# Programming in C

**Duration: 48 Hrs.**

## Introduction to Programming

- Program and Programming
- Programming Languages
- Types of software's
- Operating Systems
- Compiler, Interpreter, Loader and Linker

## Fundamentals in C

- A Simple C Program
- Program execution phases
- Backslash character constants
- Constants
- Format specifiers
- Identifiers
- Keywords
- Variables
- Data Types
- Declaration of Variable
- Assigning Values to Variables
- Initialization
- Comments
- Const Qualifier
- Basic Structure of a 'C' program
- Programming Examples

## Operators and Expressions

- Arithmetic operators
- Increment and decrement operators
- Relational operators
- Logical operators
- The assignment operators
- The conditional operator
- The size of operator
- Type casting
- Precedence and order of evaluation
- Programming Examples

## Data types

- Modifiers
- Format specifiers
- Dealing with each data types
- Memory representation of each type
- Programming Examples

## Input-Output Library Functions

- Unformatted I-O Functions
- Single Character Input-Output

- String Input-Output
- Formatted I-O Functions
- Programming Examples

## Control statements

- Conditional Control Statements
- If, if-else, nested if
- Multiple Branching Control Statement
- Switch-case
- Loop Control Statements
- While, do-while ,for
- Nested Loops
- Jump Control statements
    - Break
    - Continue
    - Goto
    - Exit
- Infinite Loop

## Function

- Introduction to Function
- Advantages of using functions
- Function Prototype
- Defining a function
- Calling a function
- Return statement
- Types of functions
- Recursion
- Nested functions
- main() function
- Library Function
- Local and global variables

## Storage class

- Types of storage class
- Scoping rules
- Dealing with all storage classes

## Pointer

- Definition of Pointer
- Declaration of Pointer Variables
- Assigning Address to Pointer Variables
- De-referencing Pointer Variables
- Pointer to Pointer
- Pointer Arithmetic
- Pointer comparisons
- De-reference and increment pointer

- pointer to const data
- const pointer
- const pointer to const data
- Void pointer or Generic Pointer
- Null pointer
- Pointer and function
- Calling function by value and reference

## Array

- One dimensional arrays
- Declaration of 1D arrays
- Initialization of 1D arrays
- Accessing element of 1D arrays
- Reading and displaying elements
- Searching an element from array
    - Linear Search
    - Binary Search
- Sorting array elements
    - Bubble Sort
    - Insertion Sort
- Two dimensional arrays
- Declaration of 2D arrays
- Initialization of 2D arrays
- Accessing element of 2D arrays
- Reading and displaying elements
- Programming Examples

## Pointer and Array

- Pointer and one dimensional arrays
- Subscripting pointer variables
- Pointer to an array
- Array of pointers
- Programming Examples

## Array and Function

- 1D & 2D array and function
- Passing individual array elements to a function
- passing individual array elements address to a function
- passing whole 1d
- Programming Example

## Dynamic memory allocation

- malloc()
- calloc()
- realloc()
- free()

## Strings

- Character arrays
- Declaring and initializing strings
- string handling functions
- string pointers
- Programming Examples

## Command line arguments

- Introduction to command line arguments
- Programs using command line

## Preprocessor

- Introduction to preprocessor
- Macro expansions
- File inclusions
- The signification (#)and token passing operator
- ( ##) operators
- Programming Examples

## Structure

- Definition of structure and uses
- Declaration of Structure Variables
- Initialization of Structure Variables
- Accessing Structure Members
- Storage of Structures in Memory
- Size of Structures
- Pointers to structures
- Array of structures
- Nested structures
- Self-referential structures
- Programming Examples

## Structure and Function

- Passing structure member to a function
- Passing structure variable to a function

## Union and Enumeration and typedef

- Definition of unions
- Structures versus unions
- Working with unions
- Advantages of unions
- enum keyword
- typedef keyword
- Programming Examples

## File Handling

- Working with text files and Binary Files
- File operations using std. library and system calls
- File management I/O functions
- Programming Examples