

# **C#**

## **SYLLABUS**

### **Module 1: Introduction to C#**

- What is C# and .NET Framework
- Features of C#
- Installing Visual Studio
- Structure of a C# Program
- Compilation & Execution
- Understanding CLR (Common Language Runtime)

### **Module 2: Data Types & Variables**

- Value Types vs Reference Types
- Variables and Constants
- Data Types (int, float, double, char, string, bool)
- Type Casting
- Nullable Types

### **Module 3: Operators & Expressions**

- Arithmetic Operators
- Relational Operators
- Logical Operators
- Assignment Operators
- Bitwise Operators
- Operator Precedence

### **Module 4: Control Statements**

- if, if-else, nested if
- switch-case
- Conditional (ternary) operator

- Decision-making programs

## **Module 5: Loops**

- for loop
- while loop
- do-while loop
- foreach loop
- break and continue

## **Module 6: Methods (Functions)**

- Method Declaration & Definition
- Parameters (ref, out)
- Method Overloading
- Recursion
- Static Methods

## **Module 7: Arrays & Strings**

- Single-dimensional Arrays
- Multi-dimensional Arrays
- Jagged Arrays
- String Class and Methods
- StringBuilder

## **Module 8: Object-Oriented Programming (OOP)**

- Classes and Objects
- Constructors & Destructors
- Access Modifiers
- Properties (get/set)
- Encapsulation

## **Module 9: Advanced OOP Concepts**

- Inheritance
- Polymorphism (Overloading & Overriding)
- Abstract Classes
- Interfaces
- Sealed Classes

## **Module 10: Exception Handling**

- try, catch, finally
- Throwing Exceptions
- Custom Exceptions
- Error Handling Best Practices

## **Module 11: Collections & Generics**

- ArrayList
- List, Dictionary, Queue, Stack
- Generics
- Iterators

## **Module 12: File Handling**

- Reading & Writing Files
- StreamReader & StreamWriter
- File and Directory operations

## **Module 13: LINQ (Language Integrated Query)**

- Introduction to LINQ
- LINQ Queries
- Filtering, Sorting, Grouping
- Working with Collections

## **Module 14: Windows Forms / GUI Development**

- Introduction to Windows Forms
- Designing UI (Buttons, TextBox, Labels)
- Event Handling
- Form Navigation

## **Module 15: Introduction to ASP.NET**

- Basics of ASP.NET
- MVC Architecture
- Creating Web Applications
- Routing & Controllers

## **Module 16: Database Connectivity**

- ADO.NET Basics
- Connecting to SQL Server
- CRUD Operations
- Data Binding

## **Module 17: Advanced Topics**

- Delegates & Events
- Lambda Expressions
- Async & Await
- Multithreading Basics

## **Module 18: Mini Projects**

- Calculator Application
- Student Management System
- Windows Form Application
- Basic Web Application