I Year I Semester	**L**	**P**	**C**
Code: 17PE103	**4**	**0**	**3**

POWER ELECTRONIC CONTROL OF DC DRIVES
(Common to PE, P&ID, PE&ED, PE&D, PE&S, EM&D)

Prerequisites: Concepts on Power Electronics and D.C.Machines

Course Educational Objectives:

1. To study the operation of Phase Controlled Converters based DC drives in four quadrants.
2. To study modeling concepts of AC – DC converters fed drive components.
3. To study the operation of DC- DC converter fed DC drives.
4. To study the operation of closed loop control based DC-DC converters fed DC drives.

UNIT-I: Introduction on single phase convertor fed DC motor drive: Basic power electronic drive system, components, stability of power electronic drive, single phase full-convertor and half-convertor fed dc drives for continuous and discontinuous mode of operation. Four quadrant operation of drive using dual convertor.

UNIT-II: Three phase AC-DC convertor fed DC motor drive: Three phase full-convertor and half-convertor fed dc drives for continuous and discontinuous mode of operation. Four quadrant operation of drive using three phase dual convertor. Pulsating torque

UNIT-III: Modeling of AC-DC convertor fed DC drive components & design of controller: Transfer function of Dc motor and load, convertor, current and speed controllers, current and speed feedback elements. Design of current controller and speed controller. Closed loop two quadrant DC motor drive, closed loop four quadrant DC motor drive, introduction to simulation of DC motor drive.

UNIT-IV: DC-DC convertor fed DC motor drive: Four quadrant DC-DC convertor fed dc motor drive, steady state analysis of DC-DC convertor dc motor drive, pulsating torques.

UNIT-V: Closed loop operation of DC-DC convertor fed dc motor drive: Design of current controller, design of speed controller, modeling of current and speed controller, introduction to simulation of speed controlled dc motor drive.

Course Outcomes:

- After completion of this course the students will be able to:
- Analyse single phase and three phase converter fed DC drives.
- Analyse the two quadrants and four quadrant controls of DC motor drives.
- Develop the mathematical models of DC drive components.
- Analyse the four quadrant and closed loop control of DC-DC converter fed DC drive.

Reference Books:

1. Electrical Motor Drives Modeling, Analysis and Control – R. Krishna, Prentice Hall India.
2. Power Semiconductor Controlled Drives – G.K. Dubey.Prentice Hall India.
3. Power Electronics and Motor control – Shepherd, Hulley, Liang-II Edition, Cambridge University Press.
4. Power electronic circuits, devices and applications – M.H.Rashid – PHI.