SUBJECT- PE & PLC(TH-5)   **SEMESTER-5TH**

NAME OF THE FACULTY- SRI Saroj Kanta Ray

TOTAL NO. OF PERIODS-60(4P/WEEK)

UNIT	DATE	PERIOD	TOPICS TO BE COVERED
1	1st week of November,2021		**UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES**
		1	Construction, Operation, V-I characteristics & application of power diode, SCR
		2	Construction, Operation, V-I characteristics & application of DIAC, TRIAC
		3	Construction, Operation, V-I characteristics & application of Power MOSFET, GTO & IGBT
		4	Two transistor analogy of SCR
		5	Gate characteristics of SCR.
		6	Switching characteristic of SCR during turn on and turn off.
		7	Turn on methods of SCR.
		8	Turn off methods of SCR (Line commutation and Forced commutation)
		9	Turn off methods of SCR: 1- Load Commutation 2- Resonant pulse commutation
		10	Voltage and Current ratings of SCR.
		11	Protection of SCR: 1-Over voltage protection 2 Over current protection.
		12	Protection of SCR: 3 Gate protection
		13	Firing Circuits: General layout diagram of firing circuit, R firing circuits
		14	Firing Circuits: R-C firing circuit, UJT pulse trigger circuit
		15	Firing Circuits: Synchronous triggering (Ramp Triggering)
		16	Design of Snubber Circuits
		17	Previous year questions discussion
		18	Numerical problems and assignments
			UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.

2	1st week of December,2021	1	Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter
		2	Two quadrant full converter and dual Converter
		3	Working of single-phase half wave-controlled converter with Resistive and R-L loads
		4	Understand need of freewheeling diode
		5	Working of single phase fully controlled converter with resistive and R- L loads.
		6	Working of three-phase half wave-controlled converter with Resistive load
		7	Working of three phase fully controlled converter with resistive load.
		8	Working of single phase AC regulator
		9	Working principle of step up & step down chopper.
		10	Control modes of chopper
		11	Operation of chopper in all four quadrants.
		12	Numerical problems and assignments
3	1st week of January,2022		**UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS**
		1	Classify inverters.
		2	Explain the working of series inverter
		3	Explain the working of parallel inverter
		4	Explain the working of single-phase bridge inverter
		5	Explain the basic principle of Cyclo-converter.
		6	Explain the working of single-phase step up & step down Cyclo-converter
		7	Applications of Cyclo-converter
		8	Numerical problems and assignments
4	3rd week of January,2022		**UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS**
		1	List applications of power electronic circuits. List the factors affecting the speed of DC Motors.
		2	Speed control for DC Shunt motor using converter
		3	Speed control for DC Shunt motor using chopper.
		4	List the factors affecting speed of the AC Motors.
		5	Speed control of Induction Motor by using AC voltage regulator
		6	Speed control of induction motor by using converters and inverters (V/F control).

		7	Working of UPS with block diagram.
		8	Battery charger circuit using SCR with the help of a diagram
		9	Basic Switched mode power supply (SMPS) - explain its working & applications
		10	Numerical problems and assignments
5	1st week of February,2022		**PLC AND ITS APPLICATIONS**
		1	Introduction of Programmable Logic Controller (PLC) Advantages of PLC
		2	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
		3	Applications of PLC Ladder diagram
		4	Description of contacts and coils in the following states i) Normally open ii) Normally closed iii) Energized output iv)latched Output v) branching
		5	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
		6	Timers-i)T ON ii) T OFF and iii)Retentive timer
		7	Counters-CTU, CTD
		8	Ladder diagrams using Timers and counters PLC Instruction set
		9	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
		10	Special control systems- Basics DCS & SCADA systems
		11	Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
		12	Numerical problems and assignments