CSOE-002: COMPUTATIONAL THINKING & PROGRAMMING

Course Objective: It will develop integrative approach towards the programming and algorithms issues with aspecial focus on C Language

Credits: 03 **L-T-P-J:3-0-0-0**

Unit-1: **8 Hours**

Introduction: Computer basics and classification of computers, operations of computer, components of a computer and operating system concepts.

Number System: Binary, Octal and hexadecimal number systems, Binary arithmetic.

Programming Concepts: Approaches of problem solving, computer algorithms and flow charts. Introduction of computer languages - machine language, assembly language and high level language.

Unit-2: **8 Hours**

Program Structure and Execution: Representing and manipulating information. Information storage: data sizes, addressing and representing strings. Integer representation and arithmetic, Boolean algebra, logical, shift and bit level operations.

Running Programs on a System

Concept of assembler, compiler, loader and linker, exceptional control flow, processes, process control, system calls, Error handling, program execution time.

Unit-3: **8 Hours**

Programming Concepts in C

Standard input and output in C, Fundamental data types and sizes: character, integer, short, long, unsigned, single and double floating point. Storage classes: automatic, register, static and external. Operators and expressions: arithmetic, relational and logical operators, operator precedence and order of evaluation.

Unit-4: **8 Hours**

Control Flow: Statements and blocks, 'If-Else', 'Else-If', 'Switch', nesting 'If-Else', loops 'While', 'Do-while' and 'For', use of 'Break' and 'Continue', 'Goto' and 'Labels'.

Functions: Basics of functions, types of functions, functions with array, passing values to functions and recursive functions.

Unit-5: **8 Hours**

Pointers and Arrays: Pointers and addresses, pointers and functions arguments, pointers and arrays, Address arithmetic, pointers arrays, multidimensional arrays, pointers to functions.

Structure: Introduction, structures and functions, arrays and pointers of structures.

File Handling: Standard C preprocessors, file access, defining and calling macros and standard libraries.

Referential Books:

- Programming in C – Gottfried B.S. (TMH).
- let us C – Kanetkar Y. (BPB).
- The C Programming Language - Kernighan B.W., Ritchie D.M. (PHI).

Course Outcome:

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

- CO1 Understanding a functional hierarchical code organization.
- CO2 Ability to define and manage data structures based on problem subject domain.
- CO3 Ability to work with textual information, characters and strings.
- CO4 Ability to work with arrays of complex objects.
- CO5 Understanding a defensive programming concept. Ability to handle possible errors during program execution.