

BCSC1005: COMPUTER ORGANIZATION

Objective: This course aims to introducing the concept of computer organization. In particular, it focuses on basic hardware architectural issues that affect the nature and performance of software.

Credits: 04

Semester III

L-T-P: 3 1 0-

Module No.	Content	Teaching Hours
I	<p>Introduction: Basic organization of the computer and Block level description of the functional units, Number representation; 1's and 2's Complement, Integer Representation, Arithmetic Addition & Subtraction with overflow. fixed and floating-point number representation, IEEE standard floating point representation. Introduction to Combinational Circuit- half adder, full adder, binary adder/subtractor, carry look ahead adders. Multiplexer and De-multiplexer, Register, bus and memory transfer,</p> <p>Central Processing Unit: Addition and subtraction of signed numbers, Multiplication: Signed operand multiplication, Booths algorithm. Processor organization, general registers organization, stack organization, Three, Two, One & Zero address instruction. Addressing modes, Micro-operations (Arithmetic, Logical & Shift) and its applications.</p>	20
II	<p>Multiprogramming and Multiprocessing: Flynn's classification, Introduction to pipelined operation. Instruction types, formats, Instruction cycles.</p> <p>Control Unit: Execution of a complete instruction. Hardwired and micro programmed control unit. Unconditional and Conditional branching. Microinstruction with next address field, pre-fetching microinstructions, Concept of horizontal and vertical microprogramming.</p> <p>Memory: Basic concept of Memory and its hierarchy, RAM memories, 2D, 2 & 1/2D memory organization. ROM memories. Cache memories: concept and design issues, performance, address mapping and replacement. Virtual memory: concept and implementation.</p> <p>Input/Output: Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Buses, bus architecture, types of buses and bus arbitration. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors. Standard communication interfaces.</p>	20

Text Books:

- M. Mano (1996), "Computer System Architecture", 3rd Edition, PHI.

Reference Books:

- D.W. Patterson (2008) , "Computer Organization and Design", 4th Edition, Elsevier Publication.
- William Stalling (2011), "Computer Organization", 8th Edition, PHI
- V. CarlHamacher, Zaky (1996), "Computer Organization", 4th International Edition, TMH.
- John P Hays, "Computer Organization", 2nd Edition, TMH.
- Tannenbaum (2005), "Structured Computer Organization", 5th Edition, PHI.
- P Pal Chaudhry (2002), "Computer Organization & Design", 2nd Edition, PHI.

Outcome: After completion of the course, the student will be able to: Understand the

- organization of the modern computer system hardware.
- Analyze the performance of component, able to calculate the effective address of different operands, arithmetic operations of positive and negative numbers.
- Understand the Basic hardware architectural issues that affect the nature and performance of software.