

Modern C# Development with .NET 10 and AI

5-Day Training Agenda

Day 1 – C# Fundamentals & Development Environment

Goal: Build a solid foundation in C# and become productive with Visual Studio and AI tools.

Module 1: Introduction

- What is C#
- C# and .NET
- Installing Visual Studio
- Creating the first application

Lab

- Hello World

Module 2: C# Fundamentals

- Variables & Data Types
- Operators & Expressions
- Control Flow
- Arrays
- Methods & Parameters
- Namespaces

Lab

- Console-based Calculator

Module 3: AI Assisted Development

- IntelliSense
- GitHub Copilot / Claude Code
- Prompt Engineering for Developers
- Reviewing AI Generated Code

Lab

- Build the same application manually and with AI, then compare.

Day 2 – Object-Oriented Programming

Module 4: Classes & Objects

- Classes

- Objects
- Fields & Methods
- Encapsulation
- Access Modifiers
- Namespaces

Lab

- Student Management System

Module 5: Constructors & Static Members

- Constructors
- Constructor Overloading
- Constructor Chaining
- Static Fields
- Static Methods
- Static Classes

Lab

- Car Factory

Module 6: Application Structure

- Solutions
- Projects
- Assemblies
- Runtime vs Design Time
- .NET Runtime Overview

Day 3 – Advanced OOP & C# Types

Module 7: Inheritance & Polymorphism

- Inheritance
- Protected Members
- Overriding
- Base Keyword
- Object Class
- ToString()

- Equals()
- GetHashCode()

Lab

- Employee Hierarchy

Module 8: Abstraction

- Abstract Classes
- Interfaces
- Interface Implementation
- Common .NET Interfaces

Lab

- Payment Gateway

Module 9: Types in .NET

- Value Types
- Reference Types
- Records
- Structs
- Enums
- Boxing & Unboxing
- Type Inference
- Passing Parameters

Lab

- Employee Record System

Day 4 – Modern C# Features

Module 10: Exception Handling

- try/catch/finally
- Custom Exceptions
- Exception Best Practices

Module 11: Generics

- Generic Collections
- Generic Classes

- Generic Methods
- Constraints

Lab

- Generic Repository

Module 12: Delegates & Lambda Expressions

- Delegates
- Multicast Delegates
- Anonymous Methods
- Lambda Expressions
- Action
- Func

Lab

- Event Driven Calculator

Module 13: LINQ

- Extension Methods
- Where
- Select
- GroupBy
- OrderBy
- Deferred Execution

Lab

- Product Inventory using LINQ

Day 5 – Asynchronous Programming, .NET Ecosystem & AI

Module 14: Async Programming

- Async/Await
- Task
- Best Practices
- Performance Considerations

Lab

- Download Manager

Module 15: The .NET Platform

- CLR
- IL
- NuGet
- .NET Languages
- EF Core Overview

Lab

- Simple Web API with EF Core

Module 16: AI Developer Workflow

- Writing Code with AI
- Documentation Generation
- Codebase Navigation
- Detecting Hallucinations
- AI Best Practices
- Future of Software Development

Final Capstone Lab

Develop a small **Employee Management Console Application** that demonstrates:

- Classes & Objects
- Constructors
- Inheritance
- Interfaces
- Exception Handling
- Generics
- LINQ
- Async/Await
- AI-assisted development
- GitHub Copilot/Claude Code review