECTION: B

SEMESTER: 5TH

Discipline: **Electrical Engg.**	**Semester:5th (B)**	**Semester: From Date: 01/07/2024 To Date: 08/11/2024** **No. of weeks: 18 WEEKS**
Subject- POWER ELECTRONICS & PLC (TH-5)	**No. of Days/per week class allotted:04 PERIODS/WEEK (WED-1,THU-1,FRI-2 Period)**	
Week	**Class Day**	**Theory/Practical Topics**
1st (01/07/2024-06/07/2024)	03/07/2024	**1.Understand the construction & working of power electronic devices** 1.1 Introduction to power electronics
	04/07/2024	1.1 Construction, Operation, V-I characteristics & application of power diode
	05/07/2024(2P)	1.1 Construction, Operation, V-I characteristics & application of SCR 1.1 Construction, Operation, V-I characteristics & application of DIAC
2nd (08/07/2024-13/07/2024)	10/07/2024	1.1 Construction, Operation, V-I characteristics & application of TRIAC
	11/07/2024	1.1 Construction, Operation, V-I characteristics & application of power MOSFET
	12/07/2024(2P)	1.1 Construction, Operation, V-I characteristics & application of IGBT & GTO
3rd (15/07/2024-20/07/2024)	18/07/2024	1.2Two transistor analogy of SCR 1.3 Gate characteristics of SCR.
	19/07/2024(2P)	1.4 Switching characteristic of SCR during Turn on & turn off 1.5 Turn on methods of SCR
4th (22/07/2024-27/07/2024)	24/07/2024	1.6 Turn off methods of SCR- load & resonant pulse commutation
	25/07/2024	1.7 voltage & current rating of SCR

	26/07/2024(2P)	1.8 Protection of SCR- 1.Over voltage protection 2. Over current protection 3. Gate protection 1.9 General layout diagram of firing circuit, R firing circuits, R-C firing circuit
5th (29/07/2024-03/08/2024)	31/07/2024	1.9 UJT pulse trigger circuit Synchronous triggering (Ramp Triggering)
	01/08/2024	1.10 Design of Snubber Circuits **2.Understand the working of converters, AC regulators & choppers** 2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter two quadrant full converter and dual Converter
	02/08/2024(2P)	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
6th (05/08/2024-10/08/2024)	07/08/2024	**2.3** Working of single-phase half wave controlled converter with R-L loads with freewheeling diode
	08/08/2024	**Class test 1**
	09/08/2024(2P)	2.4 Working of single phase fully controlled converter with resistive and R- L loads with and without freewheeling diode 2.4 Working of single phase fully controlled converter with resistive and R- L loads with and without freewheeling diode
7th (12/08/2024-17/08/2024)	14/08/2024	2.5 Working of three-phase half wave controlled converter with Resistive load
	16/08/2024(2P)	2.6 Working of three phase fully controlled converter with resistive load.
8th(19/08/2024-24/08/2024)	21/08/2024	2.7 Working of dual Converter& single phase AC regulator
	22/08/2024	2.8 Working principle of step up & step down chopper.
	23/08/2024(2P)	2.8 Working principle of step up & step down chopper. 2.9 Control modes of chopper
9th (26/08/2024-31/08/2024)	28/08/2024	2.10 Operation of chopper in all four quadrants

	29/08/2024	**3. Understand the inverters & cycloconverters** 3.1 Introduction to inverters.
	30/08/2024(2P)	3.2 working of series inverter 3.3working of parallel inverter
10th (02/09/2024-07/09/2024)	04/09/2024	3.4 working of single-phase bridge inverter
	05/09/2024	3.5 Basic principle of Cycloconverter
	06/09/2024(2P)	3.6 working of single-phase step up & step down Cycloconverter 3.7 applications of cycloconverter **4. Understand application of power electronic circuits** 4.1 List applications of power electronic circuits. 4.2 Factors affecting the speed of DC Motors
11th (09/09/2024-14/09/2024)	11/09/2024	4.3 Speed control for DC Shunt motor using converter.
	12/09/2024	**Internal Assessment**
	13/09/2024(2P)	**Internal Assessment**
12th(16/09/2024-21/09/2024)	18/09/2024	4.4 Speed control for DC Shunt motor using chopper
	19/09/2024	4.5List the factors affecting speed of the AC Motors. 4.6 Speed control of Induction Motor by using AC voltage regulator.
	20/09/2024(2P)	4.7 Speed control of induction motor by using converters and inverters (V/F control) 4.8 Working of UPS with block diagram.
13th (23/09/2024-28/09/2024)	25/09/2024	4.9 Battery charger circuit using SCR
	26/09/2024	4.10 Basic Switched mode power supply (SMPS)
	27/09/2024(2P)	**5. PLC & its application** 5.1Introduction of Programmable Logic Controller(PLC) 5.2 Advantages of PLC , 5.3Different parts of PLC by drawing the Block diagram and purpose of each part of PLC. 5.4Applications of PLC
14th (30/09/2024-05/10/2024)	03/10/2024	5.5 Ladder diagram

	04/10/2024(2P)	5.6 Description of contacts and coils in the following statesi)latched Output ii) branching 5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate
15th (14/10/2024-19/10/2024)	17/10/2024	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND
	18/10/2024(2P)	5.8 Ladder diagrams for combination circuits using OR and NOT 5.9Timers-i)T ON ii) T OFF Timers-iii)Retentive timer
16th (21/10/2024-26/10/2024)	23/10/2024	**Class test 2**
	24/10/2024	5.10 Counters-CTU, CTD
	25/10/2024(2P)	5.11 Ladder diagrams using Timers and counters 5.12 PLC Instruction set 5.13 PLC instruction set , Ladder diagrams- DOL starter
17th (28/10/2024-02/11/2024)	30/10/2024	5.13Ladder diagrams- DOL starter 5.13 Ladder diagrams- STAR-DELTA starter
	01/11/2024(2P)	5.13 Ladder diagrams- Stair case lighting, 5.13 Ladder diagrams- Traffic light Control 5.13Ladder diagrams- Temperature Controller
18th (04/11/2024-08/11/2024)	06/11/2024	5.14Basics DCS & SCADA systems
	07/11/2024	5.15 Computer Control–Data Acquisition 5.15 Direct Digital Control System
	08/11/2024(2P)	**REVISION** **DISCUSSION OF PREVIOUS YEAR QUESTIONS**