

## UGCBCS101: COMPUTER FUNDAMENTALS (3-1-0)

- 1. Computers and Data Representation Systems:** Layers of A Computing Systems; Abstraction; History of Computing Hardware and Software; Computers as a Tool and Discipline. Binary Values and Number Systems; Numbers and Computing; Positional Systems; Binary, Octal and Hexadecimal System; Arithmetic in Order Bases; Power of 2 Number Systems; Conversion from Base 10 to Other Bases; Binary Values and Computers. Data and Computers; Analog and Digital Data; Various Representations of Data.
- 2. Digital Circuit Organization:** Computers and Electricity; Logic Gates; Combinatorial circuits; Adders and Multiplexers; Circuit as Memory; ICs; CPU Chips. Computer Components; Von Neumann Architecture; Fetch-Execute Cycle; Non-Von-Neumann Architectures. I/O Devices; Memory Hierarchy: Registers, Cache, ROM, RAM, and their Relative Characteristics.
- 3. Programming Languages:** Levels of Abstraction; Machine Language; Assembly Language; Pseudo-Operations; Low Level & HLL; Decision Making; Abstraction, Translation Process; Compilers; Interpreters; Programming Language Paradigms; Functionality of Imperative Languages; Input-Output Structures; Control Structures; OO Languages, Data Types.
- 4. Data and Information Management:** Data vs Information; File Systems; File Types; File Operations and Directories. IS and Technologies; Spreadsheets; Spreadsheet Formulas; Circular References; Spreadsheet Analysis; Database Management System; The Relational Model; Relationships; Structured Query Language; Information Security; Confidentiality, Integrity and Availability; Cryptography and Encryption Techniques.

### **\*Text Resources\***

1. Dale & Lewis: Computer Science Illuminated, 3<sup>rd</sup> ed, Narosa Publishing House, 2007
2. Understanding Computers, D. Morley and C. S. Paker, 11<sup>th</sup> Ed , Thomson, 2012