FUNDAMENTALS OF COMPUTING

Course Code: CS26 **Credits: 2:0:0**
Pre – requisites: Nil **Contact Hours: 28L**
Course Coordinator: Mrs. Meeradevi K

Course Content:

Unit-I

Overview and Problem Solving with C: Computing Systems: Hardware and Software, **An Engineering problem –Solving Methodology**: Compute the straight-line distance between two points in a plane, Freezing Temperature of Seawater.
Overview of C: Importance of C, Basic Structure of C Programs, UNIX System.
Constants, Variables and Data types: Character Set, C-Tokens, Keywords and Identifies, Constants, Variables, Data Types, Defining Symbolic Constants.
Managing Input and Output Operations: Reading a Character, Writing a Character, Formatted Output.

Unit-II

Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associatively. **Control Structures in C**: Algorithm Development, **Decision Making and Branching:** Simple IF statement, IF.Else Statement, Nesting of IF...Else, The Else IF Ladder, The Switch Statements. The GOTO Statement. **Decision Making and Looping**: Introduction, The While Statement, The DO statement, The FOR statement, Jumps in Loops.

Unit-III

Arrays and Matrices: One-Dimensional Array, Two-Dimensional Arrays (Declaration and Compile Time and Run Time Initialization). Sorting Algorithms, Search Algorithms, **Character Arrays and Strings**: Introduction, Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String Handling Functions, Other String Functions.

Unit-IV

User Defined Functions: Introduction, Need for User-Defined Functions, Elements of User-Defined Functions, Definition of Functions, Return Values and Their Types, Function Calls, Categories of Functions, Recursion. **The scope, visibility and lifetime of variables:** Automatic variables, Static Variables, Register Variables, and External Variables. **Structures:** Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure variables, Arrays of Structures, Arrays within Structures.

Unit-V

Pointers: Introduction**,** Understanding Pointers, Accessing the Address of a Variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a variable through its pointer, Pointer Expressions, Pointers and Arrays, Pointers and Character Strings, Pointers as Function Arguments.

File: Introduction to files, **Using files in C**: Declaring a File Pointer Variables, Opening a File, Closing a File Using fclose (). **Read data from files**: fscanf(), fgest(), fgetc() and fread().**Writing Data to Files:** fprintf(), fputs(), fputc() and fwrite().

Text Books:

1. **E. Balaguruswamy** - Programming in ANSI C, TMH, 7th Edition, 2016
2. **Delores M. Etter** - Engineering Problem Solving with C, Third Edition, Person Education, 2012
3. **Reema Thareja** - Programming in C, 2ndEdition, Oxford University press
2015

Reference Books:

1. **Behrouz A Forouzan & Richard F Gilberg** - Computer Science: A Structural Programming Approach using C, Thomas Brooks publication, 2nd Edition, 2006.
2. **Yashvant Kanetkar** - Let Us C, BPB Publications, 15th Edition, 2016.

Course Outcomes (COs):

At the end of the course, the students will be able to

1. Identify basic elements of computing systems to solve simple real world engineering problems. (PO-1, PO-2)
2. Illustrate the use of control structures, decision making and looping statements. (PO-1, PO-2)
3. Implement the concepts and techniques related to arrays and matrices. (PO-1, PO-2)
4. Construct a programming solutions using user defined functions and structures. (PO-1, PO-2)
5. Illustrate the concepts of pointers and files. (PO-1, PO-2)

Note: The topics discussed in tutorials of the Course CSL 18/CSL 28 Fundamentals of Computing and C Programming Laboratory will be a part of CIE and SEE assessment of this Course.