

## **EE 702: DIGITAL CONTROL IN POWER ELECTRONICS (3-0-0: 3)**

Introduction to digital control application to power electronic circuits; Digital current mode control; Basic digital current control implementation; digital voltage mode control.

Pin Multiplexing (MUX) And General Purpose I/O Overview; Multiplexing And General Purpose I/O Control Registers; Introduction To Interrupts; Interrupt Hierarchy; Interrupt Control Registers; Initializing And Servicing Interrupts In Software.

ADC Overview; Operation Of ADC in The DSP; Overview Of The Event Manager (EV); Event Manager Interrupts; General Purpose (GP) Timers; Compare Units; Capture Units And Quadrature Enclosed Pulse (QEP) Circuitry; General Event Manager Information.

Introduction To Field Programmable Gate Arrays - CPLD Vs FPGA - Types Of FPGA; Xilinx XC3000 Series; Configurable Logic Blocks (CLB); Input/output Block (IOB) - Programmable Interconnect Point (PIP) - Xilinx 4000 Series - HDL Programming - Overview Of Spartan 3E And Virtex II Pro FGPA Boards - Case Study.

Controlled Rectifier; Switched Mode Power Converters; PWM Inverters; DC Motor Control; Induction Motor Control.

### **References:**

1. Simono Buso, Paolo Mattavelli," Digital control in Power Electronics", Morgan & Claypool Publisher.
2. Hamid.A.Toliat and Steven.G.Campbel "DSP Based Electro Mechanical Motion Control" CRC Press New York, 2004.
3. XC 3000 Series datasheets (Version 3.1). Xilinx, Inc., USA, 1998.
4. XC 4000 Series datasheets (Version 1.6). Xilinx, Inc., USA, 1999.
5. Wayne Wolf, "FPGA based System Design", Prentice Hall, 2004.