SUNDARGARH ENGINEERING SCHOOL, KIREI

LESSON PLAN

Subject : POWER ELECTRONICS & PLC.

Discipline : ELECTRICAL ENGINEERING

Faculty : SHYAM SUNDAR PADHI

Semester : 5TH

Week	Weekly classes	Theory Topics
1st	1st	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET, IGBT
	2nd	1.2 Two transistor analogy of SCR. 1.3 Gate characteristics of SCR.
	3rd	1.4 Switching characteristic of SCR during turn on and turn off.
	4th	1.5 Turn on methods of SCR.
2nd	1st	1.6 Turn off methods of SCR (Line commutation and Forced commutation)
	2nd	1.6.1 Load Commutation 1.6.2 Resonant pulse commutation
	3rd	1.7 Voltage and Current ratings of SCR.
	4th	1.8 Protection of SCR 1.8.1 Over voltage protection 1.8.2 Over current protection
3rd	1st	1.8.3 Gate protection
	2nd	1.9.2 Resistance firing circuits
	3rd	1.9 Firing Circuits GTO 1.9.3 R-C firing circuit
	4th	1.9.1 General layout diagram of firing circuit UJT pulse trigger circuit
4th	1st	1.9.5 Synchronous triggering (Ramp Triggering)
	2nd	Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter

	3rd	Working of single-phase half wave controlled converter with Resistive and R-L loads.
	4th	2.3 Understand need of freewheeling diode
5th	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
6th	1st	Working principle of step up & step down chopper
	2nd	Control modes of choppe
	3rd	Four quadrant chopper
	4th	Classify inverters. 3.2 Explain the working of series inverter
7th	1st	Explain the working of parallel inverter
	2nd	Explain the working of single-phase bridge inverter
	3rd	Explain the basic principle of Cyclo-converter
	4th	Explain the working of single-phase step up & step down Cyclo-converter.
8th	1st	Applications of Cyclo-converter.
	2nd	List applications of power electronic circuits. 4.2 List the factors affecting the speed of DC Motors
	3rd	Speed control for DC Shunt motor using converter. 4.
	4th	List the factors affecting speed of the AC Motors.
9th	1st	Speed control of induction motor by using converters and inverters (V/F control
	2nd	Battery charger circuit using SCR with the help of a diagram
	3rd	4.8 Working of UPS with block diagram.
	4th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
10th	1st	4.6 Speed control of Induction Motor by using AC voltage regulator
	2nd	Speed control for DC Shunt motor using chopper.
	3rd	Introduction of Programmable Logic Controller(PLC)
	4th	5.2 Advantages of PLC

11th	1st	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
	2nd	Applications of PLC
	3rd	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
12th	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
	3rd	Timers-i)T ON ii) T OFF and iii)Retentive timer
	4th	Counters-CTU, CTD
13th	1st	Counters-CTU, CTD 5.11 Ladder diagrams using Timers and counters
	2nd 3rd	PLC Instruction se
	4th	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting
14th	1st	(iii) Traffic light Control (iv) Temperature Controller
	2nd	Special control systems- Basics DCS & SCADA systems
	3rd	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	4th	Question and answer discussion

HOD, Electrical Department Principal