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

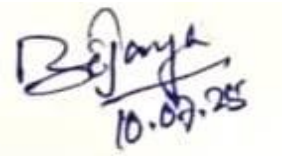
LESSION PLAN

SUBJECT: TH-5 (POWER ELECTRONIC & PLC)

Name Of The Faculty - ER. Bijaya Kumar Behera
Branch :- Electrical & Electronics Engineering **Semester:-** 5TH
Session :- 2025-26 **Examination :-** 2025 (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	18
2	Understand The Working Of Converters, Ac Regulators And Choppers.	12	12
3	Understand Applications Of Power Electronic Circuits	8	8
4	Understand Applications Of Power Electronic Circuits	10	10
5	PLC And Its Applications	12	12
	Total Period:	60	60



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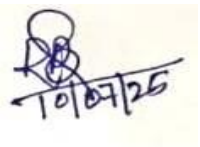

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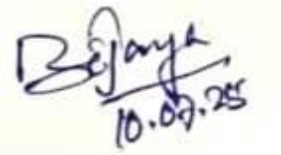
Name of the programme: Diploma in Electrical Electronics Engineering	Semester: 5th	**Name of the Teaching Faculty:** Er. Bijaya Kumar Behera	
		Academic Year : 2025-26 **Examination :** 2025 (W)	
Course Code- Th-5	**Course Year:** Third Year	**No. of Classes Alloted Per Week :**	4
		Planned Classes Required to Complete the Course	60

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
2nd	1st	1.1 Construction, Operation, V-I characteristics & application of power diode, SCR, DIAC,TRIAC, Power MOSFET,GTO &IGBT
	2nd	1.2 Two transistor analogy of SCR.
	3rd	1.3 Gate characteristics of SCR.
	4th	1.4 Switching characteristic of SCR during turn on and turn off.
3rd	1st	1.5 Turn on methods of SCR
	2nd	1.6 Turn off methods of SCR (Line commutation and Forced commutation) 1.6.1 Load Commutation
	3rd	1.6.2 Resonant pulse commutation 1.7 Voltage and Current ratings of SCR
	4th	1.8 Protection of SCR 1.8.1 Over voltage protection
4th	1st	1.8.2 Over current protection 1.8.3 Gate protection
	2nd	1.9 Firing Circuits 1.9.1 General layout diagram of firing circuit

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

Week	Class Day	Topics to be Covered
8th	3rd	3.1 Classify inverters. 3.2 Explain the working of series inverter.
	4th	3.3 Explain the working of parallel inverter
9th	1st	3.4 Explain the working of single-phase bridge inverter
	2nd	3.5 Explain the basic principle of Cyclo-converter.
	3rd	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
	4th	3.6 Explain the working of single-phase step up & step down Cyclo-converter.
10th	1st	3.7 Applications of Cyclo-converter.
	2nd	4.1 List applications of power electronic circuits.
	3rd	4.2 List the factors affecting the speed of DC Motors.
	4th	4.3 Speed control for DC Shunt motor using converter
11th	1st	4.4 Speed control for DC Shunt motor using chopper.
	2nd	4.5 List the factors affecting speed of the AC Motors.
	3rd	4.6 Speed control of Induction Motor by using AC voltage regulator.
	4th	4.7 Speed control of induction motor by using converters and inverters (V/F control).
12th	1st	4.8 Working of UPS with block 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

Week	Class Day	Topics to be Covered
12th	4th	5.1 Introduction of Programmable Logic Controller(PLC) 5.2 Advantages of PLC
13th	1st	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC
	2nd	5.4 Applications of PLC
	3rd	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) branch
14th	1st	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate
	2nd	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	3rd	5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	4th	5.10 Counters-CTU, CTD 5.11 Ladder diagrams using Timers and counters
15th	1st	5.12 PLC Instruction set
	2nd	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic 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)



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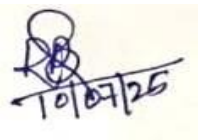

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