

20PE006 - DIGITAL CONTROL OF POWER ELECTRONICS AND DRIVE SYSTEMS

UNIT – I

Motor Control Signal Processors

Introduction- Brief Introduction to Peripherals -Types of Physical Memory - The Components of the C2xx DSP Core -System configuration registers-Memory Addressing modes - Instruction set – Programming techniques – simple programs.

UNIT – II

Peripherals of Signal Processors

General purpose Input/output (GPIO) Functionality- Interrupts - A/D converter-Event Managers (EVA, EVB)- PWM signal generation.

UNIT – III

DSP-Based Control of DC-DC Converters

Introduction- Converter Structure-Continuous Conduction Mode, Discontinuous Conduction Mode- Connecting the DSP to the Buck-Boost Converter- Controlling the Buck-Boost Converter-Main Assembly Section Code Description Interrupt Service Routine. The regulation Code Sequences.

UNIT – IV

DSP-Based Control of Matrix Converters

Space Vector Pulse Width Modulation- Principle of Constant V/Hz Control for Induction Motors- Space Vector PWM Technique- DSP Implementation- Introduction to matrix converter-Topology and Characteristics- Control Algorithms- Bidirectional Switch-Current Commutation - Overall Structure of Three-Phase Matrix Converter-Implementation of the Venturing Algorithm using the LF2407.

UNIT – V

DSP-Based Control of PMSM and SRM Drives

Control of PMSM motor drives: Introduction-Principles of the PMSM Motor- Torque Generation -PMSM Motor Control System Implementation of the PMSM Motor Control System Using LF2407.Control of SRM drives: Introduction-Fundamentals of Operation-Fundamentals of Control in SRM Drives- Open Loop Control Strategy for Torque- Closed Loop Torque Control of the SRM Drive.

TEXT BOOKS:

1. Hamid A.Toliyat, Steven Campbell, *DSP based electromechanical motion control*, CRC Press, Special Indian Edition.

REFERENCE BOOKS:

1. R.Krishnan, *Electric Motor Drives – Modeling, Analysis and Control*, Prentice-Hall of India Pvt. Ltd., New Delhi, 2010
2. T.Kenjo and S.Nagamori, *Permanent magnet and Brushless DC motors*, Clarendon press, London, 1988.