1MCACC2: COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

Total No. of Hours: 52 **Hours/Week: 4**

Course Objective: To understand in depth the processor and programming at system level.

Course Outcome: Students will be able to

CO1: Describe Register transfer and various micro-operations, describe address sequencing and microprogramming concepts.

CO2: Understand the organization and architecture of CPU and DMA controller.

CO3: Understand the concepts of microcomputer and internal architecture of microprocessor.

CO4: Write and implement efficient structured assembly language programs to solve the problems.

CO5: Understand interrupts.

Unit I	**Representation of Information**: Number system, 2's complement addition and subtraction, Codes: Excess 3, BCD and alphanumeric codes, Error Detection and Correction Codes. **Basic Building Blocks**: Boolean algebra, Basic and Universal Gates, SOP and POS expressions and simplification, Simplification of Boolean expressions using K- maps. **Combinational Logic Circuits**: Combinational circuits, Encoder, Decoder, Multiplexer, De Multiplexer, Half Adder, Full adder.	8 hrs
Unit II	**Flip-Flops**: Latches, S-R, JK flip flops, Clocked R-S flip flop, D-flipflop, JK flip-flop, Master-Slave JK flip-flop with timing diagram, T-flip-flop, Edge Triggered D flip-flop. **Sequential Logic Circuits**: Parallel Register, Shift Register and types, Shift register with parallel load, Bidirectional Shift register. **Registers and Counters**: Counters, Asynchronous Counters, Up/Down Counter, Synchronous Counter, BCD Counters.	10 hrs
Unit III	**Input-Output Organization**: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor.	12 hrs

	Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.	
Unit IV	**Microprocessor**: Evolution and Types, the 8086 microprocessor family-overview, 8086 internal architecture, introduction to programming the 8086, addressing modes of 8086, 8086 Family **Assembly Language Programming**: Program Development Steps, writing programs for use with an assembler, assembly language program development tools.	10 hrs
Unit V	**Implementing Standard Program Structures in 8086 Assembly Language**: Simple Sequence Programs, Jumps, Flags, and Conditional Jumps, If-Then, if-then-else, and multiple if-then else programs, while-do programs, while-do programs, repeat-until programs, instruction timing and delay loops. Strings, Procedures, and macros: the 8086 string instructions, writing and using procedures, writing and using assembler macros 8086 Instruction Descriptions and Assembler Directives	12 hrs

REFERENCE BOOKS

[1] M.Morris Mano, "*Digital logic and Computer Design*", Pearson Education.

[2] M. Morris Mano, "*Computer System Architecture*", Pearson, Third Edition.

[3] D. V. Hall, "*Microprocessors and Interfacing*", TMH, Second Edition.

[4] Barry B, "*The Intel Microprocessors Architecture, Programming and Interfacing*", Pearson, Eighth Edition.

[5] John Uffenbeck, "*The 8086 / 8088 Family Design Programming and Interfacing*", PHI.

[6] R.S. Goankar, "*Microprocessor Architecture, Programming and Applications with 8085*", Fourth Edition / Recent Edition.

[7] B.P Singh, "*Microprocessor and Microcontrollers*", First Edition.