

GIETPOLYTECHNIC, JAGATPUR, CUTTACK

LESSON PLAN

Discipline: ELECTRICAL	Semester: 5 th	Name Of The Teaching Faculty: RUPAK KUMAR SAHOO	
Subject: Power electronics (Th5)	No. Of Days Per Week Class Allotted: 04 P	Semester From Date: 14.07.2025 No. of weeks: 15	To Date: 15.11.2025
Week	Class Day	Theory Topic	
1 st week	1 st	<u>Unit 1: UNDERSTAND THE CONSTRUCTION & WORKING OF POWER ELECTRONICS</u>	
		➤ 1.1: Construction, operation, V-I characteristics & application of power diode, SCR, DIAC, TRIAC, power MOSFET, GTO & IGBT	
	2 nd	➤ 1.2: Two transistor analogy of SCR	
	3 rd	➤ 1.3: Gate characteristics of SCR	
2 nd week	4 th	➤ 1.4: Switching characteristics of SCR during turnon & turnoff	
		➤ 1.5: Turnon methods of SCR	
	1 st	➤ 1.6: Turnoff methods of SCR (Line communication & Forced communication)	
	2 nd	1.6.1: Load communication	
3 rd week	3 rd	➤ 1.6.2: Resonant pulse communication	
	4 th	➤ 1.7: Voltage and Current ratings of SCR	
		➤ 1.8: Protection of SCR	
	1 st	1.8.1: Overvoltage protection	
4 th week	2 nd	➤ 1.8.2: Overcurrent protection	
	3 rd	1.8.3: Gate protection	
	4 th	➤ 1.9: Firing circuits	
		1.9.1: general layout diagram of firing circuits	
5 th week		➤ 1.9.2: R firing circuits	
		➤ 1.9.3: R-C firing circuits	
		1.9.4: UJT pulse trigger circuit	
		➤ 1.9.5: synchronous triggering (Ramp triggering)	
5 th week		➤ 1.10: Design of snubber circuits	
	2 nd	<u>UNIT 2: UNDERSTAND THE WORKING OF CONVERTERS, AC REGULATORS AND CHOPPERS</u>	
	3 rd	➤ 2.1: Controlled rectifier techniques	
	4 th	➤ 2.2: Working of single phase half wave controlled converter with resistive and R-L loads	
5 th week		➤ 2.3: Understand need of freewheeling diode	
	1 st	➤ 2.4: Working of single phase fully controlled converter with resistive and R-L loads	
	2 nd	➤ 2.5: working of three phase half wave controlled converter with resistive load	

	3 rd	➤ 2.6: Working of three phase fully controlled converter with resistive load
	4 th	➤ 2.7: Working of single phase AC regulator
6 th week	1 st	➤ 2.8: Working principle of step up & step down chopper ➤ 2.9: Control modes of chopper
	2 nd	➤ 2.10: Operation of chopper in all four quadrants
	3 rd	<u>UNIT 3: UNDERSTAND THE INVERTERS AND CYCLO-CONVERTERS</u> ➤ 3.1: Classify inverters ➤ 3.2: Working of series inverter
	4 th	➤ 3.3: Working of parallel inverter ➤ 3.4: Working of single phase bridge inverter
7 th week	1 st	➤ 3.5: Basic principle of cyclo-converter ➤ 3.6: Working of single phase step up & step down cyclo-converter
	2 nd	➤ 3.7: Applications of Cyclo-converter
	3 rd	<u>UNIT 4: UNDERSTAND APPLICATIONS OF POWER ELECTRONICS CIRCUITS</u> ➤ 4.1: Application of power electronic circuits
	4 th	➤ 4.2: List the factors affecting the speed of DC motors
8 th week	1 st	➤ 4.3: Speed control for DC shunt motor using converter
	2 nd	➤ 4.4: Speed control for DC shunt motor using chopper
	3 rd	➤ 4.5: List the factors affecting speed of the AC motors
8 th week	4 th	➤ 4.6: Speed control of induction motor by using AC voltage regulator
9 th week	1 st	➤ 4.7: Speed control of Induction motor by using converters and inverters
	2 nd	➤ 4.8: Working of UPS with block diagram
	3 rd	➤ 4.9: Battery charger circuit using SCR with the help of a diagram
	4 th	➤ 4.10: Working & application of SMPS
10 th week	1 st	➤ 4.10: Working & application of SMPS
	2 nd	<u>UNIT 5: PLC AND ITS APPLICATIONS</u> ➤ 5.1: Introduction of PLC
	3 rd	➤ 5.2: Advantages of PLC
	4 th	➤ 5.2: Advantages of PLC
11 th week	1 st	➤ 5.3: Different parts of PLC
	2 nd	➤ 5.4: Application of PLC
	3 rd	➤ 5.5: Ladder diagram
	4 th	➤ 5.6: Description of contacts and coils
12 th week	1 st	➤ 5.6.1: Normally open
	2 nd	➤ 5.6.2: Normally closed
	3 rd	➤ 5.6.3: Energized output
	4 th	➤ 5.6.4: Latched output, branching
13 th week	1 st	➤ 5.7.1: Ladder diagram for AND gate
	2 nd	➤ 5.7.2: Ladder diagram for OR gate & NOT gate

	3 rd	➤ 5.8:LadderdiagramforcombinationcircuitusingNAND,NOR,AND,OR & NOT
	4 th	➤ 5.8:LadderdiagramforcombinationcircuitusingNAND,NOR,AND,OR&NOT
14 th week	1 st	➤ 5.8:LadderdiagramforcombinationcircuitusingNAND,NOR,AND,OR & NOT
	2 nd	➤ 5.9:Timers I. TON II. TOFF III. Retentivetimer
	3 rd	➤ 5.10:Counters:CTU, CTD
	4 th	➤ 5.11:Ladderdiagramusingtimers&counters
15 th week	1 st	➤ 5.12:PLCinstructionset
	2 nd	➤ 5.13:Ladderdiagramsforfollowing I. DOLstarter&star-delta starter
	3 rd	➤ 5.14:specialcontrolsystem
	4 th	➤ 5.15:computercontrol:dataacquisition

10/7/25
Signature of Teaching Faculty

10/7/25
Signature of Sr.Lecturer
Head of Dept. (EOD)
Electrical & ETC F
G.E.T (I OLY),

10/7/25
Signature of Principal