

C# Programming Course Outline

Duration: 40–50 Hours

Level: Beginner to Intermediate

Delivery Mode: Online/Offline

Tools Used: Visual Studio, .NET Framework, .NET Core, C# Compiler

Module 1: Introduction to C#

- What is C# and its Features
 - History and Evolution of C#
 - Setting Up the C# Development Environment (Visual Studio)
 - Writing and Running Your First C# Program
 - Understanding the C# Compiler and .NET Framework
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Module 2: C# Basics

- Variables and Data Types in C#
 - Basic Operators: Arithmetic, Relational, Logical
 - Data Type Conversion and Type Casting
 - Constants and Enumerations
 - User Input and Output using `Console.ReadLine()` and `Console.WriteLine()`
 - Comments and Code Readability
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Module 3: Control Flow in C#

- Conditional Statements: `if`, `if-else`, `switch-case`
 - Looping Structures: `for`, `while`, `do-while`
 - Jumping Statements: `break`, `continue`, `goto`
 - Nested Loops and Conditional Statements
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Module 4: Functions and Methods

- Defining and Calling Functions in C#
- Parameters, Return Types, and Method Overloading

- Variable Scope: Local and Global Variables
 - Recursion in C#
 - Lambda Expressions and Anonymous Methods
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Module 5: Arrays and Collections

- One-Dimensional and Multi-Dimensional Arrays
 - Array Operations: Sorting, Searching, Iteration
 - Collections in C#: List, Dictionary, Queue, Stack, HashSet
 - LINQ (Language Integrated Query) Basics
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Module 6: Object-Oriented Programming (OOP) Concepts

- Classes and Objects
 - Constructors and Destructors
 - Encapsulation, Abstraction, and Polymorphism
 - Inheritance and Interfaces
 - Method Overloading and Overriding
 - Static vs Instance Members
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Module 7: Exception Handling in C#

- Types of Exceptions in C#
 - try, catch, finally Blocks
 - Throwing and Catching Exceptions
 - Custom Exception Handling
 - Handling Multiple Exceptions
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Module 8: Working with Files

- File I/O in C#: Reading and Writing Files
- Working with Streams and StreamReader/StreamWriter
- File and Directory Management
- File Handling Errors and Exceptions
- Serialization and Deserialization

Module 9: Introduction to Multithreading and Parallel Programming

- Basics of Multithreading in C#
- Creating and Managing Threads
- Synchronization and Locks in Multithreaded Programs
- Parallel Programming with `Parallel Class` and `Task`
- Using Asynchronous Programming (`async` and `await`)

Module 10: Working with Databases in C#

- Introduction to ADO.NET
- Connecting to Databases (SQL Server, MySQL)
- Executing Queries and Commands in C#
- CRUD Operations (Create, Read, Update, Delete)
- Using `DataReader` and `DataSet`

Module 11: Windows Forms and Web Applications (Optional)

- Introduction to Windows Forms Applications
- Event Handling and Controls in Windows Forms
- Creating Web Applications with ASP.NET Core
- Web APIs in C# (Building and Consuming APIs)
- MVC Architecture in ASP.NET Core

Module 12: Final Project and Assessment

- Develop a Real-Life C# Application (e.g., Inventory System, Task Manager, Online Shop)
- Code Review, Debugging, and Optimization
- Final Exam and Viva
- Certification from BACT IT Institute of Bangladesh