

GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme		Master of Technology				Branch/Spec.	Electrical (Renewable Energy)		
Semester		II				Version	1.0.0.0		
Effective from Academic Year			2025-2026			Effective for the batch Admitted in		July 2025	
Course code		3EE11PE8	Course Name			Electrical Drive System			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Course Outcomes:

On successful completion of the course, the students will be able to:

CO1	Understand basic electrical drives and their analysis.
CO2	Demonstrate the drive controller.
CO3	Understand Scalar control of electrical drives.
CO4	Analysis of energy saving initiatives and EMI and EMC standards in brief.

Theory syllabus

Unit	Content	Hrs
1	Dynamics of Electric Drives: Fundamentals of torque equation. Speed torque convention and multi-quadrant operation, Components of load torques.	07
2	DC Motor Drives: Modeling of DC machines, Steady state characteristics with armature and speed control, Phase controlled DC motor drives, Chopper controlled DC motor drives.	08
3	Poly-phase Induction Machines: Dynamic modeling of induction machines, Small signal equations, Control characteristics of induction machines, Phase-controlled induction machine, Stator voltage control, Slip energy recovery scheme, Frequency control and vector control of induction motor drives.	08
4	Traction Motor: Starting, Speed-Time characteristics, Braking, Traction motors used in practice.	06
5	Synchronous Machines: Steady-state equivalent circuits and dynamic model of synchronous machine; Zero d-axis current control, Maximum torque per ampere control, Direct torque control and power factor control.	09
6	Electromagnetic Interference and Harmonics: Introduction to EMI and EMC, EMC for power converters, Grounding and shielding, EMC classes and Standards, Introduction to harmonics, Harmonic measurement techniques, Reduction methods mitigation tools.	07

Practical content

Practicals, assignments and tutorials are based on above syllabus.

Text Books

1.	Bimal K Bose, “Modern Power Electronics and AC Drives”, Pearson Education Asia.
2.	R. Krishnan, Electric Motor Drives: Modelling, Analysis, and Control, Pearson Education India.

Reference Books

1.	Gopal K Dubey, “Fundamentals of Electrical Drives”, CRC Press, Second Edition.
2.	R. Raja Singh, Energy Conservation Strategies for Asynchronous Machine Drives, Lap Lambert Academic Publishing, Germany.

ICT/MOOCs

1.	https://nptel.ac.in/content/storage2/courses/108104051/ui/Course_home-4.htm
2.	https://nptel.ac.in/courses/108/101/108101040/
3.	https://nptel.ac.in/courses/108/107/108107028/
4.	https://nptel.ac.in/content/storage2/courses/108104051/chapter_5/5_intro.html

Mapping of CO with PO and PSO:															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	2	1	2	1	0	2	3	1	1	2	3
CO2	2	0	3	0	2	1	1	1	0	2	2	2	0	0	0
CO3	2	0	2	0	3	0	1	1	1	1	1	1	2	3	1
CO4	1	1	2	1	3	0	0	0	1	1	0	2	2	3	2