

## **Module 1: Introduction to Programming Concepts**

### **What is Programming?**

- History and Evolution of Programming Languages
- Types of Programming Languages (Low-level vs High-level)
- Compilers vs Interpreters
- Program Execution Process (source code → compiler → executable)
- Introduction to Flowcharts and Algorithms
- Writing and Interpreting Flowcharts (using basic tools)
- Algorithm Design Basics (Input → Processing → Output)

## **Module 2: Introduction to C Programming)**

- History of C language and its importance
- Installing C Compiler (Turbo C or GCC)
- Structure of a C Program
- Writing the First C Program (Hello World)
- Compilation and Execution of C Programs
- Basic Input and Output using printf() and scanf()

## **Module 3: Data Types and Variables**

- Keywords and Identifiers
- Data Types: int, float, char, double
- Constants and Variables
- Declaring and Initializing Variables
- Type Conversion and Type Casting

## **Module 4: Operators and Expressions**

- Arithmetic Operators
- Relational and Logical Operators
- Assignment, Increment, Decrement Operators
- Conditional (?:) Operator
- Operator Precedence and Associativity
- Writing and Solving Expressions

## **Module 5: Control Flow Statements**

- Decision Making:
  - if, if-else, nested if
  - switch-case statement
- Looping:
  - for loop
  - while loop
  - do-while loop
- break and continue statements
- Practical Flowchart to Code Conversion

## **Module 6: Functions in C**

- Importance of Functions
- Declaring and Defining Functions
- Calling Functions
- Function Parameters and Return Types
- Scope and Lifetime of Variables
- Recursion (Basic Level)

## **Module 7: Arrays and Strings**

- 1D Arrays: Declaration, Initialization, Traversal
- 2D Arrays (Intro and Matrix Input/Output)
- String Handling:
  - Declaring and Initializing Strings
  - Common String Functions (strlen, strcpy, strcmp, etc.)
- Character Arrays vs String Literals

## **Module 8: Pointers and Memory**

- Introduction to Pointers
- Pointer Variables and Address-of Operator
- Pointers and Arrays
- Pointer Arithmetic
- NULL Pointer and Pointer Safety
- Simple Dynamic Memory Allocation using malloc, free

## **Module 9: Introduction to File Handling**

- File Types: Text and Binary
- Opening and Closing Files
- Reading and Writing to Files (fopen, fscanf, fprintf, fclose)
- File Modes: r, w, a, r+, w+, etc.

## **Module 10: Error Handling and Debugging**

- Types of Errors: Syntax, Runtime, Logical
- Basic Exception Concepts (though C doesn't have built-in exceptions)
- Debugging Techniques
- Using Comments and Clean Coding Practices

## **Module 11: Mini Projects and Assessments**

Develop a menu-driven program using functions

- Projects like:
- Student Marksheet System
- Simple Calculator using Functions
- File-based Contact Book
- Viva or Final Exam with Practical Coding Test