

Certificate Course in C Programming

Course Duration: 2 Months

Course Overview

The **Certificate Course in C Programming** is designed to provide students with a solid foundation in the **C programming language**, one of the most fundamental and widely used programming languages in software development. The course focuses on **writing, debugging, and executing C programs**, covering basic to intermediate concepts. Learners will gain hands-on experience with **problem-solving techniques, data types, control structures, functions, arrays, pointers, and file handling**.

This course is ideal for **students, aspiring software developers, and IT enthusiasts** who want to start a career in programming or enhance their computational thinking skills.

Course Objectives

By the end of this course, learners will be able to:

1. Understand the **basic syntax, structure, and features of C language**.
 2. Develop skills to **write, debug, and execute C programs** efficiently.
 3. Apply **programming logic and problem-solving techniques**.
 4. Understand and implement **functions, arrays, pointers, and structures**.
 5. Gain practical knowledge of **file handling operations** in C.
 6. Prepare for advanced programming courses or software development projects.
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Course Outcomes

After completing this course, students will be able to:

1. Write syntactically correct C programs using **variables, operators, and control statements**.
2. Implement **decision-making and looping constructs** to solve programming problems.
3. Design and use **functions and modular programming** for code reusability.
4. Handle **arrays, strings, and pointers** effectively in programs.
5. Perform **file input/output operations** for data storage and retrieval.

6. Build a foundation for **advanced programming in C++, Java, or Python.**
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Course Syllabus (Module-Wise)

Module 1: Introduction to C Programming

- History and features of C
 - Structure of a C program
 - C Programming Environment Setup (IDE / Compiler)
 - Data Types, Variables, Constants
 - Operators (Arithmetic, Relational, Logical, Bitwise)
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Module 2: Control Statements

- Conditional Statements: if, if-else, nested if, switch
 - Looping Statements: for, while, do-while
 - break, continue, and goto statements
 - Practical exercises on control flow
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Module 3: Functions

- Definition and declaration of functions
 - Function parameters and return types
 - Call by value and call by reference
 - Recursion in C
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Module 4: Arrays & Strings

- One-dimensional and multi-dimensional arrays
 - Array manipulation and operations
 - Introduction to strings and string handling functions
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Module 5: Pointers

- Concept of pointers and memory addresses
 - Pointer arithmetic
 - Pointers and functions
 - Pointers with arrays and strings
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Module 6: Structures & Unions

- Defining and using structures
 - Nested structures
 - Unions and differences from structures
 - Typedef and enumerated data types
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Module 7: File Handling

- File operations: opening, reading, writing, closing files
 - Text vs Binary files
 - File functions (fopen, fclose, fprintf, fscanf, fread, fwrite)
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Module 8: Practical Project & Assessment

- Mini-projects integrating loops, arrays, functions, and file handling
 - Debugging and testing programs
 - Final assessment and certification
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☒ **Teaching Methodology:** 70% Hands-on Programming | 30% Theory

☒ **Outcome:** Students will have the ability to **write real-world C programs** and will be prepared for **advanced programming or software development**.