

## PPE203DIGITAL DRIVES

|          |          |          |            |
|----------|----------|----------|------------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>Cr</b>  |
| <b>3</b> | <b>1</b> | <b>2</b> | <b>4.5</b> |

**Course objectives:** To learn about microcontrollers, PLC and other interfacing peripherals etc., and to impart knowledge about development of system. For control of drive.

**8051 ARCHITECTURE :** Architecture , memory organization , addressing modes , instruction set , Timers -,Interrupts ,I/O ports, Interfacing I/O Devices , Serial Communication.

**8051 PROGRAMMING :** Assembly language programming ,Arithmetic Instructions , Logical Instructions, Single bit Instructions , Timer Counter Programming, Serial Communication Programming Interrupt Programming , RTOS for 8051, RTOS Lite, Full RTOS, Task creation and run, LCD digital clock/thermometer using Full RTOS

**PIC MICROCONTROLLER :** Architecture, memory organization, addressing modes, instruction set, PIC programming in Assembly & C, I/O port, Data Conversion, RAM & ROM Allocation, Timer programming.

**PERIPHERAL OF PIC MICROCONTROLLER :** Timers – Interrupts, I/O ports- I2C bus-A/D converter, ART,CCP modules ,ADC, DAC and Sensor Interfacing ,Flash and EEPROM memories.

**DIGITAL SIGNAL PROCESSORS:** Computer Architecture for signal processing : Harvard Architecture, Pipelining , Hardware MAC unit, special instructions to DSP, Architecture of TMS320C5X , replication , On chip memory. Assembly language Instructions of TMS320C5X : Syntax ,Addressing modes, Instruction set

**PROGRAMMABLE LOGIC CONTROLLER:** Architecture, PLC programming, familiarisation of PLC external modules.

**SYSTEM DESIGN :** Interfacing LCD Display , Keypad Interfacing - Generation of Gate signals for converters and Inverters , Motor Control , Practical Aspects of Implementing Closed Loop Current control- Controlling DC/ AC appliances, Measurement of phase angle and frequency , Stand alone Data Acquisition System, Implementation of DSP algorithms on general purpose and special purpose digital signal processors: FIR digital filtering , IIR digital filtering-, FFT processing. PID controllers , implementation issues , motor control disk drive servo control , Stabilization/ pointing systems Microcontroller/DSP processor based controller, Micro Computer implementation for drives and its reversal. PLC based controller for drives.

**Course Outcomes:** After the completion of course the students may be able to

- To develop microcontroller based drive circuit of converters.
- To assemble drive system with control through DSPs,
- To develop drive control application using PLC
- To analyse and validate the designed system

### **Recommended Books:**

1. Muhammad Ali Mazidi, Rolin D. Mckinlay, Danny Causey ‘ PIC Microcontroller and Embedded Systems using Assembly and C for PIC18’, Pearson Education 2008
2. John Iovine, ‘PIC Microcontroller Project Book ’, McGraw Hill 2000
3. Muhammad Ali Mazidi, Janice G. Mazidi and Rolin D. McKinlay, ‘The 8051 Microcontroller and Embedded Systems’ Prentice Hall, 2005
4. John.G.Proakis, Dimitrias.G. and Manolakis. “DSP principles Algorithms 3. Sanjit K.Mitra, “Digital Signal Processing A computer Based approach” TataMcGrawHill, Fourth Edition,2010.

5. Farzad Nekoogar, Gene moriarty. "Digital Control Using Digital Signal Processing"  
P.H.International Inc.New Jersey.1999.

**Evaluation Scheme:**

| <b>S. No.</b> | <b>Evaluation Elements</b>  | <b>Weightage (%)</b> |
|---------------|---|----------------------|
| 1.            | MST   | 25                   |
| 2.            | EST   | 35                   |
| 3.            | Sessionals (May include Assignments/Projects/Tutorials/Quizes etc.) | 40                   |