

Certificate in C# .NET Programming

Course Overview

The **Certificate in C# .NET Programming** is a **3-month professional training program** designed to provide students with in-depth knowledge of **C# language and the .NET framework**. This course equips learners with skills to build **desktop applications, database-driven programs, and enterprise-level solutions** using **C# and .NET technologies**.

The program covers **C# fundamentals, object-oriented programming, exception handling, collections, file handling, Windows Forms, ADO.NET for database connectivity, and a mini-project**. By the end of the course, learners will be able to design, develop, and deploy **robust and scalable .NET applications**.

Duration: 3 Months (Approx. 60 Sessions)

Prerequisites: Basic knowledge of programming concepts (C/C++/Java) is helpful.

Course Objectives

By the end of this course, learners will:

1. Understand the **core features of C# language and the .NET architecture**.
 2. Gain practical skills in **writing, debugging, and executing C# programs**.
 3. Apply **object-oriented programming concepts** for reusable code development.
 4. Learn to use **collections, file handling, and exception handling**.
 5. Build **GUI applications** using Windows Forms.
 6. Connect applications to **databases using ADO.NET**.
 7. Work on a **hands-on mini project** integrating all learned skills.
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Course Outcomes

After successful completion, learners will be able to:

- CO1: Write efficient **C# console and Windows applications**.
- CO2: Apply **OOP principles** in real-world applications.
- CO3: Implement **data management, file handling, and error handling** in applications.
- CO4: Connect and manipulate data using **SQL databases with ADO.NET**.

- CO5: Build and deploy a **mini project** demonstrating complete application development skills.
 - CO6: Progress toward advanced learning in **ASP.NET, .NET Core, and enterprise application development**.
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Course Syllabus

Module 1: Introduction to C# and .NET Framework

- Overview of .NET architecture and CLR
- Features of C# language
- Setting up Visual Studio IDE
- Writing, compiling, and executing C# programs

Module 2: C# Fundamentals

- Data types, variables, constants, operators
- Type conversions, boxing and unboxing
- Input/output in C#
- Namespaces and assemblies

Module 3: Control Structures

- Conditional statements: if, if-else, switch
- Looping constructs: for, while, do-while, foreach
- Jump statements: break, continue, return

Module 4: Methods, Arrays, and Strings

- Defining and invoking methods
- Method overloading, recursion, parameter passing
- Arrays (1D, 2D, Jagged)
- String operations, StringBuilder class

Module 5: Object-Oriented Programming with C#

- Classes, objects, constructors, destructors
- Encapsulation, inheritance, polymorphism
- Abstract classes and interfaces

- Static members and operator overloading

Module 6: Exception Handling & Collections

- Exception handling: try, catch, finally, throw
- Built-in exception classes
- Collections: List, Dictionary, Queue, Stack
- Generics in C#

Module 7: File Handling

- File input/output using streams
- Reading/writing text and binary files
- Serialization and deserialization

Module 8: GUI Development with Windows Forms

- Introduction to Windows Forms
- Form controls: buttons, labels, textboxes, menus
- Event-driven programming in C#
- Creating simple desktop applications

Module 9: Database Connectivity with ADO.NET

- Introduction to ADO.NET architecture
- Establishing database connections (SQL Server/MySQL)
- Executing SQL queries from C#
- Performing CRUD operations (Create, Read, Update, Delete)

Module 10: Mini Project Development

- Design and implementation of a **Windows-based application** (e.g., Student Management System, Inventory Control, Library Management System)
- Integration of GUI + Database
- Project documentation and final evaluation

☒ This **3-Month Certificate in C# .NET Programming** is industry-oriented, preparing learners for roles such as **.NET Developer, Software Programmer, and Application Developer**.

