GIET
In Pursuit of Innovation

GIET POLYTECHNIC, JAGATPUR, CUTTACK

LESSON PLAN

Discipline: E&TC ENGG.	Semester: 5TH	Name Of The Teaching Faculty: RUPAK KUMAR SAOO
Subject: POWER ELECTRONICS AND PLC (TH- 5)	No. Of Days Per Week Class Allotted: 04	Semester From Date: 01/07/2024 To Date: 08/11/2024 No. of weeks: 15

Week	Class Day	Theory Topic
1st week	1st	**Unit-1: UNDERSTAND THE CONSTRUCTION & WORKING OF POWER ELECTRONIC DEVICES** ➢ 1.1: Construction, operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, power MOSFET, GTO & IGBT
	2nd	➢ 1.1: Construction, operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, power MOSFET, GTO & IGBT (Continue….)
	3rd	➢ 1.1: Construction, operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, power MOSFET, GTO & IGBT (Continue….)
	4th	➢ 1.1: Construction, operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, power MOSFET, GTO & IGBT (Continue….)
2nd week	1st	➢ 1.2: Two transistor analogy of SCR ➢ 1.3: Gate characteristics of SCR
	2nd	➢ 1.4: Switching characteristics of SCR during turn on & turn off
	3rd	➢ 1.5: Turn on methods of SCR
	4th	➢ 1.6: Turn off methods of SCR (Line communication & Forced communication)
3rd week	1st	➢ 1.6.1: Load communication ➢ 1.6.2: Resonant pulse communication
	2nd	➢ 1.7: Voltage and Current ratings of SCR ➢ 1.8: Protection of SCR ➢ 1.8.1: Over voltage protection
	3rd	➢ 1.8.2: Over current protection
	4th	➢ 1.8.3: Gate protection
4th week	1st	➢ 1.9: Firing circuits ➢ 1.9.1: General layout diagram of firing circuits
	2nd	➢ 1.9.2: R firing circuit
	3rd	➢ 1.9.3: R-C firing circuits

	4th	➢ 1.9.4: UJT pulse trigger circuit
5th week	1st	➢ 1.9.5: synchronous triggering(Ramp triggering)
	2nd	➢ 1.10: Design of snubber circuits
	3rd	**UNIT 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
	4th	➢ 2.1: Controlled rectifiers techniques(Phase Angle, Extinction Angle Control),Single quadrant semi converter, two quadrant full converter and dual converter (continue.....)
6th week	1st	➢ 2.1: Controlled rectifiers techniques (Phase Angle, Extinction Angle Control),Single quadrant semi converter, two quadrant full converter and dual converter (continue.....)
	2nd	➢ 2.2: Working of single phase half wave controlled converter with Resistive and R-L loads
	3rd	➢ 2.3: Understand need of freewheeling diode
	4th	➢ 2.4: Working of single phase fully controlled converter with Resistive and R-L loads
7th week	1st	➢ 2.5: working of three phase half wave controlled converter with Resistive load
	2nd	➢ 2.6: Working of three phase fully controlled converter with resistive load
	3rd	➢ 2.7: Working of single phase AC regulator
	4th	➢ 2.8: Working principle of step up & step down chopper
8th week	1st	➢ 2.9: Control modes of chopper
	2nd	➢ 2.10: Operation of chopper in all four quadrants
	3rd	**UNIT 3: UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS** ➢ 3.1: Classify inverters
	4th	➢ 3.2: Explain the Working of series inverter
9th week	1st	➢ 3.3: Explain the Working of parallel inverter
	2nd	➢ 3.4: Explain the Working of single phase bridge inverter
	3rd	➢ 3.5: Explain the Basic principle of Cyclo-converter
	4th	➢ 3.6: Explain the Working of single phase step up & step down Cyclo-converter
10th week	1st	➢ 3.6: Explain the Working of single phase step up & step down Cyclo-converter. (continue.....)
	2nd	➢ 3.7: Applications of Cyclo-converter.
	3rd	**UNIT 4: UNDERSTAND APPLICATIONS OF POWER ELECTRONIC CIRCUITS** ➢ 4.1: List Applications of power electronic circuits

	4th	➢ 4.2: List the factors affecting the speed of DC motors
11th week	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 week	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 & application
13th week	1st	UNIT 5: PLC AND ITS APPLICATIONS ➢ 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
	3rd	➢ 5.4: Applications of PLC ➢ 5.5: Ladder diagram
	4th	➢ 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	➢ 5.7: Ladder diagram for (i)AND gate(ii)OR gate and (iii)Not gate
	2nd	➢ 5.8: Ladder diagrams for combination circuit using NAND, NOR, AND,OR & NOT
	3rd	➢ 5.9: Timers (i)T ON(ii)T OFF and (III)Retentive timer
	4th	➢ 5.10: Counters-CTU, CTD
15th week	1st	➢ 5.11: Ladder diagrams using Timers & counters ➢ 5.12: PLC instruction set
	2nd	➢ 5.13: Ladder diagrams for following ➢ (i)DOL starter & STAR-DELTA starter(ii)Stair case lightning(iii)Trafffic 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)

29/6/24
Signature of faculty

29/6/24
Signature of Sr. lecture

HOD of Dept.
Electrical & ETC Engg
G.P.E.T (POLY), ...

29/6/24
Signature of principal