Computer Architecture & Organization

UNIT I

BASIC STRUCTURE OF COMPUTERS: Functional units, Von Neumann Architecture, Basic operational concepts, Bus structures Addressing modes, Subroutines: parameter passing, Instruction formats: Three- address Instructions, Two-address instructions, One- address instructions, Zero-address instructions.

BASIC PROCESSING UNIT: Bus architecture, Execution of a complete instruction, sequencing of control signals, Hardwired control, Micro-programmed Control, microinstruction format.

UNIT II

ARITHMETIC: Number representations and their operations, Addition and Subtraction with signed-magnitude, Design of Fast Adders, Array multiplier, Signed multiplication: Booth's Algorithm, Bit-pair recoding, Integer Division, Floating-point Arithmetic operations, guard bits and rounding.

UNIT III

THE MEMORY SYSTEM: Various technologies used in memory design, higher order memory design, Memory hierarchy, Main memory, Auxiliary memory, Cache memory, cache optimization techniques ,Memory interleaving, Virtual memory, Address Space and Memory Space, Associative memory, Page table, Page Replacement

UNIT IV

INPUT/OUTPUT ORGANIZATION: I/O mapped I/O and memory mapped I/O, Interrupts and Interrupts handling mechanisms, vectored interrupts, Synchronous vs. Asynchronous data transfer, Direct Memory Access COMPUTER PERIPHERALS: I/O devices such as magnetic disk, magnetic tape, CD-ROM systems.

UNIT V

RISC philosophy, pipelining, basic concepts in pipelining, delayed branch, branch prediction, data dependency, influence of pipelining on instruction set design, multiple execution units, performance considerations,

UNIT VI. Introduction to multiprocessors:

Basic concepts in parallel processing, classification of parallel architectures. Vector Processing, Array Processor, Literature review of multi-core architecture

BOOKS:

V.C.Hamacher,Z.G.Vranesic and S.G.Zaky, Computer Organisation, McGraw Hill,5thed,2002.

Computer Organization, Design and Architecture (IV Ed), Sajjan G. Shiva, CRC Press

Computer Architecture & Organization III Ed- J.P.Hayes.

REFERENCES BOOKS:

M Mano,“Computer System and Architecture”, PHI, 1993.

W. Stallings, “Computer Organization & Architecture”, PHI, 2001.