Maharaja Agrasen Institute of Technology

(Approved by AICTE & Affiliated to GGSIP University, New Delhi)
PSP area, Plot No.-1 Sector-22, Rohini, New Delhi – 110085
Ph.No. : 011-27582095 , 65151162/63 , 65162001
Website: www.mait.ac.in

Department of Electrical & Electronics Engineering

Power Electronics Theory (ETEE-309)

ACADEMIC PLAN FOR SEMESTER-V 2023

S.No.	TOPICS TO BE COVERED	Total No. of Lectures (42)	CO
	UNIT-I(Introduction)		
1	Syllabus, books, about subject, introduction to Power electronics and Application	1	CO1
2	Characteristics SCR, UJT, TRIAC, DIAC, GTO, MOSFET, IGBT, MCT and power BJT	2	
3	Two-transistor analogy of SCR SCR gate characteristics firing circuits of SCR and TRIAC	2	
4	Switching Characteristics of SCR, turn on methods of SCR	2	
5	Methods of commutation, Voltage and current rating of SCR	2	
6	Protection of SCR, Driver circuits for BJT/MOSFET	2	
	UNIT-II (A.C. to D.C. Converter)		
7	Classification of rectifiers	1	CO2
8	Working of single and three phase controlled rectifier	2	
9	Fully controlled and half controlled rectifiers	2	
10	Single-phase and three phase dual converter	1	
	D.C to D.C Converter		CO2
11	Classification of choppers	1	

12	Principle of operation of Buck, boost, buck-boost, cuk regulator	1	
13	Switching mode regulators Buck, boost, buck-boost, cuk regulator	1	
	D.C Motor Drives		
14	Dc motor speed control	1	
15	Controlled rectifier fed dc derives, chopper controlled dc drives	1	
	After Mid Term		
	UNIT-III(D.C. to A.C. Converter)		
16	Single phase single pulse inverter: Square wave, quasi square	1	
17	Three phase single pulse inverters (120'and 180°conduction) Modulation Techniques and reduction of harmonics	2	CO3
18	PWM techniques, SPWM techniques, SVM, Carrier less modulation	1	CO3
19	PWM Inverter, Bidirectional PWM converters	1	
20	Voltage source inverters and current source inverter. Multi level Inverter: cascaded and NPC Inverters	2	
21	Introduction of AC drives	1	
	UNIT-IV(A.C. to A.C. Converter)		
22	Ac voltage controller	1	
23	Cyclo-converters: single phase to single phase, three phase to single phase, three phase to three phase	2	
24	Cyclo-converter circuit and their operation, Matrix converter.	2	CO4
	Induction Motor Drives		CO4
25	Three phase induction motor starting, braking	1	
26	Speed control from stator and rotor sides, stator voltage control	1	
27	Variable frequency control from voltage sources and current sources	1	
	Topic Beyond Curriculum		
28	Characteristics Of IGCT, static induction thyristors, SUS, SBS, LASCR	1	CO1
29	Effect of source impedance	1	CO2

30	Multipulse Converter	1	CO4
31	Design and analysis of resonant converter chopper	1	CO3

Course Objectives

C.309.1	To learn the operation characteristics and firing circuits of power electrons devices.
C.309.2	To acquire knowledge of controlled rectifier and choppers control DC Motors
C.309.3	To get the exposure of square wave, Quashi square wave PWM and multilevel inverters there use to control AC drives
C.309.4	To apply AC controllers cyclo converter and matrix converter to control induction motors