Certificate Course in C# (CCC#)

Course Overview

This course introduces learners to **C# programming language** and its applications in software development. C# is a powerful, modern, object-oriented language widely used for **desktop applications, web applications (ASP.NET), and game development (Unity)**. The course focuses on building a strong foundation in C# programming, covering syntax, control structures, OOP concepts, exception handling, file handling, collections, and basics of GUI applications.

Duration: 2 Months (Approx. 40 Sessions)
Prerequisites: Basic knowledge of programming (C/C++/Java) is recommended.

Course Objectives

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

1. Understand the **syntax and structure** of C#.
2. Apply **object-oriented programming concepts** using C#.
3. Work with **arrays, collections, and exception handling**.
4. Perform **file operations and database connectivity** in C#.
5. Build simple **console and Windows applications** using C#.

Course Outcomes

On successful completion, learners will:

- CO1: Demonstrate proficiency in writing and executing **C# programs**.
- CO2: Apply **control structures, functions, and classes** in solving problems.
- CO3: Implement **OOP concepts** such as inheritance, polymorphism, and encapsulation.
- CO4: Use **file handling, collections, and error handling** effectively.
- CO5: Design **basic Windows applications** in C#.

Course Syllabus

Module 1: Introduction to C# & .NET Framework

- Overview of C# and .NET Framework
- Features & Advantages of C#
- C# IDEs (Visual Studio / Visual Studio Code)
- Structure of a C# Program

Module 2: C# Basics

- Data Types, Variables, Operators, Expressions
- Input/Output in C#
- Type Conversion, Boxing & Unboxing

Module 3: Control Statements

- Conditional Statements (if, if-else, switch)
- Looping Constructs (for, while, do-while, foreach)
- Jump Statements (break, continue, goto, return)

Module 4: Methods & Arrays

- Defining & Calling Methods
- Parameter Passing (Value, Reference, out, ref)
- Arrays: Single & Multidimensional
- Strings and String Operations

Module 5: Object-Oriented Programming in C#

- Classes & Objects
- Constructors & Destructors
- Inheritance, Polymorphism, Encapsulation, Abstraction
- Interfaces & Abstract Classes

Module 6: Exception Handling & Collections

- Exception Handling (try, catch, finally, throw)
- Common Exception Classes
- Collections in C# (ArrayList, List, Dictionary, Stack, Queue)

Module 7: File Handling

- Reading & Writing Files
- Streams in C#
- Serialization & Deserialization

Module 8: GUI Programming (Basics)

- Introduction to Windows Forms / WPF
- Creating Simple GUI Applications
- Event Handling

Module 9: Database Connectivity (Intro)

- ADO.NET Basics
- Connecting C# with SQL Database
- Executing Queries

Module 10: Mini Project & Assessment

- Console-based Application (Student Database / Inventory System)
- Windows-based Simple Application

☑ **By the end of 2 months**, students will have:

- Strong programming foundation in **C#**.
- Ability to build **console and simple GUI applications**.
- Skills useful for **ASP.NET development, desktop apps, and game development (Unity)**.