MSCCS-Final / MCA 2nd Year
Syllabus

Course Code: MSCCS-202, 08/MCA-202
Course Name: Computer Architecture & Microprocessor

Unit 1: Processor Basics
CPU Organisation, Fundamentals, Additional Features, Data Representation, Basic Format, Fixed Point Numbers, Floating Point Numbers, Instruction Sets, Instruction Formats, Instruction Types, Programming Consideration.

Unit 2: Organization and Architecture
Buses, System Buses, Computer Components: The Control Logic Gates, Adder And Logic Circuit, Computer Function, Interconnection Structures: Time Share Common Bus, Multiport Memory, Crossbar Switch, Multistage Switching Network, Hypercube Interconnection, Bus Interconnection, Single Bus, Multiple Bus Hierarchies, PIC (Peripheral Component Interconnect), Input Output External Devices.

Unit 3: DataPath Design
Datapath Design, Fixed Point Arithmetic: Addition And Subtraction, Multiplication and Division, Floating Point Mathematics: Addition and Subtraction, Multiplication and Division, Arithmetic Logic Unit, Combinational ALU, Sequential ALU.

Unit 4: Processor Organization
CPU Structure and Function, Basic Processor Organisation, Types of Register, General Register , Stack Organisation, Instruction Format, Addressing Mode, Type of Instructions, Instruction Cycle, The Pentium Processor, The Powerpc Processor.

Unit 5 Reduced Instruction Set Computer
RISC/CISC evolution cycle, RISC design principles, RISC characteristics, overlapped register Windows, instruction executions, RISC Pipelining, RISC vs CISC, RISC architecture and CISC architecture, SPARC, MIPS, MIPS R4000, PowerPC, Pentium.

Unit 6: Control Design
Basic Concept, Design Control Unit, Hardwired Control Unit, Classical Method, One Hot Method, Micro programmed Control, Parallelism in Micro Instructions, Horizontal Vs. Vertical, Advantage And Application Of Microprogramming, Multiplier Control Unit.

Unit 7: Memory Organization
Memory Technology, Memory Device Characteristics, Random Access Memory, Serial Access Memory, Memory Systems, Multilevel Memories, Address Translation, Memory Allocation, Computer Memory, Internal Memory, Computer Memory System Overview, Semiconductor Main Memory, Cache Memory, Main Features, Address Mapping, Structure Versus Performance, Advanced Drum Organisation, External Memory: Magnetic Disc, RAID, Optical Memory, Magnetic Tape.

Unit 8: System Organization
System Organisation, IO And System Control, Programmed IO, DMA And Interrupts, IO Processors, Parallel Processing, Processor Level Parallelism, Multiprocessors, Pipeline Control, Instruction Pipeline, Arithmetic Pipelines, Pipeline Performance, Superscalar Processing.

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Unit 9: Introduction to Micro Computer System

Microprocessor, Binary Digits, Memory, Input/Output, Microprocessor as a CPU (MPU), Organization of a Microprocessor-Based System, Microcontrollers, Microcomputer Devices: Microprocessor, Memory, Input, Output, Machine Language, Assembly Language, Advantage of assembly language. Difference between machine language and assembly language, Bus concept: Address Bus, Data Bus, Control Bus, Architecture of 8085A, Pinout of 8085A.

Unit 10 Introduction to Micro Computer System

What is Assembler and working, Programming model of 8085 microprocessor, Addressing modes, Instruction set classification: Data Transfer (Copy) operation, Arithmetic Operations, Logical Operation, Machine Control Operation, Instruction Format, Conditional Assembly, Subroutine, Transferring data to subroutine, MACROS, usage of MACRO, Macro vs. Subroutine, Intrrupts, writing interrupt subroutine.

Unit 11 Peripherals and their interfacing with 8085

Address space Partitioning, Memory Mapped IO Scheme, IO Mapped IO Scheme, Memory anf IO Interfacing, Data Transfer Scheme: Synchronous and Asynchronous Data Transfer, Interrupt Driver Data Transfer, Multiple Intrrupts, the 8385 Interrupts, Interfacing Devices and IO Devices, Generation of Control Signals for Memory and IO Devices, IO Ports, programmable DMA Controller, Intel 8257, Simple Program IO Interfacing.

Unit 12: Comparative Study of 8085, 8086 and 8088

Evolution from 8080/8085 to 8086, Evolution from 8086 to 8088, 8085 Microprocessor, Pin diagram of 8085, Signal group of 8085, Block diagram of 8085, description of 8085, 8086 Microprocessor: Pin diagram of 8086, Signal group of 8086, Internal organization of 8086, 8088 Microprocessor and its basic architeture, Pentinum Processor: History, Block diagram, Dual Core Processor.