

3/4 B.Tech. SECOND SEMESTER

EE6T2 MICROPROCESSORS AND MICROCONTROLLERS Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objective:

Microprocessor and microcontroller have become important building blocks in digital electronics design. In this course the student understands the architecture of microprocessor and its interfacing with various modules. Interfacing assembly language, 8086 microprocessor architecture, interfacing of 8051 micro controller and its application industry.

Learning outcomes:

After completion of the subject the student shall be able to

1. Describe the architecture of 8086 and its signal description
2. Write assembly language programming by using instruction set of 8086
3. Can Interface various I/o devices like stepper motor, A/D and D/A converters and go on by using interfacing devices
4. Distinguish between microprocessors and microcontrollers
5. Illustrate the 8051 architecture, pin configuration and memory expansion capability
6. Develop assembly language programming by studying instruction set of 8051 μ c.
7. Interface various industrial applications and develop the micro computer based systems.

UNIT I Intel 8086

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

UNIT II Maximum And Minimum Mode Operations

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

UNIT III Assembly Language Programming

Assembler Directives, Algorithms for implementation of FOR loop, WHILE, REPEAT and IF-THEN-ELSE features, Procedures and Macros, simple Assembly Language Programming.

UNIT IV Basic Peripherals and Interfacing

Static Memory interfacing with 8086, 8255 PPI, Architecture of 8255 PPI, Various modes of operations and interface of I/O devices to 8086 using 8255, Interfacing A/D, D/A Converter, Stepper motor interface.

UNIT V Interfacing With Advanced Devices

Programmable timer 8253, DMA Controller 8257, Programmable Interrupt Controller 8259, Serial Communication Interface USART 8251.

UNIT VI Microcontrollers

Introduction to 8-bit and 16-bit Microcontrollers, Architecture of 8051, Register Organization, Memory Organization, Addressing Modes, Instruction Set and Assembly Language Programming of 8051.

UNIT VII Hardware Description of 8051.

I/O Ports, Interrupt structure and interrupt priorities, Timers and Counters, Programming Timers and Counters, Serial Communication.

UNIT VIII Interfacing and Industrial Applications

Applications of Microcontrollers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard interfacing, interfacing seven segment display, ADC and DAC interfacing.

Learning Resources

Text Books:

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

References:

1. Ajay V. Deshmukh, "Microcontrollers – Theory & Applications", Tata McGraw Hill.
2. Kenneth J Ayala, "The 8086 Microprocessors Architecture, Programming and Applications", Thomson Publishers, 2005.