

PEE6I101 ELECTRIC DRIVES (3-0-1)

MODULE-I

(10 HOURS)

University portion (80%): (8 Hours)

Requirements, AC and DC drives, Advantages of Electrical Drives, Fundamentals of Torque Equations, Speed Torque Conventions and Multi-quadrant Operation, Equivalent Values of Drive Parameters, Components of Load Torques, Calculation of Time and Energy Loss in Transient Operations, Steady State Stability, Load Equalization, Control of Electrical Drives, Thermal Model of Motor for Heating and Cooling, Classes of Motor Duty, Determination of Motor Rating. [Book 1 Ch- 1.1,1.2,2,3,4]

College/Institute portion (20%): (2 Hours)

Electrical Motors, Power Modulators, Choice of electrical Drives, modern trends in drives technology, Nature and Classification of Load Torques. [Book 1 Ch- 1.3,1.4,1.5,2.5] Or related advanced topics as decided by the concerned faculty teaching the subject.

MODULE-II

(10 HOURS)

University portion (80%): (8 Hours)

Steady State Performance of DC/AC Drives:DC Motors and their Performances, Starting, Braking, Transient Analysis, Speed Control, Methods of Armature Voltage Control, Controlled Rectifier Fed DC Drives,Induction Motor Drives: Speed Control, Pole Changing, Pole Amplitude Modulation, Stator Voltage Control, Variable Frequency Control from Voltage Source, Voltage Source Inverter Control, Variable Frequency Control from Current Source, Current Source Inverter Control, Current Regulated Voltage Source Inverter Control, Rotor Resistance Control, Slip Power Recovery.[Book 1 Ch- 5.1,5.2,5.3,5.4,5.5,5.6,5.9,6.8, 6.9,6.10,6.11,6.12,6.13,6.16,6.17,6.18,6.20,6.21]

Transformer and Uncontrolled Rectifier Control, Chopper Controlled DC Drives.[Book 1 Ch- 5.8,5.18] Or related advanced topics as decided by the concerned faculty teaching the subject.

MODULE-III

(10 HOURS)

University portion (80%): (8 Hours)

Synchronous Motor Drives: Synchronous Motor Variable Speed Drives, Variable Frequency Control of Multiple Synchronous Motors. Electric Traction: System of electric traction Mechanics of Train Movement: Speed- time, distance- time and simplified speed-time curves, Attractive effort for acceleration and propulsion, effective weight, train resistance, adhesive weight, specific energy output and consumption. [Book 1 Ch- 7.3, 7.4,10.2,10.6]

College/Institute portion (20%): (2 Hours)

Traction Motors: Review of characteristics of different types of DC and AC motors used in traction and their suitability.[Book 1 Ch- 10.10.9,10.10,10.12,10.15,10.16] Or related advanced topics as decided by the concerned faculty teaching the subject.

MODULE-IV

(10 HOURS)

University portion (80%): (8 Hours)

Drives for specific application like Textile Mills, Steel Rolling Mills, Cranes and Hoist Drives, Cement Mills, Sugar Mills, Machine Tools, Paper Mills, Coal Mines, Centrifugal Pumps. Application Areas and Functions of Microprocessors in Drive Technology.[Book 2 Ch-7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 8.3]

College/Institute portion (20%): (2 Hours)

Control of DC Drives using Microprocessors, some aspects of control system design of microprocessor based variable speed drive [Book 2 Ch-8.4,8.5] Or related advanced topics as decided by the concerned faculty teaching the subject.

BOOKS

- [1]. G.K.Dubey, Norasa Pub. House ND "Electric Drive"
- [2]. V.Subrahmanyam, TMH "Electric Drives"
- [3]. M.H.Rashid (P.H.I.Edition) "Power Electronics"

Electrical Drives Lab

(Any Eight Experiments)

1. Speed Control of Single Phase Induction Motor by using Single Phase AC to AC Converter.
2. Speed Control of Separately Excited DC Shunt Motor using Single Phase Fully Controlled AC to DC Converter.
3. Speed Control of Separately Excited DC Shunt Motor using Four-Quadrant Chopper.
4. Speed Control of Separately Excited DC Shunt Motor using Single Phase Dual Converter.
5. Speed Control of Three Phase Squirrel Cage Induction Motor using Three Phase AC to AC Controller.
6. Speed Control of Three Phase Squirrel Cage Induction Motor using Three Phase PWM Inverter.
7. Speed Control of Three Phase Slip Ring Induction Motor using Rheostatic Control Method.
8. Speed Control of DC Shunt Motor using Three Phase AC to DC Converter.
9. Determination of the Transfer Function of DC Shunt Motor.
10. Determination of the Moment of Inertia of DC Shunt Motor Drive System by Retardation Test.