

DISCIPLINE: Electrical & Electronics Engg.	SEMESTER: 5 th Semester	NAME OF THE TEACHING FACULTY: Majji.Lalitha , GUEST FACULTY IN EEE
SUBJECT: Power Electronics & PLC (th5)	NO OF DAYS/PER WEEK CLASSES ALLOTTED: 4	SEMESTER FROM DATE: 14.07.2025 TO DATE: 15.11.2025 NO OF WEEKS: 15

Week	Class Day	Topics
		1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC
1st	1st	Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC.
	2nd	Construction, Operation, V-I characteristics & application of MOSFET, GTO & IGBT.
	3rd	Two transistor analogy of SCR, Gate characteristics of SCR.
	4th	Switching characteristic of SCR during turn on and turn off.
2nd	1 ST	Turn on methods of SCR, Turn off methods of SCR (Line commutation and Forced commutation)
	2 ND	Load Commutation, Resonant pulse commutation
	3 RD	Voltage and Current ratings of SCR.
	4 TH	ASSIGNMENT
3rd		Protection of SCR
	1st	Over voltage protection.
	2nd	Over current protection, Gate protection.
	3 RD	CLASS TEST
		Firing Circuits
	4 TH	General layout diagram of firing circuit
4th	1st	R firing circuits, R-C firing circuit.
	2nd	UJT pulse trigger circuit.
	3 RD	CLASS TEST
	4 TH	Synchronous triggering (Ramp Triggering)
5th	1st	Design of Snubber Circuits
	2nd	ASSIGNMENT
		2 UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS
	3 RD	Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.
	4 TH	Working of single-phase half wave controlled converter with Resistive and R-L loads
6th	1 ST	Understand need of freewheeling diode.
	2 ND	Working of single phase fully controlled converter with resistive and R- L loads.
	3 RD	Working of three-phase half wave controlled converter with Resistive load.
	4 TH	CLASS TEST
7th	1 ST	Working of three phase fully controlled converter with resistive load.
	2 ND	Working of single phase AC regulator.

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

M. Lalitha
10/09/25
Signature of Lecturer

D. S. R. S. R.
10.09.25
Signature of HOD