

Lesson Plan

Discipline: Electrical, Semester: 5th, Name of Faculty : BINAYAK DASH		
Subject: Power Electronics & PLC	No. of days/ week Class allotted: 4	Semester From Date:16.01.2024 To date : 23.05.2024
Week	Class Day	Theory
1st	1st	UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC
	2nd	Construction, Operation, V-I characteristics & application of TRIAC, Power MOSFET, GTO & IGBT
	3rd	Two transistor analogy of SCR
	4th	Gate characteristics of SCR.
2nd	1st	<u>Switching characteristic of SCR during turn on and turn off.</u> Turn on methods of SCR.
	2nd	Turn off methods of SCR (Line commutation and Forced commutation)
	3rd	Load Commutation
	4th	<u>Resonant pulse commutation</u> Voltage and Current ratings of SCR.
3rd	1st	Protection of SCR
	2nd	Over voltage protection Over current protection
	3rd	Over current protection
	4th	Gate protection
4th	1st	Firing Circuits General layout diagram of firing circuit
	2nd	R firing circuits

	3rd	R-C firing circuit
	4th	UJT pulse trigger circuit
5th	1st	Synchronous triggering (Ramp Triggering)
	2nd	0 Design of Snubber Circuits
	3rd	Question discussion

	4th	Doubt clearing class
6th	1st	Class test
	2nd	<p>UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS</p> <p>Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter</p>
	3rd	Working of single-phase half wave controlled converter with Resistive and R-L loads.
	4th	Understand need of freewheeling diode.
7th 8th	1st	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
	1st	Working principle of step up & step down
	2nd	chopper Control modes of chopper
	3rd	Operation of chopper in all four quadrants
	4th	Question discussion and problem solving class

9th	1st	Doubt clearing class
	2nd	Class test
	3rd	UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS Classify inverters. Explain the working of series inverter
	4th	Explain the working of parallel inverter Explain the working of single-phase bridge inverter.
10th	1st	Explain the basic principle of Cyclo-converter. 3.6 Explain the working of single-phase step up & step down Cyclo-converter
	2nd	Applications of Cyclo-converter Doubt clearing and problem solving
	3rd	Class test.
	4th	UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS List applications of power electronic circuits. List the factors affecting the speed of DC Motors

11th	1st	Speed control for DC Shunt motor using converter. Speed control for DC Shunt motor using chopper.
	2nd	List the factors affecting speed of the AC Motors. Speed control of Induction Motor by using AC voltage regulator.
	3rd	Speed control of induction motor by using converters and inverters (V/F control). Working of UPS with block diagram.
	4th	Battery charger circuit using SCR with the help of a diagram. Basic Switched mode power supply (SMPS) - explain its working & applications Doubt clearing
12th	1st	class test

13th	2nd	PLC AND ITS APPLICATIONS Introduction of Programmable Logic Controller(PLC) <u>Advantages of PLC</u>
	3rd	Different parts of PLC by drawing the Block diagram and purpose <u>of each part of PLC</u> . <u>5.4 Applications of PLC</u> <u>5.5 Ladder diagram</u> Description of contacts and coils in the following states i)Normally open ii) Normally closed iii) Energized output iv)latched Output v) <u>branching</u>
	4th	Description of contacts and coils in the following states i)Normally open ii) Normally closed iii) Energized output iv)latched Output v) <u>branching</u>
	1st	Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	2nd	Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
14th	3rd	Timers-i)T ON ii) T OFF and iii)Retentive timer
	4th	Counters-CTU, CTD
	1st	Ladder diagrams using Timers and counters
	2nd	PLC Instruction set
15th	3rd	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	4th	Special control systems- Basics DCS & SCADA systems
	1st	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	2nd	Doubt clearing class
15th	3rd	Diagram practice
	4th	Class test

Reference

1. Power Electronics, Dr. P. S. Bhimbhra
2. Modern Power Electronics, B.K.Bose