

ACADEMIC LESSON PLAN WINTER 2024

Discipline: ETC	Semester: 5 th	Name of the Teaching Faculty: Lucky Rani Behuria
Subject: PE&PLC	No. of days/per week class allotted:4p/week	Semester From: 1 st July 2024 to 08 th Nov 2024 No. of Weeks: 19 weeks
Week	Class Day	Theory Topics
1 st	1 st	1. UNDERSTAND THE CONSTRUCTION AND WORKING OF POWER ELECTRONIC DEVICES 1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT (CONTD.)
	2 nd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT
	3 rd	1.2 Two transistor analogy of SCR.
	4 th	1.3 Gate characteristics of SCR.
2 nd	1 st	1.4 Switching characteristic of SCR during turn on and turn off. (CONTD.)
	2 nd	1.4 Switching characteristic of SCR during turn on and turn off.
	3 rd	1.5 Turn on methods of SCR.
	4 th	1.6 Turn off methods of SCR (Line commutation and Forced commutation) 1.6.1 Load Commutation
3 rd	1 st	1.6.2 Resonant pulse commutation
	2 nd	1.7 Voltage and Current ratings of SCR.
	3 rd	1.8 Protection of SCR 1.8.1 Over voltage protection
	4 th	1.8.2 Over current protection 1.8.3 Gate protection
4 th	1 st	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	2 nd	1.9.2 R firing circuits
	3 rd	1.9.3 R-C firing circuit
	4 th	1.9.4 UJT pulse trigger circuit
5 th	1 st	1.9.5 Synchronous triggering (Ramp Triggering)
	2 nd	1.10 Design of Snubber Circuits
	3 rd	2. UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS. 2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter. (CONTD.)
	4 th	2.1 Controlled rectifiers Techniques (Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter.
6 th	1 st	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2 nd	2.3 Understand need of freewheeling diode.
	3 rd	2.4 Working of single phase fully controlled converter with resistive and R-L loads.
	4 th	2.5 Working of three-phase half wave controlled converter with Resistive load
7 th	1 st	2.6 Working of three phase fully controlled converter with resistive load.
	2 nd	2.7 Working of single phase AC regulator.
	3 rd	2.8 Working principle of step up & step down chopper.
	4 th	2.9 Control modes of chopper
8 th	1 st	2.10 Operation of chopper in all four quadrants (CONTD.)
	2 nd	2.10 Operation of chopper in all four quadrants
	3 rd	3. UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS 3.1 Classify inverters.
	4 th	3.2 Explain the working of series inverter.

9 th	1 st	3.3 Explain the working of parallel inverter
	2 nd	3.4 Explain the working of single-phase bridge inverter.
	3 rd	3.5 Explain the basic principle of Cyclo-converter.
	4 th	3.6 Explain the working of single-phase step up & step down Cyclo-converter.(CONTD.)
10 th	1 st	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
	2 nd	3.7 Applications of Cyclo-converter.
	3 rd	4. UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS
	4 th	4.1 List applications of power electronic circuits. 4.2 List the factors affecting the speed of DC Motors.
11 th	1 st	4.3 Speed control for DC Shunt motor using converter.
	2 nd	4.4 Speed control for DC Shunt motor using chopper.
	3 rd	4.5 List the factors affecting speed of the AC Motors.
	4 th	4.6 Speed control of Induction Motor by using AC voltage regulator.
12 th	1 st	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	2 nd	4.8 Working of UPS with block diagram.
	3 rd	4.9 Battery charger circuit using SCR with the help of a diagram.
	4 th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
13 th	1 st	5. PLC AND ITS APPLICATIONS 5.1 Introduction of Programmable Logic Controller(PLC) 5.2 Advantages of PLC
	2 nd	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC. 5.4 Applications of PLC
	3 rd	5.5 Ladder diagram 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
	4 th	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
14 th	1 st	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	2 nd	5.9 Timers-i) T ON ii) T OFF and iii) Retentive timer
	3 rd	5.10 Counters-CTU, CTD
	4 th	5.11 Ladder diagrams using Timers and counters
15 th	1 st	5.12 PLC Instruction set
	2 nd	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3 rd	5.14 Special control systems- Basics DCS & SCADA systems
	4 th	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
16 th	1 st	Revision class
	2 nd	Revision class
	3 rd	Revision class
	4 th	Revision class
17 th	1 st	Revision class
	2 nd	Revision class
	3 rd	Revision class
	4 th	Revision class

Lucky Dani Beluwa

Signature of Teaching Faculty

