



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 - SOUMYAJIT ROUT

Branch :- ELECTRICAL ENGINEERING

Session :- 2024-25


Semester :- 5TH

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


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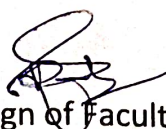

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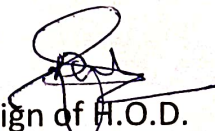
Discipline: EE	Semester: 5TH	Name of the Teaching Faculty: Er. SOUMYAJIT ROUT	
		SESSION : 2024-25	EXAMINATION : 2024 (W)
Week	Class Day	Topics to be Covered	
1 st	1 st	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, Power MOSFET, GTO & IGBT	
	2 nd	1.1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

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

Week	Class Day	Topics to be Covered
10 th	1 st	3.5 Explain the basic principle of Cyclo-converter.
	2 nd	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
	3 rd	3.7 Applications of Cyclo-converter. applications of power electronic circuits. 4.1 List
	4 th	4.2 List the factors affecting the speed of DC Motors.
	5 th	4.2 List the factors affecting the speed of DC Motors.
11 th	1 st	
	2 nd	4.4 Speed control for DC Shunt motor using chopper
	3 rd	4.4 Speed control for DC Shunt motor using chopper
	4 th	4.5 List the factors affecting speed of the AC Motors
	5 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	4.7 Speed control of induction motor by using converters and inverters (V/F control).
	3 rd	4.8 Working of UPS with block diagram.
	4 th	4.8 Working of UPS with block diagram.
	5 th	Tutorial
13 th	1 st	4.9 Battery charger circuit using SCR with the help of a diagram.
	2 nd	4.9 Battery charger circuit using SCR with the help of a diagram.
	3 rd	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
	4 th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
	5 th	Tutorial
14 th	1 st	5.1 Introduction of Programmable Logic Controller(PLC)
	2 nd	5.1 Introduction of Programmable Logic Controller(PLC)
	3 rd	5.2 Advantages of PLC 5.3 Different parts of PLC by drawing the Block diagram & purpose of each part of PLC.
	4 th	5.4 Applications of PLC 5.5 Ladder diagram
	5 th	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
15 th	1 st	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
	2 nd	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	3 rd	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
	4 th	5.10 Counters-CTU, CTD
	5 th	Tutorial
16 th	1 st	5.10 Counters-CTU, CTD
	2 nd	5.10 Counters-CTU, CTD
	3 rd	
	4 th	
	5 th	Tutorial
17 th	1 st	5.12 PLC Instruction set
17 th	2 nd	5.11 Ladder diagrams using Timers and counters
	3 rd	5.12 PLC Instruction set
	4 th	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	5 th	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
18 th	1 st	5.14 Special control systems- Basics DCS & SCADA systems
	2 nd	5.14 Special control systems- Basics DCS & SCADA systems
	3 rd	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	4 th	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	5 th	Tutorial


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