

Microsoft .NET Syllabus

Introduction to .NET Framework

- ✓ Overview of the .NET ecosystem
 - Evolution of .NET: .NET Framework, .NET Core, and .NET 5/6/7
 - Cross-platform capabilities
 - Use cases: Web, desktop, mobile, and cloud applications
- ✓ .NET architecture and key components
 - Common Language Runtime (CLR)
 - Base Class Library (BCL)
 - Garbage collection and memory management
- ✓ Supported languages: C#, F#, and VB.NET

Setting Up the Development Environment

- ✓ Installing Visual Studio and Visual Studio Code
- ✓ .NET CLI (Command Line Interface) basics
- ✓ Project structure and configurations
- ✓ Debugging tools and techniques in .NET

C# Programming Language

- ✓ **C# syntax and fundamentals**
 - Data types, variables, and operators
 - Control structures (if, switch, loops)
 - Arrays and collections (List, Dictionary, HashSet)
- ✓ **Object-Oriented Programming (OOP)**
 - Classes, objects, and methods
 - Inheritance, polymorphism, encapsulation, and abstraction
 - Interfaces and abstract classes
- ✓ **Advanced C# concepts**
 - Delegates, events, and lambda expressions
 - LINQ (Language Integrated Query)
 - Asynchronous programming with async/await
 - Exception handling and debugging

.NET Framework Basics

- ✓ .NET project types (console, library, and web projects)
- ✓ Assemblies and the Global Assembly Cache (GAC)
- ✓ Application domains
- ✓ Configuration files (App.config and Web.config)

Working with Data

- ✓ **ADO.NET basics**
 - Connecting to databases (SQL Server, MySQL, etc.)
 - Performing CRUD operations
 - Using DataSet, DataReader, and DataAdapter
- ✓ **Entity Framework (EF) and EF Core**
 - Code-first and database-first approaches
 - LINQ to Entities
 - Migrations and database management
- ✓ **Working with JSON and XML**
 - Serialization and deserialization
 - Reading and writing JSON/XML files

Developing Web Applications with ASP.NET

ASP.NET MVC

- ✓ MVC architecture overview
 - Models, Views, and Controllers
- ✓ Routing and URL patterns
- ✓ Razor view engine and syntax
- ✓ State management: Sessions, cookies, and query strings

ASP.NET Core

- ✓ **Introduction to ASP.NET Core**
 - Middleware and pipeline
 - Dependency injection
- ✓ **Building RESTful APIs with ASP.NET Core**
 - Routing and controllers

- Authentication and authorization (JWT, OAuth)
- ✓ **Razor Pages in ASP.NET Core**
- ✓ **Blazor for interactive web UI**
 - Server-side Blazor
 - Blazor WebAssembly

Desktop Application Development

Windows Forms

- ✓ Creating basic forms and controls
- ✓ Handling user input and events
- ✓ Working with menus, toolbars, and dialogs

WPF (Windows Presentation Foundation)

- ✓ XAML for UI design
- ✓ Data binding and MVVM architecture
- ✓ Animations and styling
- ✓ Working with user controls and custom controls

.NET MAUI (for cross-platform apps)

- Building cross-platform UI
- Handling device-specific features

Advanced .NET Topics

- ✓ Dependency Injection (DI) and Inversion of Control (IoC)
- ✓ Unit Testing with MSTest, NUnit, and xUnit
- ✓ Advanced LINQ queries
- ✓ Reflection and dynamic programming
- ✓ Building reusable libraries and NuGet packages

Cloud Development with .NET

- ✓ Overview of Azure for .NET developers
- ✓ Hosting applications in Azure App Service
- ✓ Working with Azure Functions
- ✓ Using Azure Blob Storage and Cosmos DB
- ✓ Implementing SignalR for real-time communication

Security in .NET Applications

- ✓ Secure coding practices
- ✓ Protecting sensitive data using encryption
- ✓ Implementing authentication and authorization
 - Identity Framework
 - OAuth2 and OpenID Connect
- ✓ Cross-Site Scripting (XSS) and SQL Injection prevention

Performance Optimization

- ✓ Profiling and debugging tools
 - dotnet-trace and PerfView
- ✓ Caching strategies
- ✓ Optimizing database queries and Entity Framework usage
- ✓ Asynchronous programming for better scalability