

# LESSON PLAN

SUB:-POWER ELECTRONICS & PLC.

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 5<sup>TH</sup>

SESSION:2022-2023

NAME OF FACULTY: - ASHWINI KUMAR SAHU



GOVERNMENT POLYTECHNIC,  
BHADRAK

Hod Electrical  
HOD (ELECT.)  
G.P.BHADRAK

Academic Co-ordinator

Principal  
Govt. Polytechnic Bhadrak  
Govt. Polytechnic  
Bhadrak

<b>Discipline:</b> <b>ELECTRICAL ENGG.</b>	<b>Semester:</b> 5 <sup>th</sup>	<b>Name of the Teaching Faculty :</b> ASHWINI KUMAR SAHU Sr.Lect in Elect.Engg.
<b>Subject:</b> <b>POWER ELECTRONICS AND PLC</b>	<b>No. of Days/per week class allotted:4</b>	<b>Semester from date: 15.09.2022 To Date: 21.01.2023</b>  <b>No. of Weeks:15</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory</b>
1 <sup>st</sup>	1 <sup>st</sup>	Construction, Operation, V-I characteristics & application of power Diode.
	2 <sup>nd</sup>	Construction, Operation, V-I characteristics & application of SCR
	3 <sup>rd</sup>	Construction, Operation, V-I characteristics & application of DIAC & TRIAC
	4 <sup>th</sup>	Construction, Operation, V-I characteristics & application of Power MOSFET
2 <sup>nd</sup>	1 <sup>st</sup>	Construction, Operation, V-I characteristics & application of GTO & IGBT
	2 <sup>nd</sup>	Two transistor analogy of SCR..
	3 <sup>rd</sup>	Gate characteristics of SCR.
	4 <sup>th</sup>	Switching characteristic of SCR during turn on and turn off.
3 <sup>rd</sup>	1 <sup>st</sup>	Turn on methods of SCR..
	2 <sup>nd</sup>	Turn off methods of SCR (Line commutation and Forced commutation)
	3 <sup>rd</sup>	Load Commutation Resonant pulse commutation
	4 <sup>th</sup>	Voltage and Current ratings of SCR
4 <sup>th</sup>	1 <sup>st</sup>	Protection of SCR Over voltage protection
	2 <sup>nd</sup>	Over current protection Gate protection
	3 <sup>rd</sup>	Firing Circuits and General layout diagram of firing circuit 1.
	4 <sup>th</sup>	R firing circuits and R-C firing circuit.
5 <sup>th</sup>	1 <sup>st</sup>	UJT pulse trigger circuit and Synchronous triggering (Ramp Triggering.
	2 <sup>nd</sup>	Design of Snubber Circuits and chapter revision
	3 <sup>rd</sup>	Controlled rectifiers Techniques(Phase Angle, Extinction Angle control),
	4 <sup>th</sup>	Single quadrant semi converter, two quadrant full converter and dual Converter.
6 <sup>th</sup>	1 <sup>st</sup>	Working of single-phase half wave controlled converter with Resistive
	2 <sup>nd</sup>	Working of single-phase half wave controlled converter with R-L loads and Understand need of freewheeling diode.



	3 <sup>rd</sup>	Working of three-phase half wave controlled converter with Resistive load
	4 <sup>th</sup>	Working of three-phase fully wave controlled converter with Resistive load
7 <sup>th</sup>	1 <sup>st</sup>	Working of single phase AC regulator
	2 <sup>nd</sup>	Working principle of step up chopper
	3 <sup>rd</sup>	Working principle of step down chopper
	4 <sup>th</sup>	Control modes of chopper
8 <sup>th</sup>	1 <sup>st</sup>	Operation of chopper in all four quadrants
	2 <sup>nd</sup>	Class test of ch-1 and ch-2
	3 <sup>rd</sup>	Classify inverters
	4 <sup>th</sup>	Explain the working of series inverter
9 <sup>th</sup>	1 <sup>st</sup>	Explain the working of parallel inverter
	2 <sup>nd</sup>	Explain the working of single-phase bridge inverter
	3 <sup>rd</sup>	Explain the basic principle of Cyclo-converter
	4 <sup>th</sup>	Explain the working of single-phase step up Cyclo-converter
10 <sup>th</sup>	1 <sup>st</sup>	Explain the working of single-phase step down Cyclo-converter
	2 <sup>nd</sup>	
	3 <sup>rd</sup>	List applications of power electronic circuits
	4 <sup>th</sup>	List the factors affecting the speed of DC Motors
11 <sup>th</sup>	1 <sup>st</sup>	Speed control for DC Shunt motor using converter
	2 <sup>nd</sup>	Speed control for DC Shunt motor using chopper
	3 <sup>rd</sup>	List the factors affecting speed of the AC Motors.
	4 <sup>th</sup>	Speed control of Induction Motor by using AC voltage regulator
12 <sup>th</sup>	1 <sup>st</sup>	Speed control of induction motor by using converters and inverters (V/F control)
	2 <sup>nd</sup>	Working of UPS with block diagram
	3 <sup>rd</sup>	Battery charger circuit using SCR with the help of a diagram.
	4 <sup>th</sup>	Basic Switched mode power supply (SMPS) - explain its working & applications
13 <sup>th</sup>	1 <sup>st</sup>	Introduction of Programmable Logic Controller(PLC) Advantages of PLC
	2 <sup>nd</sup>	Different parts of PLC by drawing the Block diagram and purpose of each part of PLC
	3 <sup>rd</sup>	Applications of PLC Ladder diagram
	4 <sup>th</sup>	Description of contacts and coils in the following states i) Normally open ii) Normally closed iii) Energized output iv) latched Output v) branching
14 <sup>th</sup>	1 <sup>st</sup>	Ladder diagrams for i) AND gate ii) OR gate and iii) NOT gate.

	2 <sup>nd</sup>	Ladder diagrams for combination circuits using NAND,NOR, AND, OR and NOT
	3 <sup>rd</sup>	Timers-i)T ON ii) T OFF and iii)Retentive timer
	4 <sup>th</sup>	Counters-CTU, CTD
15 <sup>th</sup>	1 <sup>st</sup>	Ladder diagrams using Timers and counters And PLC Instruction set
	2 <sup>nd</sup>	Ladder diagrams for following (i) DOL starter and STAR-DELTA starter (ii) Stair case lighting (iii) Traffic light Control (iv) Temperature Controller
	3 <sup>rd</sup>	Special control systems- Basics DCS & SCADA systems Computer Control-Data Acquisition, Direct Digital Control System (Basics only)
	4 <sup>th</sup>	Previous year question discussions

**SIGNATURE OF FACULTY**