

## CSE211:COMPUTER ORGANIZATION AND DESIGN

**Course Outcomes:** Through this course students should be able to

CO1 :: illustrate the design of the various functional units and components of computers.

CO2 :: teach the basics of organizational and architectural issues of a digital computer and Classify and compute the performance of machines, Machine Instructions.

CO3 :: examine the elements of modern instructions sets and their impact on processor design.

CO4 :: compare the design issues in terms of speed, technology, cost, performance.

CO5 :: identify the performance of various classes of Memories, build large memories using small memories for better performance and analyze arithmetic for ALU implementation

CO6 :: understand the concepts of parallel processing, pipelining and interprocessor communication.

### Unit I

**Basics Of Digital Electronics** : Multiplexers and De multiplexers, Decoder and Encoder, Registers., shift registers, Introduction to combinational circuit, introduction to sequential circuits

**Register Transfer and Micro Operations** : Register Transfer Language and Register Transfer, Bus and Memory Transfer, Logic Micro Operations, Shift Micro Operations, Design of arithmetic logic unit., arithmetic microoperations

### Unit II

**Computer Organization** : instruction codes, computer registers, common bus system, computer instructions, timing and control, instruction cycle, memory reference instructions, input-output and interrupt

### Unit III

**Central Processing Unit** : General Register Organization, Stack Organization, Addressing Modes, Reduced instruction set computer, Complex instruction set computer, instruction formats

### Unit IV

**Input-Output Organization** : Peripheral Devices, Input Output Interface, Data Transfer Schemes, Program Control and Interrupts, Direct Memory Access Transfer and Input/Output Processor, Priority interrupt, Direct memory access transfer, Input/Output processor., modes of data transfer, Processor status word

### Unit V

**Memory Unit** : Memory Hierarchy and Processor Vs Memory Speed, Cache Memory, Memory Management, Associative memory, Virtual memory, main memory, auxiliary memory

### Unit VI

**Introduction to Parallel Processing** : Pipelining, Characteristics of multiprocessors, Interconnection Structures, parallel processing

**Latest technology and trends in computer architecture** : multi-cores processor., next generation processors architecture, microarchitecture, latest processor for smartphone or tablet and desktop

**Multiprocessors** : Categorization of multiprocessors(SISD,MIMD,SIMD.SPMD), Introduction to GPU

### Text Books:

1. COMPUTER SYSTEM ARCHITECTURE by MORRIS MANO, PRENTICE HALL

### References:

1. COMPUTER ARCHITECTURE A QUANTITATIVE APPROACH by HENNESSY,J.L,DAVID A PATTERSON, AND GOLDBERG, PEARSON
2. COMPUTER ORGANIZATION AND ARCHITECTURE-DESIGNING FOR PERFORMANCE by WILLIAM STALLINGS, PRENTICE HALL