

## MICROCONTROLLERS FOR EMBEDDED SYSTEM DESIGN (EC501)

### **Objective of the Course :**

*The objective of this course is to introduce embedded system design environment. The course covers microcontrollers, their programming & interfacing techniques.*

### **UNIT - I**

**Intel 8051 Micro controller:** Basic differences between Microprocessors and Microcontroller. Introduction to Intel 8051 Microcontroller, architecture, registers, Internal and External Memory. Instruction Set. On Chip Counters / Timers, Serial I/O, Interrupts and their use. Assembly language programming.

### **UNIT - II**

**Atmel And PIC Microcontrollers:** Introduction to Atmel and PIC C6X microcontrollers, architecture, registers, Internal and External Memory, Instruction Set, On Chip Counters / Timers, Serial I/O, Interrupts and their use. PWM, Watch dog Timer, ISP, IAP features. Assembly language programming.

### **UNIT - III**

**Philips P89V51RD2 Microcontrollers:** Introduction to Philips P89V51RD2, Microcontrollers, architecture, registers, Internal and External Memory, Instruction Set, On Chip Flash memory, Counters/Timers, Serial I/O, Interrupts and their use. PWM, Watch dog Timer, ISP, IAP features. Assembly language programming.

### **UNIT - IV**

**ARM7TDMI(Advanced RISC Machines):** Introduction to ARM7TDMI Microcontrollers, architecture, registers, Internal and External Memory, Instruction Set, On Chip Counters/Timers, Serial I/O, Interrupts and their use. PWM, Watch dog Timer, ISP, IAP features. Assembly language programming.

### **UNIT - V**

**Serial I/O Devices :** RS232 Specifications, RS422/Apple Talk/ RS 423/RS435 & other communication protocols. Ethernet Protocol, SDMA Channels and IDMA Simulation, CPM Interrupt controller and CPM Timers.

**CASE STUDIES:** Design of Embedded Systems using the Microcontroller– 8051/ ARM7TDMI, for applications in the area of Communications, Automotives, and industrial control.

### **Text Books :**

1. M.A. Mazadi & J.G. Mazidi, “The 8051 Micro Controller & Embedded Systems”, Pearson Education. Asia -2000.
2. John B. Peatman, “Designing with PIC Micro Controllers”, Pearson Education.
3. Jonathan W. Valvano, “Embedded Microcomputer systems, Real Time Interfacing”, Brookes/Cole, Thomas learning, 1999

### **Reference Books :**

1. Ajay V Deshmukh, “Microcontrollers Theory and Applications”, Tata McGraw-Hill
2. Kenneth J Ayala, “The 8051 Microcontroller”
3. <http://www.sunrom.com/files/P89V51RD2.pdf>
4. [http://www.eecs.umich.edu/~panalyzer/pdfs/ARM\\_doc.pdf](http://www.eecs.umich.edu/~panalyzer/pdfs/ARM_doc.pdf)
5. Raj Kamal, “Microcontrollers : Architecture, Programming, Interfacing and System Design”, Pearson ed.