

EC/EE-302

MICROPROCESSORS & MICROCONTROLLERS

L T P C

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COURSE OBJECTIVES:

1. To understand the architecture of 8086 family, addressing modes, Instruction description and assembler directives of 8086 microprocessor.
2. To develop the programming skills for applying them on various applications of 8086 microprocessor.
3. To understand 8086 systems connections and programmable parallel ports
4. To understand Analog interfacing with 8086 and learn different programmable peripheral devices.
5. Understand architecture of 8051 microcontroller.

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. describe Architectures of 8086 Microprocessor and 8051 Microcontroller.
2. Develop 8086 Assembly Language Programs using software interrupts, subroutines and macros.
3. explain the response of 8086 when an interrupt occurs, 8086 System Connections, DMA data Transfer and RS 232 Standard.
4. Discuss the interaction of the ADC, DAC and Keyboard with 8086 Microprocessor.
5. Illustrate the interaction of the programmable peripherals devices like 8255, 8251, 8259, and 8254 with 8086 Microprocessor.

UNIT I*Text Book - 1 (13)*

Introduction to microcomputers and microprocessors, The 8086 Microprocessors family-overview, 8086 internal architecture, Introduction to programming the 8086, 8086 Instruction Descriptions and Assembler Directives.

UNIT II*Text Book - 1 (13)*

Program Development steps, writing programs for use with an assembler, assembly language program development tools, writing and using procedures, writing and using assembler macros, 8086 Interrupts and Interrupt responses.

UNIT III*Text Book - 1 (13)*

8086 System Connections : 8086 Microprocessor pin diagram, minimum mode and maximum mode of 8086, 8086 bus activities during a read machine cycle, 8086 bus activities during a write machine cycle, addressing memory and ports in microcomputer systems.

Digital Interfacing : Programmable parallel ports and handshake Input/ Output: Methods of parallel data transfer, Implementing Handshake data transfer, 8255A Internal Block Diagram and System connections, 8255A operational modes and initialization, constructing and sending 8255A control words. Interface microprocessor to keyboards.

UNIT IV*Text Book - 1 (15)*

Analog Interfacing : D/A converter operation and specifications, D/A Applications and Interfacing to Microcomputers, A/D converter specifications, A/D converter Types, and Interfacing Different types of A/D converters to Microcomputers.

Programmable peripheral devices : 8254, 8259, 8251, DMA data transfer, RS232 communication standard.

UNIT V*Text Book - 2 (10)*

Introduction to microcontrollers, comparing microprocessors and microcontrollers, Architecture: Architecture of 8051, pin configuration of 8051 microcontroller, Input/output pins, ports and external memory, counters and timers, serial data Input / Output and interrupts, Addressing modes of 8051 microcontroller.

LEARNING RESOURCES:**TEXT BOOK(s):**

1. Douglas V. Hall - Microprocessors and Interfacing, 2nd Edition, TMH, 2006.
2. Kenneth J. Ayala - The 8051 Microcontroller Architecture, Programming and Applications, Second Edition, Penram International Publishers, 2005.

REFERENCE BOOK(s):

1. John Uffenbeck - The 80X86 Family, Design, Programming and Interfacing, 3rd Edition, Pearson Education, 2002.
2. Barry B. Bray - The intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium processors, architecture, programming, and interfacing, 6th Edition, PHI edition, 2003.
3. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay - The 8051 Microcontroller and Embedded Systems, Pearson Education, second edition 2006.

WEB RESOURCES:

<http://nptel.iitm.ac.in/courses/>