

Day 1: Introduction to React and .NET 8

Lecture:

- Overview of Full Stack Development
- Understanding React and .NET 8
- Setting up the Development Environment (Node.js, .NET SDK, VS Code/Visual Studio)
- Introduction to TypeScript for React
- Overview of REST APIs and MVC architecture in .NET 8

Lab:

- Install Node.js, .NET 8 SDK, and required dependencies
 - Create a simple React app using Vite or Create React App
 - Set up a .NET 8 Web API project
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Day 2: React Basics and State Management

Lecture:

- JSX and Components in React
- Props and State in React
- React Hooks: useState, useEffect
- Component Lifecycle
- Basic State Management with Context API

Lab:

- Create functional components in React
 - Implement state management with hooks
 - Build a simple counter app using useState and useEffect
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Day 3: .NET 8 Web API Fundamentals

Lecture:

- Understanding .NET 8 Minimal APIs
- Dependency Injection in .NET
- Controllers vs Minimal APIs
- Working with EF Core and Database Connections
- CRUD Operations in .NET 8

Lab:

- Set up Entity Framework Core with SQLite/PostgreSQL
 - Create a Minimal API with GET, POST, PUT, DELETE endpoints
 - Test APIs using Postman or Swagger
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Day 4: Connecting React with .NET 8 API**Lecture:**

- Fetching Data from .NET API in React
- Using Fetch API & Axios
- Handling Async Operations and Errors
- CORS and Cross-Origin Communication

Lab:

- Consume the .NET API in a React app
 - Display data using React state and hooks
 - Implement error handling for API calls
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Day 5: Advanced React Concepts**Lecture:**

- React Router for Navigation
- Forms and Form Handling in React
- Validation with React Hook Form
- Optimizing Performance with React.memo and useCallback

Lab:

- Implement a multi-page app using React Router
 - Create a form with validation for user input
 - Optimize components using React.memo
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Day 6: Authentication & Authorization**Lecture:**

- Introduction to JWT Authentication
- Securing APIs with Authentication & Authorization in .NET 8

- Implementing User Login & Registration in React
- Using React Context for Authentication State

Lab:

- Implement JWT-based authentication in .NET 8
 - Secure API endpoints with authentication
 - Create login and registration UI in React
 - Store and manage authentication tokens
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Day 7: Full Stack CRUD Application

Lecture:

- Creating a Full Stack CRUD app (React + .NET 8)
- Managing State with Redux Toolkit (Optional)
- Optimizing API Calls with React Query

Lab:

- Implement a full CRUD app (Users/Products Management)
 - Use Redux Toolkit or React Context for state management
 - Optimize API interactions with React Query
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Day 8: Deployment & Testing

Lecture:

- Unit Testing in .NET 8 with xUnit
- Testing React Components with Jest & React Testing Library
- CI/CD Basics for React & .NET Apps

Lab:

- Write and run unit tests in .NET and React
 - Deploy the React app and .NET API to cloud platforms
 - Set up CI/CD pipeline using GitHub Actions
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Day 9: Real-Time Features & Advanced Topics

Lecture:

- WebSockets with SignalR for Real-Time Communication

- Implementing Background Jobs with Hangfire
- Optimizing Performance in React and .NET 8

Lab:

- Implement a real-time notification system with SignalR
 - Optimize API performance using caching techniques
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Day 10: Capstone Project

Lecture:

- Project Planning & Architecture
- Best Practices for Scalable Full Stack Applications
- Code Review & Deployment Strategies

Lab:

- Build and present a final project (e.g., Task Management App)
- Implement best practices for security and performance