Maharaja Agrasen Institute of Technology

(Approved by AICTE & Affiliated to GGSIP University, New Delhi)

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Department of Electrical & Electronics Engineering

ACADEMIC PLAN FOR SEMESTER-VII 2022

Subject: Electric Drives — Subject Code: ETEE-401

Semester: 7th — Branch: EEE

Total Week: 14 — Total Lectures: 42

Sr. No.	Topics to be covered	Total No. of Lectures	CO'S
1	**Dynamics of Electric Drives:** Types of loads, quadrant diagram of speed time characteristics	1	
2	Basic and modified characteristics of dc and ac motors	1	CO1
3	equalization of load, steady state stability	1	
4	calculation of time and energy loss	1	
5	control of electric drives, modes of operation	1	
6	speed control and drive classifications	1	
7	closed loop control of drives	2	
8	selection of motor power rating, class of duty, thermal considerations	1	
9	**DC Motor Drives:** DC motor speed control	1	
10	Methods of armature control, field weakening	1	
11	semiconductor controlled drives	1	
12	starting, braking, transient analysis	1	CO2
13	controlled rectifier fed dc drives	2	
14	chopper controlled dc drives	2	
15	**Induction Motor Drives:** Three phase induction motor starting	1	
16	braking, transient analysis	1	
17	speed control from stator and rotor sides	2	
18	stator voltage control	1	CO3
19	variable frequency control from voltage sources	2	

	and current sources		
20	static rotor resistance control, slip power recovery	1	
21	static Scherbius and static Kramer drive	1	
22	**Drives with Special Machine:** Introduction to permanent magnet machines	1	CO4
23	thermal properties of PM, concept of BLDC motor	1	
24	120° and 180° operation	1	
25	rotor position detection, open loop voltage control,	1	
26	closed loop current control	1	
27	high speed single pulse operation	1	
28	permanent magnet synchronous machines	1	
29	rotor position detection and synchronization	1	
30	sinusoidal PWM excitation, closed and open loop control	1	
31	PMSG and its application to wind energy	1	
32	stepper motor, current and voltage control	1	
33	drive circuits, SRM drive	1	
34	modeling and analysis of SRM	1	
35	different configurations of converters	1	
36	closed and open loop operation	1	
37	high speed operation with angle of advance	1	

Course Objectives

C.401.1	Ascertain the selection of a suitable motor for different types of industrial loads used in electrical drives.
C.401.2	Illustrate the operation of dc motor drives.
C.401.3	Compare various speed control schemes used in induction motor drives.
C.401.4	Design control schemes used for open and closed loop operations in special machine drives.