

C# and ASP.NET Core Training



1. Foundations of C# and ASP.NET Core

➡ Introduction to C# :

- Basics: Syntax, Data Types, Variables, and Constants
- Control Structures: Loops, Conditionals
- Object-Oriented Programming:
 - Classes and Objects
 - Inheritance, Polymorphism, Abstraction, and Encapsulation
- LINQ and Collections
- Exception Handling
- Asynchronous Programming with `async` and `await`

➡ Getting Started with ASP.NET Core :

- Overview of .NET Core and .NET 6/7 Framework
- Setting up the Development Environment (VS Code, Visual Studio, CLI)
- Understanding Middleware and Request Pipeline
- Dependency Injection (DI) in ASP.NET Core

2. Building Web APIs with ASP.NET Core

➡ Creating a Web API Project :

- REST Principles and Best Practices
- Configuring Routing and Endpoints
- Handling HTTP Methods: GET, POST, PUT, DELETE

➡ Advanced API Concepts:

- Model Binding and Validation
- Error Handling and Logging
- Securing APIs with:
 - JWT Authentication and Authorization
 - Role-Based Security
- API Versioning
- Rate Limiting and Caching
- Swagger/OpenAPI Documentation

➡ **Data Management :**

- Working with Entity Framework Core (Code-First and Database-First Approaches)
- Implementing CRUD Operations with EF Core
- LINQ Queries and Relationships (One-to-One, One-to-Many)

3. Building MVC Applications with ASP.NET Core

➡ **MVC Architecture :**

- Model-View-Controller Pattern
- Creating Controllers and Actions
- Views and Razor Syntax
- Model Binding and Validation

➡ **State Management :**

- Session, Cookies, and TempData
- View Components and Partial Views

➡ **Advanced MVC Topics :**

- Filters (Action, Authorization, and Exception Filters)
- Custom Tag Helpers
- Localization and Globalization

➡ **Deploying MVC Applications :**

- Publishing to IIS, Docker, or Azure

4. React Basics and Integration

➡ **React Essentials :**

- Setting up a React Project (with Create React App or Vite)
- Components (Functional and Class Components)
- Props and State
- React Hooks: `useState`, `useEffect`, `useContext`, etc.
- React Router for Navigation
- State Management with Context API or Redux

➡ Working with APIs :

- Fetching Data with `fetch` or Axios
- Handling API Errors
- Form Handling and Validation

5. Full-Stack Integration: ASP.NET Core and React

➡ Integration Techniques:

- Using ASP.NET Core as a Backend for React
- Enabling CORS in ASP.NET Core
- Connecting React Frontend to ASP.NET Core API
- Handling Authentication with JWT in React

➡ Advanced Features :

- Real-Time Communication using SignalR
- File Uploads and Downloads
- Implementing Role-Based Frontend Access Control

6. Deployment and Optimization

➡ Deployment Strategies:

- Hosting ASP.NET Core and React App on IIS or Nginx
- Deploying to Azure, AWS, or Heroku
- Using Docker for Containerization

➡ Performance Optimization:

- Optimizing API Performance (Caching, Async Operations)
- Bundling and Minification in React
- Lazy Loading Components and Code Splitting

7. Projects and Assignments

➡ Simple CRUD Application:

- Build a basic API with ASP.NET Core for managing data (e.g., Todo List).
- Create a React frontend to consume the API.

➡ E-commerce Application:

- Features: Product Management, User Authentication, and Payment Integration
- Backend: ASP.NET Core API
- Frontend: React with Redux or Context API

➡ Real-Time Chat Application:

- Use SignalR for real-time messaging.
- Secure the API with JWT.

8. Interview Preparation

- Mock Interviews and Problem Solving
- Common Interview Questions on C#, ASP.NET Core, MVC, Web API, and React
- Live Debugging and Code Optimization Exercises

