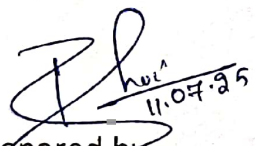



## LESSON PLAN FOR ACADEMIC SESSION: 2025-26(Winter)

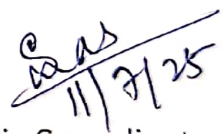
Discipline: Electrical Engineering	Semester : 5th	Name of the Teaching Faculty : Pratima Bhoi
Subject : Power Electronics & PLC	No. of days / week class allotted	Semester From : 14/07/2025 to 15/11/2025 Nos. of Weeks per semester : 17
Week	Class Day	Theory Topics
1 <sup>ST</sup>	1 <sup>st</sup>	Introduction to Power Electronics 1.1 Construction , Operation , V-I Characteristics & application of Power diode & DIAC
	2 <sup>nd</sup>	1.1 Construction , Operation , V-I Characteristics & application of SCR
	3 <sup>rd</sup>	1.1 Construction , Operation , V-I Characteristics & application of TRIAC
	4 <sup>th</sup>	1.1 Construction , Operation , V-I Characteristics & application of Power MOSFET..
2 <sup>ND</sup>	1 <sup>st</sup>	1.1 Construction , Operation , V-I Characteristics & application of GTO & IGBT.
	2 <sup>nd</sup>	1.3 Gate characteristic of SCR.
	3 <sup>rd</sup>	1.4 Switching characteristics of SCR during Turn on and turn off Time.
	4 <sup>th</sup>	Continue....
3 <sup>RD</sup>	1 <sup>st</sup>	1.5 Turn on method of SCR.
	2 <sup>nd</sup>	Continue....
	3 <sup>rd</sup>	1.6 Turn off methods of SCR ( Line commutation and forced commutation)
	4 <sup>th</sup>	1.6.1 Load Commutation
4 <sup>TH</sup>	1 <sup>st</sup>	1.6.2 Resonance pulse Commutation
	2 <sup>nd</sup>	1.7 voltage and current rating of SCR
	3 <sup>rd</sup>	1.8 Protection of SCR 1.8.1 Over voltage protection 1.8.2 over current protection 1.8.3 Gate protection
	4 <sup>th</sup>	Continue....
5 <sup>TH</sup>	1 <sup>st</sup>	1.9 Firing circuit 1.9.1 General layout diagram of firing circuit 1.9.2 R firing circuits
	2 <sup>nd</sup>	1.9.3 R-C firing circuit
	3 <sup>rd</sup>	1.9.4 UJT Pulse trigger circuit
	4 <sup>th</sup>	1.9.5 Synchronous triggering (Ramp Triggering) 1.10 Design of Snubber Circuits
6 <sup>TH</sup>	1 <sup>st</sup>	1.9.5 Synchronous triggering (Ramp Triggering) 1.10 Design of Snubber Circuits
	2 <sup>nd</sup>	2.1 Controlled rectifier Techniques( Phase Angle , Extinction Angle control) , single quadrant semi converter, two quadrant full converter and dual converter.
	3 <sup>rd</sup>	2.2 Working of Single-phase half wave controlled converter with Resistive (R) loads.

	4 <sup>th</sup>	2.2 Working of Single-phase half wave controlled converter with R-L load
7 <sup>TH</sup>	1 <sup>st</sup>	Continue....
	2 <sup>nd</sup>	2.3 Understand need of Freewheeling diode. 2.4 working of single phase fully controlled converter with resistive load.
	3 <sup>rd</sup>	2.4 Working of single phase fully controlled converter with R-L load.
	4 <sup>th</sup>	2.5 Working of three -phase half wave controlled converter with resistive load
8 <sup>TH</sup>	1 <sup>st</sup>	Continue....
	2 <sup>nd</sup>	2.6 Working of three phase fully controlled converter with resistive load
	3 <sup>rd</sup>	Continue....
	4 <sup>th</sup>	2.7 Working of single phase AC regulator
9 <sup>TH</sup>	1 <sup>st</sup>	2.8 Working principle of step up chopper
	2 <sup>nd</sup>	2.8 Working principle of step down chopper
	3 <sup>rd</sup>	2.9 control mode of chopper
	4 <sup>th</sup>	2.10 Operation of chopper in all four quadrants
10 <sup>TH</sup>	1 <sup>st</sup>	3.1 Classify inverters.
	2 <sup>nd</sup>	3.2 Explain the working of series inverter.
	3 <sup>rd</sup>	3.3 Explain the working of Parallel inverter.
	4 <sup>th</sup>	Continue....
11 <sup>TH</sup>	1 <sup>st</sup>	3.4 Explain the Working of single-phase bridge inverter.
	2 <sup>nd</sup>	3.5 Explain the basic principle of Cyclo-converter.
	3 <sup>rd</sup>	3.6 Explain the Working of single -phase step-up Cyclo-Converter
	4 <sup>th</sup>	Continue....
12 <sup>th</sup>	1 <sup>st</sup>	3.6 Explain the Working of single -phase step-down Cyclo-converter. 3.7 Application of Cyclo-Converter .
	2 <sup>nd</sup>	4.1 List application of power electronic circuits. 4.2 List the factors affecting the speed of D.C Motors.
	3 <sup>rd</sup>	4.3 Speed control for DC shunt motor using converter.
	4 <sup>th</sup>	4.4 Speed control for DC shunt motor using chopper.
13 <sup>th</sup>	1 <sup>st</sup>	4.5 List the factors affecting speed of the AC Motors.
	2 <sup>nd</sup>	4.6 Speed control of induction motor by using AC voltage regulator.
	3 <sup>rd</sup>	4.7 Speed control of induction motor by using converter and inverter (V/F control).
	4 <sup>th</sup>	4.8 Working of UPS with block diagram.
14 <sup>th</sup>	1 <sup>st</sup>	Continue....
	2 <sup>nd</sup>	4.9 Battery charger circuit using SCR with the help of a diagram
	3 <sup>rd</sup>	4.10 Basic Switched mode power supply (SMPS). Explain its working & application

	4 <sup>th</sup>	5.1 Introduction of programmable Logic controller (PLC) 5.2 Advantages of PLC 5.3 different parts of PLC by drawing the Block diagram and purpose of each parts of PLC
15 <sup>th</sup>	1 <sup>st</sup>	5.4 Application of PLC 5.5 Ladder diagram
	2 <sup>nd</sup>	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
	3 <sup>rd</sup>	5.7 Ladder diagram for i) AND Gate ii) OR Gate and iii) NOT Gate
	4 <sup>th</sup>	5.8 Ladder diagram for combination circuit using NAND, NOR AND, OR and NOT
16 <sup>th</sup>	1 <sup>st</sup>	5.9 Timers i) T ON II) T OFF and iii) Retentive timer 5.10 counter-CTU, CTD
	2 <sup>nd</sup>	5.11 Ladder diagrams using Timers and counter 5.12 PLC instruction SET
	3 <sup>rd</sup>	5.13 Ladder diagram for following i) DOL starter and STAR-DELTA starter
	4 <sup>th</sup>	ii) Stair case lighting iii) Traffic light control iv) Temperature controller
17 <sup>th</sup>	1 <sup>st</sup>	5.14 Special control system- Basics DCS & SCADA systems
	2 <sup>nd</sup>	5.15 computers control-Data Acquisition, Direct Digital Control
	3 <sup>rd</sup>	Previous Year Question Discussion
	4 <sup>th</sup>	Previous Year Question Discussion

  
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