Computer System Architecture (CSA)

MCS-602

Block I

Unit I: Introduction to computer system and its submodules, Number System and Representation of information

Unit II: Arithmetic and Logical operation and hardware implementation, Software implementation of some complex operation, Arithmetic and Logic Unit, Introduction to memory Unit, control unit and Instruction Set

Unit III: Working with an ALU, Concepts of Machine level programming, Assembly level programming and High level programming.

Unit IV: Various addressing modes and designing of an Instruction set, Concepts of subroutine and subroutine call, Use of stack for handling subroutine call and return.

Block II

Unit V: Introduction to CPU design, Instruction interpretation and execution, Micro-operation and their RTL specification

Unit VI : Hardwired control CPU design

Unit VII : Microprogrammed control CPU design

Unit VIII: Concepts of semiconductor memory, CPU- memory interaction, organization of memory modules, Cache memory and related mapping and replacement policies, Virtual memory.

Block III

Unit IX : Introduction to input/output processing, working with video display unit and keyboard and routine to control them

Unit X: Programmed controlled I/O transfer, Interrupt controlled I/O transfer, DMA controller.

Unit XI : Secondary storage and type of storage devices, Introduction to buses and connecting I/O devices to CPU and memory.

Unit XII : Introduction to RISC and CISC paradigm, Design issues of a RISC processor and example of an existing RISC processor.

Block IV

Unit XIII: Introduction to pipelining and pipeline hazards, design issues of pipeline architecture, Instruction level parallelism and advanced issues, Introduction to interconnection network and practical issues, Examples of interconnection networks.

Unit XIV: Multiprocessors and its characteristics, Memory organization for multiprocessors systems.

Unit XV: synchronization and models of memory consistency, Issues of deadlock and scheduling in multiprocessor systems, Cache in multiprocessor systems and related problems, Cache coherence protocols

Unit XVI: Parallel processing concepts, Parallelism algorithm for multiprocessor systems.