Course Title: Microprocessor
Course no: CSC-153 Full Marks: 70+10+20
Credit hours: 3 Pass Marks: 28+4+8

Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

Course Synopsis: This course contains of fundamental concepts of computer organization, basic I/O interfaces and Interrupt operations.

Goal: The course objective is to introduce the operation, programming, and application of microprocessor.

Course Contents:

Unit 1. Introduction **3 Hrs.**

Introduction to Microprocessors, Basic organization

Unit 2. Basic Computer Architecture **10 Hrs.**

SAP Architectures, Instructions, Microprogram; 8-bit "W" bus, 4-bit program counter, 4-bit Memory Address Register (MAR), 16x8-bit memory, 8-bit instruction register (IR), 6-cycle controller with 12-bit micro-instruction word, 8-bit accumulator, 8-bit B register, 8-bit adder-subtractor, 8-bit output register, SAP-1 Instructions, Fetch & Execution, microprogram, fetch cycle, execution cycle, microprogram, controller implementation, SAP 2 Architecture, architectural differences with SAP-1, bi-directional registers, instruction set, flags.

Unit 3. Instruction Cycle **3 Hrs.**

Fetch Operation and Timing Diagram, Execute Operation and Timing Diagram, Machine Cycle and States

Unit 4. Intel 8085\8086\8088 **8 Hrs.**

Functional Block Diagram and Pin configuration, Timing and Control Unit, Registers, Data and Address Bus, Instructions, Operation Code and Operands, Addressing Modes, Interrupts, Flags, Instructions and Data Flow

Unit 5. Assembly Language Programming **9 Hrs.**

Assembly instruction format, Instruction Types, Mnemonics, Operands, Macro assemblers, Linking, Assembler directives, Simple sequence programs, Flags, Branch, Jumps, While-Do, Repeat-Until, If-Then-Else and Multiple If-then Programs, Debugging.

Unit 6. Basic I/O, Memory R/W and Interrupt Operations **6 Hrs.**

Memory Read, Memory Write, I/O Read, I/O Write, Direct Memory Access, Interrupt, Types, Interrupt Masking, 8259 operation.

Unit 7. Input/ Output Interfaces **6 Hrs.**

Parallel communication, Serial communication, Data transfer wait operation, 8255A working, 8255A Modes, RS-232 interface, Keyboard and display controller.

Laboratory works: Assembly language programming using 8085\8086\8088 trainer kit. The programming should include: Arithmetic operation, base conversion, conditional branching etc. Sample Lab work list may include:

1. Assembly language program using 8085 microprocessor kit.
2. Program should comprise the use of all types of instructions and addressing modes.
3. The programming should include the concept of Arrays and the concept of Multiplications and Division operations on Microprocessor.
4. Assembly language programming, using any type of Assembler, which should include the different functions of Int 10h, and Int 21h.

References:

1. Ramesh S. Gaonkar, **Microprocessor Architecture, Programming, and Applications with 8085**, Prentice Hall
2. A. P. Malvino and J, A. Brown, **Digital Computer Electronics**, 3rd Edition, Tata McGraw Hill
3. D. V. Hall, **Microprocessors and Interfacing - Programming and Hardware,** McGraw Hill
4. 0000 to 8085 **Introduction to 8085 Microprocessor for Engineers and Scientists**, A. K. Gosh, Prentice Hall