3/4 B.Tech - SIXTH SEMESTER

EC6T2   **Microprocessors & Microcontrollers**   **Credits:3**

Lecture: 3 periods/week   **Internal Assessment: 30 Marks**
Tutorial: 1 period /week   **Semester End Examination: 70 Marks**

Prerequisites: C programming (EC1T5),   Computer Architecture and Organization (EC5T3)

Course objectives:

- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, and write assembly language programs.
- To understand various interfacing techniques for microprocessor.
- To understand design and implementation of microprocessor-based systems in both hardware and software.

Learning Outcomes:

Student will be able to

- Interface 8086 microprocessor with the external memory chips
- Develop programs using different class of instructions for 8086 microprocessor and 8051 microcontroller.
- Design and develop real time application modules using ARM microcontroller.

UNIT-I

Introduction to Microprocessors: Introduction and evolution of microprocessors, Architecture of 8085 processor, pin configuration of 8085, bus organization, and basic instruction sets.

UNIT-II

Instruction sets and programming of 8086:   Architecture and features of 8086, pin configuration of 8086, minimum mode and maximum mode, timing diagrams, Addressing modes. Data transfer instructions, arithmetic instructions, logical instructions, flag manipulation instructions, control transfer instructions, shift / rotate, string instructions & related programs

UNIT-III

Peripheral Interfacing: keyboard / display controller 8279, programming 8255 with 8086, modes of operation of 8254, interfacing programmable interrupt controller 8259, programmable communication interface 8251 & DMA controller 8257.

UNIT- IV

Microcontroller: Introduction to 8051 microcontroller, architecture, memory organization, special function registers, on chip resources, Addressing modes of 8051 and basic instruction set of 8051 and programming.

UNIT-V

ARM Architecture: introduction to 16/32 bit processors, ARM Architecture, ARM Instruction sets, thumb instruction set, thumb instruction format.

Development tools for ARM: Introduction to micro controller development tools, Serial peripheral interface I^2 C Bus, ADC , UART – Stepper Motor Control - DC Motor Control.

Learning Resources

Text Books:

1. Microprocessors & Interfacing, Douglas.V. Hall, 3 rd Edition, Pearson/ PHI. 2007
2. Microcontrollers, Architecture, programming, interfacing and system design, Rajkamal, Pearson, 4th edition.2010

References:

1. Microprocessors & Controllers, N.Senthil Kumar, Oxford University press 2010.
2. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, 2 rd Edition., PHI.
3. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, Tata Mc Hill, 2000. 4. Micro Controllers – Deshmukh, Tata McGraw Hill Edition.6th reprint, 2007.

Web Resources:

1. http://freevideolectures.com/Course/3018/Microprocessors-and-Microcontrollers
2. http://www.cdeep.iitb.ac.in/NPTEL2/
3. www.nptel.ac.in/