

Discipline: EE	Semester: 5 th Sem.	Name of the Teaching Faculty: Pallabi Mohanta
Subject: Power Electronics and PLC	No. of Days/per week class allotted: 04	Semester From Date: 1 August 2023 to 30 November 2023 No. of Weeks: 15
Week	Class/ Day	Theory Topics
1 st	01	Construction, Operation, V-I characteristics
	02	Application of power diode, SCR.
	03	DIAC, TRIAC,
	04	Power MOSFET, GTO & IGBT
2 nd	01	Two transistor analogy of SCR. Gate characteristics of SCR.
	02	Switching characteristic of SCR during turn on and turn off.
	03	Turn on methods of SCR
	04	Turn off methods of SCR (Line commutation and Forced commutation)
3 rd	01	Load Commutation, Resonant pulse commutation
	02	Protection of SCR, Over voltage protection
	03	Over current protection, Gate protection
	04	Firing Circuits, General layout diagram of firing circuit.
4 th	01	R firing circuits.
	02	R-C firing circuit
	03	UJT pulse trigger circuit
	04	Synchronous triggering (Ramp Triggering)
5 th	01	Design of Snubber Circuits.
	02	Tutorial class
	03	Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter.
	04	Two quadrant full converter and dual Converter.
6 th	01	Working of single-phase half wave controlled converter with Resistive and R-L loads.





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	02	Understand need of freewheeling diode.
	03	Working of single phase fully controlled converter with resistive and R-L loads.
	04	Working of three-phase half wave controlled converter with Resistive load.
7 th	01	Working of three phase fully controlled converter with resistive load..
	02	Working of single phase AC regulator.
	03	Working principle of step up chopper.
	04	Step down chopper.
8 th	01	Control modes of chopper.
	02	Operation of chopper in all four quadrants.
	03	Classify inverters.
	04	Explain the working of series inverter.
9 th	01	Explain the working of parallel inverter.
	02	Explain the working of single-phase bridge inverter
	03	Explain the basic principle of Cyclo-converter
	04	Explain the working of single-phase step up cyclo-converter.

10 th	01	step down Cyclo-converter.
	02	Applications of Cyclo-converter
	03	List applications of power electronic circuits.
	04	List the factors affecting the speed of DC Motors
11 th	01	Speed control for DC Shunt motor using converter.
	02	Speed control for DC Shunt motor using chopper.
	03	List the factors affecting speed of the AC Motors.
	04	Speed control of Induction Motor by using AC voltage regulator





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12 th	01	Speed control of induction motor by using converters and inverters (V/F control)
	02	Working of UPS with block diagram
	03	Battery charger circuit using SCR with the help of a diagram.
	04	Basic Switched mode power supply (SMPS) - explain its working & applications
13 th	01	Introduction of Programmable Logic Controller(PLC), Advantages of PLC
	02	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
	03	Applications of PLC , Ladder diagram
	04	Description of contacts and coils in the following states i)Normally open ii) Normally closed iii) Energized output iv)latched Output v) branching
14 th	01	Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate..
	02	Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	03	Timers-i)T ON ii) T OFF and iii)Retentive timer.
	04	Counters-CTU, CTD 5.11 Ladder diagrams using Timers and counters.
15 th	01	PLC Instruction set
	02	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	03	Special control systems- Basics DCS & SCADA systems
	04	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)

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