NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSION PLAN

SUBJECT: POWER ELECTRONIC & PLC (TH5)

Name Of The Faculty - ER ELINA JAYSINGH
Branch :- ELECTRICAL & ELECTRONICS ENGINEERING **Semester** :- 5TH
Session :- 2024-25 **Examination** :- 2024 (w)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Understand The Construction And Working Of Power Electronic Devices	18	22
2	Understand The Working Of Converters, Ac Regulators And Choppers.	12	15
3	Understand Applications Of Power Electronic Circuits	8	12
4	Understand Applications Of Power Electronic Circuits	10	12
5	PLC And Its Applications	12	14
	Total Period:	60	75

Sign of Faculty

Sign of H.O.D.

iscipline: EEE	Semester: 3rd	**Name of the Teaching Faculty:** Er. ELINA JAYSINGH
		SESSION : 2024-25 **EXAMINATION :** 2024 (S)
Week	**Class Day**	**Topics to be Covered**
1st	1st	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
	3rd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	4th	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	5th	Tutorial
2nd	1st	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
	3rd	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	4th	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	5th	Tutorial
3rd	1st	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
	3rd	1.2 Two transistor analogy of SCR.
	4th	1.3 Gate characteristics of SCR.
	5th	Tutorial
4th	1st	1.4 Switching characteristic of SCR during turn on and turn off.
	2nd	1.5 Turn on methods of SCR
	3rd	1.6 Turn off methods of SCR (Line commutation and Forced commutation) 1.6.1 Load Commutation
	4th	1.6.2 Resonant pulse commutation 1.7 Voltage and Current ratings of SCR
	5th	Tutorial

Week	Class Day	Topics to be Covered
5th	1st	1.8 Protection of SCR 1.8.1 Over voltage protection
	2nd	1.8.2 Over current protection 1.8.3 Gate protection
	3rd	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit
	4th	1.9.2 R firing circuits
	5th	Tutorial
6th	1st	1.9.3 R-C firing circui
6th	2nd	1.9.4 UJT pulse trigger circuit
	3rd	1.9.5 Synchronous triggering (Ramp Triggering) 1.10 Design of Snubber Circuits
	4th	2.1 Controlled rectifiers Techniques(Phase Angle, Extinction Angle control), Single quadrant semi converter, two quadrant full converter and dual Converter
	5th	Tutorial
7th	1st	2.2 Working of single-phase half wave controlled converter with Resistive and R-L loads.
	2nd	2.3 Understand need of freewheeling diode.
	3rd	2.4 Working of single phase fully controlled converter with resistive and R- L loads.
	4th	2.5 Working of three-phase half wave controlled converter with Resistive load
	5th	Tutorial
8th	1st	2.6 Working of three phase fully controlled converter with resistive load.
	2nd	2.7 Working of single phase AC regulator.
	3rd	2.8 Working principle of step up & step down chopper.
	4th	2.9 Control modes of chopper
	5th	Tutorial
9th	1st	2.10 Operation of chopper in all four quadrants
	2nd	3.1 Classify inverters. 3.2 Explain the working of series inverter.
	3rd	3.3 Explain the working of parallel inverter
	4th	3.4 Explain the working of single-phase bridge inverter
	5th	Tutorial

Week	Class Day	Topics to be Covered
10th	1st	3.5 Explain the basic principle of Cyclo-converter.
	2nd	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
	3rd	3.7 Applications of Cyclo-converter. 4.1 List applications of power electronic circuits.
	4th	4.2 List the factors affecting the speed of DC Motors.
	5th	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
11th	3rd	4.4 Speed control for DC Shunt motor using chopper
	4th	4.5 List the factors affecting speed of the AC Motors
	5th	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	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	3rd	4.8 Working of UPS with block diagram.
	4th	4.8 Working of UPS with block diagram.
	5th	Tutorial
13th	1st	4.9 Battery charger circuit using SCR with the help of a diagram.
	2nd	4.9 Battery charger circuit using SCR with the help of a diagram.
	3rd	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
	4th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
	5th	Tutorial
14th	1st	5.1 Introduction of Programmable Logic Controller(PLC)
	2nd	5.1 Introduction of Programmable Logic Controller(PLC)
	3rd	5.2 Advantages of PLC 5.3 Different parts of PLC by drawing the Block diagram & purpose of each part of PLC.
	4th	5.4 Applications of PLC 5.5 Ladder diagram
	5th	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

Week	Class Day	Topics to be Covered
15th	1st	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
	2nd	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	3rd	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT 5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	4th	5.10 Counters-CTU, CTD
	5th	Tutorial
16th	1st	5.10 Counters-CTU, CTD
	2nd	5.10 Counters-CTU, CTD
	3rd	5.11 Ladder diagrams using Timers and counters
	4th	5.11 Ladder diagrams using Timers and counters
	5th	Tutorial
17th	1st	5.12 PLC Instruction set
17th	2nd	5.11 Ladder diagrams using Timers and counters
	3rd	
	4th	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	5th	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
18th	1st	5.14 Special control systems- Basics DCS & SCADA systems
	2nd	5.14 Special control systems- Basics DCS & SCADA systems
	3rd	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	4th	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	5th	Tutorial

Sign of Faculty

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