

LESSON PLAN FOR Power Electronics & PLC (Th5)

Discipline: Electrical Engineering	Semester: 5th	Name of the Teaching Faculty: Ms. Deepika sarkar (Lect. In ETC)
Subject: Power Electronics & PLC	No. of days per week class allotted: 5	Semester From Date : 01.10.21 to Date: 31.01.22 Required No. of Weeks: 15
Week	Class Day	Theory
		1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONICS DEVICES
week 1	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
week 5	1st	Synchronous triggering (Ramp Triggering)
	2nd	Design of Snubber Circuits
		UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.
	3rd	Controlled rectifiers Techniques(Phase Angle, Extinction Angle control)
	4th	Single quadrant semi converter, two quadrant full converter
week 6	1st	dual Converter
	2nd	Working of single-phase half wave controlled converter with Resistive and R-L loads.
	3rd	Understand need of freewheeling diode

	4th	Working of single phase fully controlled converter with resistive and R- L loads
week 7	1st	Working of three-phase half wave controlled converter with Resistive load
	2nd	Working of three phase fully controlled converter with resistive load.
	3rd	Working of single phase AC regulator
	4th	Working principle of step up & step down chopper
week 8	1st	Control modes of chopper
	2nd	Operation of chopper in all four quadrants.
		UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS
	3rd	Classification of inverters.
	4th	working of series inverter.
week 9	1st	working of parallel inverter
	2nd	working of single-phase bridge inverter.
	3rd	basic principle of Cyclo-converter
	4th	working of single-phase step up Cyclo-converter.
week 10	1st	working of single-phase stepdown Cyclo-converter.
	2nd	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 11	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 12	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
week 13		PLC AND ITS APPLICATIONS
	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 iii) Energized output iv) latched Output v) branching
week 14	1st	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
	2nd	Timers-i)T ON ii) T OFF and iii)Retentive timer
	3rd	Counters-CTU, CTD
	4th	Ladder diagrams using Timers and counters
week 15	1st	PLC Instruction set
	2nd	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3rd	Special control systems- Basics DCS & SCADA systems
	4th	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)