

Discipline: 5th SEM ELECTRONICS and Telecommunication Engineering		Name of the Teaching Faculty: Er. DEBI PRASAD PATNAIK	
Subject: - TH - 5 Power Electronics & PLC	No. of days per week class allotted: 04	Semester From Date: 01 October, 2021 To 08 January, 2022 No. of Weeks: 15	
WEEKS	No. of Days/per week Class allotted: 4	Syllabus To be Covered	
1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES [18 Periods]			
1ST WEEK	1st	1	1.1 Construction, Operation, V-I characteristics & application of power diode
	2nd	2	1.1 Construction, Operation, V-I characteristics & application of SCR
	3rd	3	1.1 Construction, Operation, V-I characteristics & application of DIAC, TRIAC
	4th	4	1.1 Construction, Operation, V-I characteristics & application of Power MOSFET, GTO & IGBT
2ND WEEK	1st	5	1.2 Two transistor analogy of SCR.
	2nd	6	1.3 Gate characteristics of SCR.
	3rd	7	1.4 Switching characteristic of SCR during turn on and turn off.
	4th	8	1.5 Turn on methods of SCR.
3RD WEEK	1st	9	1.6 Turn off methods of SCR (Line commutation and Forced commutation)
	2nd	10	1.6.1 Load Commutation, 1.6.2 Resonant pulse commutation
	3rd	11	1.7 Voltage and Current ratings of SCR. 1.8 Protection of SCR
	4th	12	1.8.1 Over voltage protection, 1.8.2 Over current protection, 1.8.3 Gate protection
4TH WEEK	1st	13	1.9 Firing Circuits, 1.9.1 General layout diagram of firing circuit
	2nd	14	1.9.2 R firing circuits
	3rd	15	1.9.3 R-C firing circuit
	4th	16	1.9.4 UJT pulse trigger circuit
5TH WEEK	1st	17	1.9.5 Synchronous triggering (Ramp Triggering)
	2nd	18	1.10 Design of Snubber Circuits

2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS.			
	3rd	19	2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control),
	4th	20	2.1 Single quadrant semi converter, two quadrant full converter and dual Converter
6TH WEEK	1st	21	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2nd	22	2.3 Understand need of freewheeling diode.
	3rd	23	2.4 Working of single phase fully controlled converter with resistive and R- L loads.
	4th	24	2.5 Working of three-phase half wave controlled converter with Resistive load
7TH WEEK	1st	25	2.6 Working of three phase fully controlled converter with resistive load.
	2nd	26	2.7 Working of single phase AC regulator.
	3rd	27	2.8 Working principle of step up & step down chopper.
	4th	28	2.9 Control modes of chopper
8TH WEEK	1st	29	2.10 Operation of chopper in all four quadrants.
	2nd	30	2.10 Operation of chopper in all four quadrants.
	3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS		
	3rd	31	3.1 Classify inverters.
	4th	32	3.2 Explain the working of series inverter.
9TH WEEK	1st	33	3.3 Explain the working of parallel inverter
	2nd	34	3.4 Explain the working of single-phase bridge inverter.
	3rd	35	3.5 Explain the basic principle of Cyclo-converter.
	4th	36	3.6 Explain the working of single-phase step up Cyclo-converter.
10TH WEEK	1st	37	3.6 Explain the working of single-phase step down Cyclo-converter.
	2nd	38	3.7 Applications of Cyclo-converter.

4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS			
	3rd	39	4.1 List applications of power electronic circuits.
	4th	40	4.2 List the factors affecting the speed of DC Motors.
11TH WEEK	1st	41	4.3 Speed control for DC Shunt motor using converter.
	2nd	42	4.4 Speed control for DC Shunt motor using chopper.
	3rd	43	4.5 List the factors affecting speed of the AC Motors.
	4th	44	4.6 Speed control of Induction Motor by using AC voltage regulator.
12TH WEEK	1st	45	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	2nd	46	4.8 Working of UPS with block diagram.
	3rd	47	4.9 Battery charger circuit using SCR with the help of a diagram.
	4th	48	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
5. PLC AND ITS APPLICATIONS			
13TH WEEK	1st	49	5.1 Introduction of Programmable Logic Controller(PLC), 5.2 Advantages of PLC
	2nd	50	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC. 5.4 Applications of PLC
	3rd	51	5.5 Ladder diagram
	4th	52	5.6 Description of contacts and coils in the following states i)Normally open ii) Normally closed iii) Energized output iv)latched Output v) branching
14TH WEEK	1st	53	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	2nd	54	5.8 Ladder diagrams for combination circuits using NAND, NOR, AND, OR and NOT Gates
	3rd	55	5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	4th	56	5.10 Counters-CTU, CTD 5.11 Ladder diagrams using Timers and counters
15TH WEEK	1st	57	5.12 PLC Instruction set
	2nd	58	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting
	3rd	59	5.13 Ladder diagrams for following (iii) Traffic light Control (iv) Temperature Controller
	4th	60	5.14 Special control systems- Basics DCS & SCADA systems 5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)