NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY SERGARH-756060, BALASORE (ODISHA)

(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT: Th-5 (POWER ELECTRONICS AND PLC)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No of Periods as per the ayllabus	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 The Inverters And Cyclo-Converters	8	8
4	Understand Applications Of Power Electronic Circuits	10	10
5	PLC And Its Applications	12	12
	Total Period:	60	60

Discipline: EEE	Semester: 5th	Name of the Teaching Faculty: Er. PRAKASH KUMAR MOHANTY
Week	**Class Day**	**Theory / Practical Topics**
1st	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.
2nd	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
	4th	1.7 Voltage and Current ratings of SCR.
3rd	1st	Protection of SCR Over voltage protection
	2nd	1.8.2 Over current protection
	3rd	1.8.3 Gate protection
	4th	Firing Circuits General layout diagram of firing circuit
4th	1st	1.9.2 R firing circuits

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

8th	2nd	3.3 Explain the working of parallel inverter
	3rd	3.4 Explain the working of single-phase bridge inverter.
	4th	3.5 Explain the basic principle of Cyclo-converter.
9th	1st	3.6 Explain the working of single-phase step up & step down Cyclo- converter.
	2nd	3.7 Applications of Cyclo-converter.
	3rd	4.1 List applications of power electronic circuits.
	4th	4.2 List the factors affecting the speed of DC Motors.
10th	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.
11th	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
	4th	4.10 Basic Switched mode power supply (SMPS) - explain its working & applications
12th	1st	5.1 Introduction of Programmable Logic Controller(PLC)

12th	2nd	5.2 Advantages of PLC
	3rd	5.3 Different parts of PLC by drawing the Block diagram and purpose of each part of PLC.
	4th	5.4 Applications of PLC
13th	1st	5.5 Ladder diagram
	2nd	5.6 Description of contacts and coils in the following states i)Normally open ii) Normally closed iii) Energized output iv)latched Output v)
	3rd	5.7 Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.
	4th	5.8 Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
14th	1st	5.9 Timers-i)T ON ii) T OFF and iii)Retentive timer
	2nd	5.10 Counters-CTU, CTD
	3rd	5.11 Ladder diagrams using Timers and counters
	4th	5.12 PLC Instruction set
15th	1st	5.13 Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light
	2nd	5.14 Special control systems- Basics DCS & SCADA systems
	3rd	5.15 Computer Control–Data Acquisition, Direct Digital Control System (Basics only)
	4th	CLASS TEST