LESSON PLAN

Discipline: Elect. Engg.	**Semester:** Fifth (5th)	**Name of the Faculty: SARMISTA PANDA**
Subject: Power Electronics and PLC	**No. of days/week class allotted:** Five (5)	**No. of Weeks:** 15
WEEK	**CLASS DAY**	**THEORY TOPICS**
1st	1st	Introduction of Power Electronic Devices
	2nd	Construction, Operation, V-I characteristics & application of SCR,
	3rd	Construction, Operation, V-I characteristics & application of power diode , Two transistor analogy of SCR
	4th	Gate characteristics of SCR, Switching characteristic of SCR during turn on and turn off
	5th	Turn on methods of SCR.
2nd	1st	Turn off methods of SCR (Line commutation and Forced commutation) , Load Commutation, Resonant pulse commutation
	2nd	Voltage and Current ratings of SCR, Protection of SCR
	3rd	Over voltage protection , Over current protection
	4th	Gate protection, Firing Circuits
	5th	General layout diagram of firing circuit
3rd	1st	R firing circuits
	2nd	R-C firing circuit , UJT pulse trigger circuit
	3rd	Synchronous triggering (Ramp Triggering) , Design of Snubber Circuits
	4th	Construction, Operation, V-I characteristics & application of Power MOSFET
	5th	Construction, Operation, V-I characteristics & application of IGBT
	1st	Construction, Operation, V-I characteristics & application of GTO , DIAC, TRIAC

4th	2nd	**Review Class**
	3rd	Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter
	4th	Working of single-phase half wave controlled converter with Resistive loads.
	5th	Monthly test
5th	1st	Working of single-phase half wave controlled converter with R-L loads.
	2nd	Understand need of freewheeling diode.
	3rd	Working of single phase fully controlled converter with resistive loads.
	4th	Working of single phase fully controlled converter with R- L loads.
	5th	Working of three-phase half wave controlled converter with Resistive load
6th	1st	Working of three phase fully controlled converter with resistive load.
	2nd	Working of single-phase AC regulator.
	3rd	Working principle of step up chopper.
	4th	Working principle of step down chopper.
	5th	Control modes of chopper
7th	1st	Operation of chopper in all four quadrants.
	2nd	**Review Class**
	3rd	Classify inverters.
	4th	Explain the working of series inverter.
	5th	Monthly test
8th	1st	Explain the working of parallel inverter
	2nd	Explain the working of single-phase bridge inverter.
	3rd	Explain the working of single-phase bridge inverter

		(Continue…)
	4th	Explain the basic principle of Cyclo-converter.
	5th	Explain the working of single-phase step up Cyclo-converter.
9th	1st	Explain the working of single-phase step down Cyclo-converter , Applications of Cyclo-converter.
	2nd	**Review Class**
	3rd	List applications of power electronic circuits.
	4th	List the factors affecting the speed of DC Motors.
	5th	Speed control for DC Shunt motor using converter.
10th	1st	Speed control for DC Shunt motor using chopper.
	2nd	List the factors affecting speed of the AC Motors.
	3rd	Speed control of Induction Motor by using AC voltage regulator.
	4th	**Monthly test**
	5th	Speed control of induction motor by using converters (V/F control).
11th	1st	Speed control of induction motor by using 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) - explain its working & applications
	5th	**Review Class**

12th	1st	Introduction of Programmable Logic Controller (PLC) , Advantages of PLC
	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
	5th	Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
13th	1st	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
	5th	PLC Instruction set
14th	1st	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (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	**Review Class**
	5th	**Monthly test**
15th	1st	revision
	2nd	revision
	3rd	revision
	4th	revision
	5th	revision