



TECHNOCATION FREELANCING TRAINING INSTITUTE & SOFTWARE HOUSE

Professional C# (C Sharp) Programming Course Outline

Module 1: Introduction to C# & .NET Framework

- Overview of C# & .NET Ecosystem
 - Installing & Setting Up Development Environment (Visual Studio, .NET SDK)
 - Writing & Running a Simple C# Program
 - Understanding CLR (Common Language Runtime) & C# Compilation
 - C# vs. Other Programming Languages
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Module 2: C# Basics & Syntax

- Data Types & Variables (`int`, `float`, `char`, `string`, `bool`)
 - Operators in C# (Arithmetic, Logical, Bitwise, Assignment)
 - Type Conversion & Casting
 - Nullable Types in C#
 - Console Input/Output (`Console.WriteLine()`, `Console.ReadLine()`)
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Module 3: Control Flow & Decision Making

- Conditional Statements (`if`, `else if`, `switch-case`)
 - Looping Constructs (`for`, `while`, `do-while`, `foreach`)
 - Using `break`, `continue`, and `goto`
 - Exception Handling (`try-catch-finally`, `throw`)
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Module 4: Object-Oriented Programming (OOP) in C#

- Classes & Objects (`class`, `new`, `this`)
 - Methods & Access Modifiers (`public`, `private`, `protected`, `internal`)
 - Constructors & Destructors
 - Encapsulation, Inheritance, Polymorphism, Abstraction
 - Interfaces vs. Abstract Classes
 - Static Classes & Members
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Module 5: Collections & Generics in C#

- Arrays & Lists (`List<T>`, `ArrayList`)
 - Dictionaries (`Dictionary<TKey, TValue>`)
 - Queues & Stacks
 - LINQ (Language-Integrated Query) Basics
 - Generics & Type Safety
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Module 6: Delegates, Events & Lambda Expressions

- Understanding Delegates (`delegate`, `Action<T>`, `Func<T, TResult>`)
 - Event Handling in C# (`event`, `EventHandler`)
 - Lambda Expressions & Anonymous Methods
 - Working with Async & Await in C#
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Module 7: File Handling & I/O Operations

- Working with Files & Streams (`File`, `StreamReader`, `StreamWriter`)
 - Reading & Writing Text & Binary Files
 - Serializing & Deserializing Data (`JSON`, `XML`)
 - Using `System.IO` for Directory & File Manipulation
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Module 8: Database Programming with C# & ADO.NET

- Introduction to ADO.NET & SQL Server
- Connecting to a Database (`SqlConnection`, `SqlCommand`)

- Executing Queries (SELECT, INSERT, UPDATE, DELETE)
 - Using Entity Framework for ORM
 - LINQ to SQL & LINQ to Entities
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Module 9: Developing Desktop Applications with WPF & WinForms

- Introduction to Windows Forms Applications
 - Designing UI with WPF & XAML
 - Handling User Input & Events
 - Working with Data Binding & MVVM Pattern
 - Creating CRUD Applications
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Module 10: Web Development with C# & ASP.NET Core

- Understanding Web Development with C#
 - Creating Web Applications with ASP.NET Core
 - MVC Architecture (Models, Views, Controllers)
 - Authentication & Authorization in ASP.NET
 - Consuming & Creating RESTful APIs with C#
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Module 11: Game Development with C# & Unity

- Introduction to Unity & C# for Game Development
 - Understanding Game Objects & Components
 - Physics & Animation in Unity
 - Scripting Player Controls in C#
 - Building & Deploying a Simple Game
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Module 12: Working with APIs & Web Services

- Calling RESTful APIs in C#
- Working with `HttpClient` for HTTP Requests
- Handling JSON & XML Data (`Newtonsoft.Json`)
- Creating Web Services with C# (SOAP & REST)

Module 13: Advanced C# Topics

- Multithreading & Parallel Programming (Thread, Task, async/await)
- Memory Management & Garbage Collection in C#
- Dependency Injection & Design Patterns
- Testing & Debugging C# Applications (Unit Testing with NUnit)
- Performance Optimization Techniques

Module 14: Real-World Projects & Deployment

- Building a Desktop Application (To-Do List, Inventory Management System)
- Creating a Web Application with ASP.NET Core
- Developing a C# API for an E-Commerce Platform
- Game Development Project (Basic 2D or 3D Game)
- Deploying C# Applications (Azure, IIS, Docker)