PNS SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL ENGINEERING

Branch: Electrical & ETC Engg.	Semester: 5TH	Name of the Lecturer: **Chacha Amitav Tripathy**
Subject: PE&PLC	Classes Alloted in a Week: 5	Duration of Semester: 01.07.2024 - 08.11.2024
Week	Class Day	Theory / Practical Topic
1st	1	**UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES:** Construction, Operation, V-I characteristics & application of power diode.
	2	Construction, Operation, V-I characteristics & application of SCR.
	3	Construction, Operation, V-I characteristics & application of DIAC
	4	Construction, Operation, V-I characteristics & application of TRIAC
	5	Construction, Operation, V-I characteristics & application of Power MOSFET
2nd	1	Construction, Operation, V-I characteristics & application of GTO
	2	Construction, Operation, V-I characteristics & application of IGBT
	3	Two transistor analogy of SCR
	4	Gate characteristics of SCR.
	5	Switching characteristic of SCR during turn on and turn off.
3rd	1	Turn on methods of SCR.
	2	Turn off methods of SCR (Load Commutation & Resonant pulse commutation)
	3	Voltage and Current ratings of SCR.
	4	Protection of SCR Over voltage protection Over current protection Gate protection
	5	Firing Circuits General layout diagram of firing circuit R firing circuits R-C firing circuit
4th	1	UJT pulse trigger circuit
	2	Synchronous triggering (Ramp Triggering)
	3	Design of Snubber Circuits
	4	**UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS:** Controlled rectifiers techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.
	5	Working of single-phase half wave controlled converter with Resistive
5th	1	Working of single-phase half wave controlled converter with R-L loads.
	2	Understand need of freewheeling diode.
	3	Working of single phase fully controlled converter with resistive.
	4	Working of single phase fully controlled converter with R- L loads.
	5	Working of three-phase half wave controlled converter with Resistive load
6th	1	Working of three phase fully controlled converter with resistive load.
	2	Working of single phase AC regulator.
	3	Working principle of step up & step down chopper.
	4	Control modes of chopper
	5	Operation of chopper in all four quadrants.

7th	1	**UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS:** Classify inverters
	2	Explain the working of series inverter
	3	Explain the working of parallel inverter
	4	Explain the working of single-phase bridge inverter
	5	Explain the basic principle of Cyclo-converter
8th	1	Explain the working of single-phase step up & step down Cyclo-converter.
	2	Explain the working of single-phase step up & step down Cyclo-converter.
	3	Applications of Cyclo-converter
	4	**PUNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS:** List applications of power electronic circuits
	5	List the factors affecting the speed of DC Motors
9th	1	Speed control for DC Shunt motor using converter
	2	Speed control for DC Shunt motor using chopper
	3	List the factors affecting speed of the AC Motors
	4	Speed control of Induction Motor by using AC voltage regulator
	5	Speed control of induction motor by using converters and inverters (V/F control)
10th	1	Working of UPS with block diagram
	2	Battery charger circuit using SCR with the help of a diagram
	3	Basic Switched mode power supply (SMPS) - explain its working & applications
	4	**PLC AND ITS APPLICATIONS:** Introduction of Programmable Logic Controller(PLC). Advantages of PLC
	5	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC
11th	1	Applications of PLC, Ladder diagram
	2	Description of contacts and coils in the following states i)Normally open ii)Normally closed iii) Energized output iv)latched Output v) branching
	3	Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate
	4	Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	5	Timers-i)T ON ii) T OFF and iii)Retentive timer, Counters-CTU, CTD
12th	1	Ladder diagrams using Timers and counters
	2	PLC Instruction set
	3	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	4	Special control systems- Basics DCS & SCADA systems
	5	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)

Signature of the Lecturer

Signature of the H.O.D.