

## Computer Organization and Architecture

| I YEAR SEM-II B.Tech CSE | CORE                                      | L | T | P | C |
|--------------------------|---|---|---|---|---|
| CODE:CS1201              | COMPUTER ORGANIZATION<br>AND ARCHITECTURE | 2 | 2 | 0 | 4 |

### UNIT-I

**Basic functional blocks of a computer:** CPU, memory, input -output subsystems, control unit. Instruction set architecture of a CPU registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study instruction sets of some common CPUs.

**Data representation:** signed number representation, fixed and floating point representations, character representation.

### UNIT-II

**ALU:** Computer arithmetic integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication shift-and-add, Booth multiplier, carry save multiplier, etc. Division non-restoring and restoring techniques, floating point arithmetic.

**CPU control unit design:** hardwired and micro-programmed design approaches, Case study design of a simple hypothetical CPU.

### UNIT-III

**Memory system design:** semiconductor memory technologies, memory organization. Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs block size, mapping functions, replacement algorithms, write policy

Peripheral devices and their characteristics:

### UNIT-IV

**Input -output subsystems,** I/O transfers program controlled, interrupt driven and DMA, privileged and non privileged instructions, software interrupts and exceptions. Programs and processes role of interrupts in process state transitions.

### UNIT-V

**Performance enhancement techniques:** Pipelining: Basic concepts of pipelining, Throughput and speedup, pipeline hazards.

### UNIT-VI

**Micro processors:** Organization of 8085 and Instruction Set, Programming. Organization of 8086 and Instruction Set, Programming. Machine Instructions, Format and Addressing Modes.

**Text Books:**

1. 1. V. C. Hamacher, Z. G. Vranesic and S. G. Zaky, Computer Organization, 5/e, McGraw Hill, 2002.
2. 2. William Stallings, Computer Organization and Architecture: Designing for Performance, 8/e, Pearson Education India. 2010.

**References:**

1. A. S. Tanenbaum, Structured Computer Organization, 5/e, Prentice Hall of India, 2009.
2. D. A. Patterson and J. L. Hennessy, Computer Organization and Design, 4/e, Morgan Kaufmann, 2008.
3. J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, 4/e, Morgan Kaufmann, 2006.
4. D. V. Hall, Microprocessors and Interfacing, 2/e, McGraw Hall, 2006
5. 8086 Assembler Tutorial for Beginners By Prof. Emerson GiovaniCarati.