Discipline: Electrical Engineering	Semester: 5th	Name of the Teaching Faculty: Pradosh Ku. Panda (Lect. In EE) 31/07/23
Subject: POWER ELECTRONICS & PLC	No. of days per week class allotted: 4	Semester From Date : 01/08/2023 to Date: 30/11/2023 No. of Weeks: 15
chapters	Class Day	Theory
week 1		**1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONICS DEVICES**
	1st	Construction, operation, V-I characteristics & application of power diode
	2nd	Construction, Operation, V-I characteristics & application of SCR
	3rd	Construction, Operation, V-I characteristics & application of DIAC,TRIAC
	4th	Construction, operation, V-I characteristics & application of power MOSFET
week 2	1st	Construction, Operation, V-I characteristics & application of GTO
	2nd	Construction, Operation, V-I characteristics & application of IGBT
	3rd	Two transistor analogy of SCR.
	4th	Gate characteristics of SCR
week 3	1st	Switching characteristic of SCR during turn on and turn off.
	2nd	Turn on methods of SCR
	3rd	Turn off methods of SCR (Line commutation and Forced commutation)
	4th	Load Commutation, Resonant pulse commutation
week 4	1st	Voltage and Current ratings of SCR.
	2nd	**Protection of SCR** a.Over voltage protection ,b.Over current protection ,c.Gate protection
	3rd	Firing Circuits, General layout diagram of firing circuit , R firing circuits,R-C firing circuit
	4th	UJT pulse trigger circuit, Synchronous triggering (Ramp Triggering)
week 5	1st	Design of Snubber Circuits
		UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.
	2nd	Controlled rectifiers Techniques(Phase Angle, Extinction Angle control)
	3rd	Single quadrant semi converter, two quadrant full converter, dual Converter
	4th	Working of single-phase half wave controlled converter with Resistive and R-L loads.
week 6	1st	Understand need of freewheeling diode, Working of single phase fully controlled converter with resistive and R- L loads
	2nd	Working of three-phase half wave controlled converter with Resistive load
	3rd	Working of three phase fully controlled converter with resistive load.
	4th	Working of single phase AC regulator
week 7	1st	Working principle of step up & step down chopper
	2nd	Control modes of chopper, Operation of chopper in all four quadrants.
		UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS
	3rd	Classification of inverters. Working of series inverter.
	4th	working of parallel inverter. working of single-phase bridge inverter.
week 8	1st	basic principle of Cyclo-converter, working of single-phase step up Cyclo-converter.

	2nd	working of single-phase step-down Cyclo-converter. Applications of Cyclo-converter.
		UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS
	3rd	applications of power electronic circuits
	4th	factors affecting the speed of DC Motors
week 9	1st	Speed control for DC Shunt motor using converter
	2nd	Speed control for DC Shunt motor using chopper.
	3rd	factors affecting speed of the AC Motors
	4th	Speed control of Induction Motor by using AC voltage regulator
week 10	1st	Speed control of induction motor by using converters and inverters (V/F control)
	2nd	*Working of UPS with block diagram.*
	3rd	Battery charger circuit using SCR with the help of a diagram
	4th	Basic Switched mode power supply (SMPS) - its working & applications
		PLC AND ITS APPLICATIONS
week 11	1st	Introduction of PLC & its advantages
	2nd	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
	3rd	Applications of PLC Ladder diagram
	4th	Description of contacts and coils in the following states i)Normally open ii) Normally closed
week 12	1st	iii) Energized output iv)latched Output v) branching
	2nd	*Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.*
	3rd	*Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT*
	4th	Timers-i)T ON
week 13	1st	ii) T OFF
	2nd	iii)Retentive timer
	3rd	Counters-CTU, CTD
	4th	Ladder diagrams using Timers and counters
week 14	1st	*PLC Instruction set*
	2nd	Ladder diagrams for following
	3rd	(i) DOL starter and STAR-DELTA starter
	4th	(ii) Stair case lighting
week 15	1st	(iii) Traffic light Control
	2nd	(iv) Temperature Controller
	3rd	Special control systems- Basics DCS & SCADA systems
	4th	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)

31/07/2023

HOD
Electrical Engg

31/07/23

Academic Co-ordinator

31/7/23

Principal
Govt. polytechnic Nabarangapur