



SILVER OAK UNIVERSITY

Computer Application

Integrated M.Sc(IT)

Subject Name: Microprocessor and Interfacing

Subject Code:

Semester: 3rd

Prerequisite: Fundamentals of Digital Logic Design and Computer Organization

Objective: Microprocessors and Interfacing course is intended to introduce the architecture, programming of microprocessors and interfacing various hardware circuits to microprocessors.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits C | Evaluation Scheme | | | | Total Marks |
|-----------------|---|---|--------------|-------------------|----|----------|----|----------------|
| L | T | P | | Internal | | External | | |
| | | | | Th | Pr | Th | Pr | |
| 4 | 0 | 2 | 5 | 40 | 20 | 60 | 30 | 150 |

Content:

| Unit No. | Course Contents | Teaching Hours | Weightage % |
|----------|---|----------------|-------------|
| 1 | Introduction to Microprocessor: Components of a typical Microprocessor, CPU module, ROM & RAM families, Components of a Microprocessor: Registers, ALU and control & timing, System bus (data, address and control bus), Microprocessor systems with bus organization | 4 | 10 |
| 2 | Features of 8085 Microprocessor, PIN Diagram of 8085, Control and status signals, Block Diagram of 8085 Microprocessor, Programming Model of 8085, BUS organization and 8085 registers Microprocessor operations: Microprocessor initiated Operations, Internal data operations, Externally Initiated operations Microprocessor Communication & Bus Timings De-multiplexing of Buses, Generating Control Signals, 8085 Machine Cycles & Bus Timings, Memory Interfacing | 6 | 15 |
| 3 | Instruction Set & Programming Techniques, Classification of Instructions, Instruction Format, Instruction Timings & Operation Status, Data Transfer Operations, Arithmetic Operations, Logic Operations, Branch Operations, Stack, I/O & Machine Control Instructions, Addressing Modes, Writing, Assembling & Executing A Program, Debugging the Programs | 8 | 20 |

| | | | |
|---|--|---|----|
| | | | |
| 4 | Looping, Counting and Indexing, Counters and Time delays, Stack & Subroutines, Code Conversion, BCD Arithmetic operations and 16 Bit data operations | 7 | 20 |
| 5 | Interfacing Concepts, Ports, Interfacing Of I/O Devices, Comparison of Memory Mapped I/O & Peripheral I/O, Interrupts In 8085, Programmable Interrupt Controller 8259A, Programmable Peripheral Interface 8255A | 8 | 15 |
| 6 | Advanced Microprocessor: 8086 logical block diagram Features of 8086 Microprocessor, Register Organization of 8086: General Data Registers, Segment Registers, Pointer and Index Registers Flag Register, Internal Organization of 8086, Bus Interface Unit (BUI), Execution Unit (EU), Memory Segmentation Flag register and description of all flag bits, Pipelining, Cache memory, Memory Management, Virtual Memory System | 6 | 20 |

Course Outcome:

| Sr. No. | CO statement | Unit No |
|---------|---|---------|
| CO-1 | List and specify the various features of microprocessor, memory and I/O devices including concepts of system bus. | 1 |
| CO-2 | Identify the various elements of 8085 microprocessor architecture, its bus organization including control signals. | 2 |
| CO-3 | Describe the 8085 processor addressing modes, instruction classification and function of each instruction and write the assembly language programs using 8085 instructions. | 3 |
| CO-4 | Develop programming skills in assembly language. | 4 |
| CO-5 | Explain the concepts of memory and I/O interfacing with 8085 processor with Programmable devices. | 5 |
| CO-6 | List and describe the features of advance microprocessors. | 6 |

Teaching & Learning Methodology: -

1. Flipped Classroom
2. Adaptive Teaching
3. Direct Instruction Methodology
4. Context based learning.
5. Kinesthetic Learning

List of Experiments/Tutorials:

1. Write an 8085 assembly language program for exchanging two 8-bit numbers stored in memory locations 2050H and 2051H.
2. Write an 8085 assembly language program to add two 8-bit numbers stored in memory locations 2050H and 2051H. Store result in location 2052h.
3. Write an 8085 assembly language program to add two 16-bit numbers stored in memory.
4. Write an 8085 assembly language program to add two decimal numbers using DAA instruction.
5. Write an 8085 assembly language program to find the minimum from two 8-bit numbers.
6. Write an 8085 assembly language program to get the minimum from block of N 8-bit numbers.
7. Write an 8085 assembly language program to add block of 8-bit numbers.
8. Write an 8085 assembly language program to find the number of 1's binary representation of given 8-bit number.
9. Write an 8085 assembly language program to count the length of string ended with 0dH starting from location 2050h.
10. Write an 8085 assembly language program to covert given hex digit to its equivalent ASCII number

Major Equipment:

- 8085 based microprocessor kit
- Modern desktop PC with open source 8085 Simulator

Books Recommended: -

1. Microprocessor Architecture, Programming, and Applications with the 8085, Ramesh S. Gaonkar Pub: Penram International.
2. Microprocessors and Interfacing, N. Senthil Kumar, M. Saravanan, S. Jeevanathan, S. K. Shah, Oxford.
3. Advanced Microprocessors, Daniel Tabak, McGraw-Hill
4. Microprocessor & Interfacing - Douglas Hall, TMH
5. 8086 Programming and Advance Processor Architecture, Savaliya M. T., WileyIndia
6. The 8088 and 8086 Microprocessors, Triebel & Singh, Pearson Education

List of Open Source Software/learning website:

- Open source simulator for 8085 processor
- www.nptel.ac.in
- www.intel.com
- www.cpu-world.com