MICROPROCESSORS AND MICROCONTROLLERS

Course Code: 13EC1115

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Pre requisites: Digital Logic Design, Computer Organization

Course Educational Objectives:

- To describe the architecture of 8086 and its programming in assembly language
- To present interrupt structures in microprocessors
- To elaborate interfacing of peripheral devices like I/O ports, keyboards, displays, ADCS, DACs, stepper motor
- To discuss architecture of 8051 and its features

Course Outcomes:

Student will be able to

- Understand the architectures and instruction sets of microprocessors and microcontrollers
- Develop applications which involve interfacing of peripherals to microprocessors
- Develop logical programming skills in 8086 assembly language
- Understand the programming of 8051 on-chip peripherals like timers, serial port

UNIT-I (10 Lectures)

INTEL 8086 MICROPROCESSOR:

8086 internal architecture, addressing modes, pin diagram, Minimum mode and maximum mode of operation, timing diagrams, Memory interfacing to 8086 (Static RAM & EPROM), 8086 interrupts and interrupt responses

UNIT-II (14 Lectures)

8086 PROGRAMMING:

Instruction set of 8086, assembler directives, program development Steps, constructing the machine course Codes for 8086 instructions, writing programs for Use with an assembler, writing and using procedures and assembler macros.

UNIT-III (11 Lectures)

PROGRAMMABLE DEVICES AND INTERFACING OF I/O:

Priority interrupt controller Intel 8259A, programmable peripheral interface 8255A, Interfacing of A/D and D/A converters to 8086 microprocessor, interfacing a microprocessor to keyboards, 7-segment display unit, stepper motor.

UNIT-IV (11 Lectures)

USART, KEYBOARD/ DISPLAY CONTROLLER AND DMA INTERFACING:

Serial data transfer scheme, asynchronous and synchronous data transfer schemes, serial I/O 8251 USART architecture and interfacing, Sample program of serial data transfer, Need for DMA, 8257 DMA controller,8279keyboard/display controller.

UNIT-V (14 Lectures)

8051 MICRO CONTROLLER:

Overview of 8051 family, Pin description of the 8051, 256-byte on-chip RAM, 8051 flag bits and PSW register, 8051 register banks and stack, instruction set, Programming 8051 timers, counter programming, Basics of serial communication, 8051 serial port programming in Assembly.

TEXT BOOKS:

1. A.K.Ray and K.M.Bhurchandi, "*Advanced Microprocessors and Peripherals*", 2nd Edn, TMH, 2006.
2. Mazidi and Mazidi, *"The 8051 Microcontroller and Embedded Systems"*, 2nd Edn, PHI, 2004.

REFERENCES:

1. Barry B. Brey, *"The Intel Microprocessors-Architecture, Programming & Interfacing"*, 6th Edn., Pearson Education, 2004.
2. Liu and GA Gibson, *"Micro Computer System 8086/8088 Family Architecture, Programming and Design"*, 2nd Edn., PHI, 2006.
3. Douglas V. Hall, *"Micro Processors & Interfacing*", 2nd Edn., 2007.
4. Raj Kamal *"Microcontrollers Architecture*, *Programming, Interfacing and System Design",* 1st Edn., Pearson Education, 2005.