

3/4 B.Tech. SIXTH SEMESTER**EE6T3****MICROCONTROLLERS AND APPLICATIONS****Credits: 3****Lecture: 3 periods/week****Internal assessment: 30 marks****Tutorial: 1 period /week****Semester end examination: 70 marks****Course Objective:**

Microprocessor and Microcontrollers have become important building blocks in digital electronic design. It is important to understand the architecture of microprocessors and its interfacing with various modules. 8086 microprocessor architecture, programming, interfacing, architecture of 8051 microcontroller and its application in industry are covered in this course.

Course Outcomes:

After completing this course, student is able to

1. Have a clear understanding of the architecture and instruction set of 8086 and 8051.
2. Write 8086 assembly language programs to perform a given task.
3. Understand interrupt service routines for all interrupt types.
4. Write microcontroller programs and interface devices.

UNIT I**INTEL 8086**

Introduction and evolution of Microprocessors, Architecture of 8086, Register Organization of 8086, Memory Organization of 8086, Pin diagram of 8086.

Minimum and Maximum mode operations of 8086, General Bus Operation of 8086, Read and Write cycle timing diagram.

UNIT II**ASSEMBLY LANGUAGE PROGRAMMING**

Addressing Modes and Instruction set, Assembler Directives, Procedures and Macros, simple assembly language programming.

UNIT III**8051 Microcontrollers**

Intel 8051 architecture, memory organization, flags, stack, and special function registers, I/O ports counters and timers, serial data I/O, interrupts.

Addressing modes, 8051 Microcontroller instructions - moving data, logical operations, arithmetic operations, jump and call instructions.

UNIT IV**ASSEMBLY LANGUAGE PROGRAMMING**

Microcontroller programming - assembly language programming, timer and counter programming, interrupt programming.

UNIT V**PERIPHERALS AND INTERFACING**

Serial and parallel I/O (8251 and 8255), Programmable DMA controller, Programmable interrupt controller.

Applications of Microcontrollers- Interfacing external memory, Interfacing 8051 to LED's, interfacing seven segment display, ADC and DAC interfacing, Waveform generation, Stepper motor control and firing pulse generation.

Learning Resources

Text Books:

1. “Microprocessors and Interfacing”, Douglas V. Hall, Tata Mc-Graw Hill, Revised 2nd Edition, 2006.
2. “Advanced Microprocessors and interfacing”, A. K. Ray and K. M. Burchandi, Tata Mc-Graw Hill, 2nd edition, 2006.
3. “The 8051 Microcontroller Architecture, Programming and Applications”, Kenneth J. Ayala, Thomson Publishers, 2nd Edition, 2004

Reference Books:

1. “Microcontrollers – Theory & Applications”, Ajay V. Deshmukh, Tata McGraw Hill, 2005.
2. “The 8086 Microprocessors Architecture, Programming and Interfacing the PC”, Kenneth J Ayala, West Publishers, 1995.