

UTKALMANI GOPABANDHU INSTITUTE OF
ENGINEERING,ROURKELA



LESSON PLAN

SESSION-2023-2024

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT CODE:

Th.5

NAME:

POWER ELECTRONICS & PLC.

BRANCH:

ELECTRONICS & TELECOMMUNICATION

SEMESTER:

DIPLOMA -5TH (SEM)

PERIODS PER WEEK:

4

NAME OF THE FACULTY:

PRASANTA KUMAR DAKHIN RAY

NO. OF PERIODS PER WEEK:

4 (AS PER AICTE)

NO OF CLASSES ALLOTTED PER WEEK OFFLINE MODE: 04 (16/01/2024 to 26/04/2024)

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Week/Date	Lecture	Topic to be covered
1 st week	1 st	Introduction to power electronic
	2 ND	SCR ,CONSTRUCTION OF SCR , ITS OPERATION
	3 RD	V-I characteristics of SCR, symbol & its application
	4 TH	DIAC ,
2 nd week	1 st	Construction of DIAC, v-I characteristics of DIAC, symbol & its application
	2 nd	TRIAC, constructions of TRIAC, v-I characteristics of TRIAC ,symbol ,& its application .
	3 rd	GTO, construction of GTO, operation of GTO ,symbol ,&its application
	4 th	IGBT, construction of IGBT, operation of IGBT ,symbol,& its application .
3 rd week	1 st	Power diode, construction of power diode, symbol & v-I characteristics of power diode .
	2 nd	Power MOSFET , construction detail of power MOSFET

		,v-I characteristics of power MOSFET & symbol .
	3 rd	Discuss two transistor analogy of SCR, & Gate characteristics of SCR .
	4 th	Explain Turn on method of SCR, &also Turn – off method of SCR (a)line commutation .
4 th week	1 st	(b) forced commutation, (c) load commutation & (d) resonant pulse commutation .
	2 nd	Discuss voltage & current rating of SCR, how to protect the SCR due to over voltage, over current & gate protection .
	3 rd	What is firing circuits. explain general layout diagram of firing circuits. describe R firing circuits .
	4 th	Explain R-C firing circuits, & also describe UJT pulse trigger circuits .
5 th week	1 st	Explain synchronous triggering (RAMP TRIGGERING)& also how to design of SNUBBER circuits . introduction to controlled rectifiers techniques .
	2 nd	Define (phase angle, extinction angle). what is single quadrant semi- converter, two quadrant full converter & dual converter .
	3 rd	Working of single – phase half wave controlled converter with R & R-L LOADS & also what do mean by freewheeling diode .
	4 th	Working of single phase fully controlled converter with R & R-L loads & working of three phase half wave controlled converter with R load .

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6 th week	1 st	Working of three phase fully controlled converter with R load. & working of single phase AC regulator .
	2 nd	Working principle of step up & step down chopper & control modes of chopper with its operation of chopper in all four quadrants .
	3 rd	What is inverter & classify inverter & also working operation of series inverter .
	4 th	Working of parallel inverter, working of single -phase bridge inverter .
7 th week	1 st	What is CYCLO – CONVERTER & its basic principle & working of single – phase step up CYCLO – CONVERTER .
	2 nd	Working of single -phase step –down CYCLO – CONVERTER & with its application .

	3 rd	Lists applications of power electronic circuits & also lists the factors affecting the speed of DC motors & explain. Speed control for DC shunt motor using converter.
	4 th	Explain speed control for DC shunt motor using chopper & list the factors affecting speed of the AC motors .
8 th week	1 st	Explain speed control of induction motor by using AC voltage regulator .
	2 nd	Explain speed control of induction motor by using converters & inverters (v/f control) .
	3 rd	What is UPS? working of UPS with its block diagram & types of UPS (i.e. on – line ups & off – line ups)
	4 th	Explain with the help of a diagram of battery charger circuit using SCR .
9 th week	1 st	What is SMPS (switched mode power supply) & its types & Explain the fly back converter SMPS .
	2 nd	Explain half – bridge converter SMPS & also Explain full – bridge converter SMPS .
	3 rd	Explain push – pull converter SMPS & its applications .
	4 th	Introduction of programmable logic controller (PLC) & its advantages PLC .
10 th week	1 st	Describe different parts of plc (input module , output module , power supply & CPU)
	2 nd	What is ladder diagram & describe of contacts & coils in the states 1) normally open 2) normally close 3) Energized output 4) latched output & 5) branching
	3 rd	Explain ladder diagram for 1) AND gate 2) OR gate .
	4 th	Explain ladder diagram for 3) NOT gate .

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11 th week	1 st	Discuss ladder diagram for combination CKT using EX-OR gate.
	2 nd	Discuss ladder diagram for combination CKT using EX-NOR gate.
	3 rd	Discuss ladder diagram for combination CKT using NOR gate.
	4 th	Discuss ladder diagram for combination CKT using NAND gate .
12 th week	1 st	Describe timer instruction of PLC T-OFF.
	2 nd	Describe timer instruction of PLC T-ON.
	3 rd	Discuss RENTIVE Timer instruction of PLC
	4 th	Discuss counter instruction of PLC COUNT -UP INSTRUCTION

13 th week	1 st	Discuss counter instruction of PLC COUNT -DOWN INSTRUCTION
	2 nd	Explain ladder diagram using TIMER INSTRUCTION
	3 rd	Explain ladder diagram using COUNTER INSTRUCTION
	4 th	Describe PLC INSTRUCTION SET
14 th week	1 st	Examine if OPEN instruction (XIO)
	2 nd	Examine if CLOSE instruction (XIC)
	3 rd	RELAY CONTACT INSTRUCTION
	4 th	Describe ladder diagram for following STAR - DELTA starter
15 th week	1 st	Describe ladder diagram for following DOL starter
	2 nd	Discuss ladder diagram for stair case lighting
	3 rd	Discuss ladder diagram for Traffic light control
	4 th	Discuss ladder diagram for TEMPERATURE CONTROLLER
16 th week	1 st	Special control system (Basic DCS)
	2 nd	Basic concepts of SCADA systems .
	3 rd	Explain computer -control Direct Digital control systems .
	4 th	Explain computer control - Data Acquisition
17 th week	1 st	Review unit -1
	2 nd	Review unit -2
	3 rd	Review unit -3
	4 th	Review unit -4
18 th week	1 st	Review unit -5
	2 nd	Discussion of MCQ
	3 RD	Discussion of MCQ
	4 TH	Discussion of MCQ

