

ACADEMIC LESSION PLAN FOR WINTER SEMESTER - 2022
DEPT. OF ELECTRONICS & TELECOMMUNICATION
GOVT. POLYTECHNIC, BALASORE

DISCIPLINE: ELECTRONICS & TELECOMMUNICATION ENGINEERING	SEMESTER: 5TH	NAME OF THE TEACHING FACULTY: PRAKASH CHANDRA DAS
SUBJECT: POWER ELECTRONICS & PLC	NO OF DAYS /PER WEEK CLASS ALLOTTED: 4	SEMESTER FROM DATE: 15 th SEPTEMBER 2022 TO DATE: 22 DECEMBER 2022 NO. OF WEEKS: 15
WEEK	CLASS DAY	THEORY TOPICS
1st	1st	1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES(18) 1.1 Construction, Operation, V-I characteristics & application of power diode, SCR,
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	3rd	DIAC, TRIAC,
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2nd	1st	Power MOSFET, GTO & IGBT
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	3rd	1.2 Two transistor analogy of SCR.
	4th	1.3 Gate characteristics of SCR.
3rd	1st	1.4 Switching characteristic of SCR during turn on and turn off.
	2nd	1.4 Switching characteristic of SCR during turn on and turn off.
	3rd	1.5 Turn on methods of SCR.
	4th	1.6 Turn off methods of SCR (Line commutation and Forced commutation)
4th	1st	1.6.1 Load Commutation
	2nd	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
5th	1st	1.8.2 Over current protection 1.8.3 Gate protection
	2nd	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	3rd	1.9.2 R firing circuits. 1.9.3 R-C firing circuit
	4th	1.9.4 UJT pulse trigger circuit. 1.9.5 Synchronous triggering (Ramp Triggering)

6th	1st	1.10 Design of Snubber Circuits	
	2nd	2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS(12) 2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter,	
		3rd	two quadrant full converter and dual Converter
		4th	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads
7th	1st	2.3 Understand need of freewheeling diode.	
	2nd	2.4 Working of single phase fully controlled converter with resistive and R- L loads.	
	3rd	2.5 Working of three-phase half wave controlled converter with Resistive load	
	4th	2.6 Working of three phase fully controlled converter with resistive load.	
8th	1st	2.7 Working of single phase AC regulator.	
	2nd	2.8 Working principle of step up & step down chopper.	
	3rd	2.9 Control modes of chopper	
	4th	2.10 Operation of chopper in all four quadrants.	
9th	1st	3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS(8) 3.1 Classify inverters. 3.2 Explain the working of series inverter.	
	2nd	3.3 Explain the working of parallel inverter	
	3rd	3.4 Explain the working of single-phase bridge inverter.	
	4th	3.5 Explain the basic principle of Cyclo-converter.	
10th	1st	3.6 Explain the working of single-phase step up & step down Cyclo-converter.	
	2nd	3.7 Applications of Cyclo-converter.	
	3rd	4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS(10) 4.1 List applications of power electronic circuits.	
	4th	4.2 List the factors affecting the speed of DC Motors.	
11th	1st	4.3 Speed control for DC Shunt motor using converter.	
	2nd	4.4 Speed control for DC Shunt motor using chopper.	
	3rd	4.5 List the factors affecting speed of the AC Motors.	
	4th	4.6 Speed control of Induction Motor by using AC voltage regulator.	
12th	1st	4.7 Speed control of induction motor by using converters and inverters (V/F control).	
	2nd	4.8 Working of UPS with block diagram.	

	3rd	4.9 Battery charger circuit using SCR with the help of a diagram.
	4th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
13th	1st	5. PLC AND ITS APPLICATIONS(12) 5.1 Introduction of Programmable Logic Controller(PLC). 5.2 Advantages of PLC
	2nd	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC. 5.4 Applications of PLC. 5.5 Ladder diagram
	3rd	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.
	4th	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
14th	1st	5.8 Ladder diagrams for combination circuits using NAND, NOR, AND, OR and NOT
	2nd	5.9 Timers-i) T ON ii) T OFF and iii) Retentive timer
	3rd	5.10 Counters-CTU, CTD
	4th	5.11 Ladder diagrams using Timers and counters
15th	1st	5.12 PLC Instruction set
	2nd	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3rd	5.14 Special control systems- Basics DCS & SCADA systems
	4th	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)