

C Programming Course Contents

Course Duration: One Month

1. Introduction to C Programming

- History and features of C
- Structure of a C program
- Setting up the environment (compiler, IDE)
- Writing your first C program (Hello World)
- Compilation and execution process

2. Basic Syntax and Data Types

- Keywords and identifiers
- Variables and constants
- Data types: int, float, char, double, etc.
- Input and output functions (scanf, printf)

3. Operators and Expressions

- Arithmetic operators
- Relational operators
- Logical operators
- Bitwise operators
- Assignment operators
- Operator precedence and associativity

4. Control Structures

- Conditional statements: if, if-else, switch
- Loops: for, while, do-while
- Nested loops and conditions
- break and continue

5. Functions

- Function declaration and definition
- Function arguments and return types
- Call by value and call by reference
- Recursion

6. Arrays and Strings

- One-dimensional arrays
- Multi-dimensional arrays
- String handling and manipulation (string library functions)
- Array of strings

7. Pointers

- Introduction to pointers
- Pointer arithmetic
- Pointers and arrays
- Pointers to pointers
- Pointers and functions (passing pointers to functions)

8. Structures and Unions

- Defining structures
- Accessing structure members
- Nested structures
- Arrays of structures
- Unions and their uses

9. Dynamic Memory Allocation

- malloc(), calloc(), realloc(), and free()
- Managing memory in C programs

10. File Handling

- File pointers
- Reading from and writing to files
- File operations (fopen(), fclose(), fread(), fwrite(), etc.)

11. Preprocessor Directives

- Macro definitions (#define)
- File inclusion (#include)
- Conditional compilation (#ifdef, #ifndef)

12. Advanced Topics (optional)

- Command-line arguments
- Enumerations
- Typedef
- Error handling
- Introduction to linked lists and other data structures (optional)
- Basics of multi-file projects