

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE IN PHYSICS
SYLLABUS WITH EFFECT FROM 2020-2021

BPS-CSE3A

ELECTIVE-III(A): MICROPROCESSOR 8085 AND MICROCONTROLLER
(Common to B.Sc.Physics with Computer Applications)

Lecture: 60 Hours

Tutorial: 15 Hours

Credits:4

Course Objective:

To study the architecture of the microprocessor 8085 and micro controller 8051

Learning Outcome :

At end of the course, students will be able to:

- Describe the general architecture of a microcomputer system and architecture & organization of 8085 Microprocessor and understand the difference between 8085 and advanced microprocessor
- Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
- Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
- Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
- Understand the concepts of interrupts and microcontrollers

Unit I: Microprocessor 8085 Architecture

(12hours)

Introduction to Microprocessor – Architecture of Microprocessor 8085-Internal registers (8-bit & 16-bit)-CPU-ALU-Types of System Bus-Bus Structure- multiplexing and demultiplexing address/data bus-Instruction Register and Decoder - Timing and Control Unit-Interrupts and Serial I/O (principle only)-external memory – Block diagram of 8085-Programmer’s model of 8085-pin configuration of 8085.

Unit II: Instruction Set-I

(12 hours)

Machine Language and Assembly Language-Addressing modes-types of instruction format-Data Transfer type instructions-Arithmetic and logical instructions-Branching instructions-looping and time delay -system clock-T-state-instruction and machine cycles-Timing diagram for MOV R_d, R_s - MVI A, data8 - LXI R_p, 16bits, memory read and memory write cycle.

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Unit III: Instruction Set-II and Programming

(12 hours)

Special Instructions: Rotate instructions-stack and subroutine related instructions-PSW-peripheral instructions-I/O and Machine Control Instructions.

Assembly Language Programs – Addition– Subtraction– Multiplication (8-bit) – Division (8-bit) Ascending / Descending Order, Largest/Smallest (single byte)-Addition of N numbers (single byte)-code conversion program.

Unit III: Memory/IO Interface

(12 hours)

Memory Interface (Basics) – memory mapped I/O & I/O mapped I/O- Generating Control Signals – Interfacing 2KX8 EPROM – 2KX8 RAM -Interfacing I/O ports to 8085-Hand shake signals-Functional block diagram and working of PPI-8255-Interfacing 8255 to 8085-LED Interface.

Unit V: Interrupts and Introduction to Microcontrollers

(12 hours)

Interrupts in 8085- Generation of RST codes-Hardware, software interrupts and their function-Interrupts pulse width and Triggering levels-Interrupt priority-Vector interrupt model -SIM and RIM instructions-Simple polled and Interrupt controlled data transfer-Introduction to Microcontroller –Comparison of Microprocessor and Microcontroller.

Books for study:

1. Microprocessor Architecture, Programming and Application with the 8085, Ramesh S. Gaonkar, Penram International Publishing, Mumbai, (2011).
2. Fundamental of Microprocessor 8085: Architecture Programming, and Interfacing, V. Vijayendran, Viswanathan, S., Printers & Publishers Pvt. Ltd (2009).
3. The 8051 Microcontroller, Architecture, Program and application, Kenneth J Ayala, Penram

Books for reference:

1. Microprocessor Organisation and Architecture, Leventhal L.A , Prentice Hall India.
2. Ram, Fundamentals of microprocessors and microcomputers - Dhanpat Rai Publications, New Delhi
3. The 8080/85 Family: Design, Programming & Interfacing, John Uffenbeck, , PHI India.
4. A. K. Ray & K. M. Bhurchandani, Advance Microprocessor and Peripherals, 2nd Edition, Tata McGraw Hill, 2006
5. Mathur A.P., Introduction to Microprocessors. 3rd edn., Tata McGraw, New Delhi,
6. Muhammed Ali Mazidi, Janice Gillispie Mazidi – The 8051 Microcontroller and Embedded systems
7. Microprocessors & Microcontrollers by B.P. Singh, Galgotia publications Pvt. Ltd.