Course Type	Course Code	Name of Course	L	T	P	Credit
DC3	CSC203	**Computer Organization**	3	0	0	9

Course Objective

The objective of the course is to present an understanding of the basic principles on which computers work. To know about the various components and their organization.

Learning Outcomes

Upon successful completion of this course, students will:

- understand the structure, function and characteristics of computer systems.
- Understand the design of the various functional units and components of computers.
- identify the elements of modern instructions sets and their impact on processor design.
- understand the function of each element of a memory hierarchy,
- Identify and compare different methods for computer I/O.
- Be able to write assembly language code.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Basics of computer, Von-Neumann Architecture, Generations of Computer, Basic Functional Blocks of a Computer, Instruction Execution, Register Transfer and Micro operations, Digital Circuits.	4	Understanding of Computer, its components and its working.
2	Data representation: Signed number representation, fixed and floating point representations, character representation.	4	This unit will help student in understanding the number system and its importance.
3	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, Decimal arithmetic-Operations, BCD Adder, BCD Subtraction.	7	This will help in understanding performing the arithmetic operations. This will create the foundation for designing ALU.
4	Organization of a Computer: Central Processing Unit (CPU) - Hardwired and micro-programmed design approaches, ALU organization, Instruction formats, Three-, two-, one- and zero-address instructions, Addressing modes- Immediate, Register direct and indirect, Indexed, Based-indexed	7	One can understand the design and working of CPU and its components. Along with this understanding of different instruction format will be provided.
5	Input-Output Organization: Input-output subsystems, I/O transfers- Program controlled, Interrupt driven and DMA, Privileged and non-privileged instructions, Introduction to Peripheral Devices and their Characteristics	8	To understand about the interface designing to interact with the Input Output devices.
6	Memory Organization: Memory hierarchy, Main memory, Auxiliary memory, Cache memory-Organization, Mapping, Replacement, Writing policies, Virtual memory-Page table, Page replacement, Associative memory	6	This will help student in categorizing memory and understanding the processing to storing and fetching data.
7	Programming Basic Computer: Programming Arithmetic and Operations, Assembly Language, Machine Language	6	One can learn about the programming operations and writing assembly language programs.

Text Books:

1. "Computer System Architecture", by M. Morris Mano (PHI)

Reference Books:

1. "Computer Organization and Architecture – Designing for Performance", by William Stallings (Person)
2. "Computer Architecture and Organization", by John P. Hayes (McGraw Hill)
3. "Advanced Computer Architecture", by Kai Hwang and Naresh Jotwani (McGraw Hill)
4. "Computer Organization and Architecture", by P. N. Basu (Vikas Publishing House Pvt. Ltd.)