PCEL4303 **MICROPROCESSOR & MICRO CONTROLLERS**

MODULE - I (10 hours)

Microprocessor Architecture: Microprocessor and Microcomputer Architecture, Pins & Signals, Register Organization, Timing & Control Module, 8085 Instruction Timing & Execution.

Assembly Language Programming of 8085: Instruction set of 8085, Memory & I/O Addressing, Assembly language programming, Stack & Subroutines.

Interfacing EPROM & RAM Memories: 2764 & 6264, 8085 Interrupts

(Book 1: Ch.1,2,3,4 & 7)

MODULE – II (15 hours)

8086 Microprocessor: Architectures, Pin Diagrams and Timing Diagrams: Register Organisation, Architecture, Signal Description, Physical Memory Organisations, Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum Mode System and Timings, Maximum Mode System and Timings

8086 Instruction Set and Assembler Directives: Machine Language Instruction Formats, Addressing Modes, Instruction Set, Assembler Directives and Operators

Assembly Language Programming with 8086: Machine Level Programs, Machine Coding the Programs ,Programming with an Assembler

Special Architectural Features and Related Programming: Stack, Interrupts and Interrupt Service Routines, Interrupt Cycle,Non Maskable Interrupt, Maskable Interrupt, Interrupt Programming, Passing Parameters to Procedures, Handling Programs of Size More than 64k,MACROS, Timings and Delays

Basic Peripherals and Their Interfacing with 8086: Semiconductor Memory Interfacing, Dynamic RAM Interfacing, Interfacing I/O Ports, PIO 8255],Modes of Operation of 8255, Interfacing Analog to Digital Data Converters, Interfacing Digital to Analog to Converters, Stepper Motor Interfacing ,

Special Purpose Programmable Peripheral Devices and Their Interfacing

Programmable Interval Timer 8253, Programmable Interrupt Controller 8259A, The Keyboard/Display Controller 8279, Programmable Communication Interface 8251USART

DMA, Floppy Disk and CRT Controllers

DMA Controller 8257,DMA Transfers and Operations, Programmable DMA Interface 8237, Floppy Disk Controller 8272, CRT Controller 8275

80386 Microprocessor: Introduction, Architecture, Pins & Signals, Memory System, Registers, Memory Management, Paging Technique, Protected Mode Operation.

(Book-2: Ch.1.1 to 1.9, ch.2.1 to 2.4,ch.3.1 to 3.3, ch.4.1 to 4.10,ch.5.1 to 5.8,ch.6.1 to 6.4, ch.7.1 to 7.5, ch.10.1 to 10.3, 10.7,10.9)

MODULE –III (15 HOURS)

8051 Microcontrollers: Microcontrollers and embedded processors, Overview of the 8051 family

8051 Hardware Connection: Pin description of the 8051

8051 Assembly Language Programming: Inside the 8051, Assembly, Programming

Assembling and Running an 8051 Program, The Program Counter and ROM Space in the 8051

8051 data types and Directives, PSW Register, register Banks and Stack

Jump, loop, and Call Instructions: Loop and Jump Instructions, Call Instructions, Time Delay for Various 8051 chips

8051 I/O Port Programming: I/O Programming, I/O Bit Manipulation Programming,
8051 Addressing Modes: Immediate and register Addressing Modes, Accessing memory using various Addressing Modes, Bit Addresses for I/O and RAM
Arithmetic & Logic Instructions and Programs: Arithmetic Instructions, Signed number concepts and Arithmetic Operations, Logic and Compare Instructions, Rotate Instruction and data Serialization, BCD, ASCII, and other Application Programs
8051 Serial Port Programming in Assembly: Basic of Serial communication, 8051 connection to RS232, 8051 Serial port Programming in Assembly, Programming the second Serial port
Interrupts Programming in Assembly: 8051 Interrupts, Programming timer Interrupts, Programming external hardware Interrupts, Programming the Serial Communication interrupt, Interrupt Priority in the 8051
ADC, DAC, and Sensor Interfacing: Parallel and Serial ADC, DAC Interfacing Sensor Interfacing and Signal Conditioning
Interfacing to External Memory: Semiconductor Memory, Memory Address Decoding, Interfacing with External ROM, 8051 Data Memory space, Accessing External data Memory
8051 Interfacing with the 8255: 8255 Interfacing, Pogramming for the 8255
Motor Control: RELAY, PWM, DC, and Stepper Motors: Relays and Opto-isolations, Stepper Motor Interfacing, DC Motor Interfacing and PWM
(Book-3: Ch.1.1,1.2,ch.2.1 to 2.7,ch.3.1 to 3.3,ch.4.1,4.2,ch.5.1 to 5.3,ch.6.1 to 6.5,ch.10.1 to 10.4,ch.11.1 to 11.5,ch.13.1 to 13.3,ch.14.1 to 14.4,ch.15.1,15.2,ch.17.1 to 17.3)

TEXT BOOKS

1. Ghosh & Sridhar,0000 to 8085–Introduction to Microprocessor for Scientists & Engineers, PHI
2. A.K. Roy & K.M. Bhurchandi, Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing)– TMH Publication
3. Mazidi & Mazidi, The 8051 Microcontroller & Embedded Systems– Pearson / PHI publication

. ***REFERENCE:***

1. M. Rafiqzzaman, Microprocessor – Theory & Applications. (Intel & Motorola), PHI
2. The 8086 Microprocessor: Programming & Interfacing the PC by Keneeth J. Ayela
3. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH
4. R.S. Gaonkar, Microprocessor architecture, programming & application with 8085, Penram International Publishing. (India) Pvt. Ltd.
5. W.A.Triebel and Avtar Singh, The 8088 and 8086 Microprocessors, Pearson Education
6. Barry B. B The Intel Microprocessor – (Architecture, Programming & Interfacing) by Pearson