C# The programming language Intermediate Training

Duration: **2 Day**

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C# The Programming Language Intermediate is an intermediate-level course designed for developers who already have a solid understanding of C# and want to expand their skills by mastering advanced language features and modern .NET development techniques.

The programme explores advanced object-oriented programming concepts including inheritance, abstract classes, interfaces, delegates, lambda expressions, LINQ, and Entity Framework. Participants will learn how these features can be applied to build scalable, maintainable, and well-structured .NET applications using real-world development scenarios.

In addition to advanced language features, the course covers database connectivity, file handling, data collections, and exception management. Practical exercises using console applications, class libraries, unit testing projects, and the Entity Framework Database-First approach provide participants with hands-on experience that can be applied immediately in professional software development.

Instructor-led presentations are combined with demonstrations and practical laboratories to reinforce learning and help participants confidently apply advanced C# techniques in production environments.

Prerequisites

Participants are recommended to have:

- C# knowledge equivalent to the **C# Fundamentals** course.
- An understanding of methods, properties, and constructors.
- Familiarity with object-oriented programming concepts including abstraction and encapsulation.
- Basic experience using Visual Studio or a similar development environment.

Who Should Attend

This course is designed for:

- Software developers with existing C# programming experience.
- .NET Framework and .NET application developers.
- Programmers looking to improve application maintainability and scalability through advanced C# techniques.
- Professional developers working on enterprise .NET solutions.

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What You Will Learn

Upon successful completion of this course, participants will be able to:

- Create derived classes based on custom or .NET base classes.
- Apply polymorphism using abstract classes and interfaces.
- Implement and use delegates, including the built-in delegate types provided by .NET.
- Write cleaner and more maintainable code using lambda expressions.
- Connect to relational databases using the Entity Framework Database-First approach.
- Query, filter, and manipulate data efficiently using LINQ.
- Implement effective exception handling techniques to build reliable applications.
- Work confidently with collections, data structures, and file operations in .NET applications.

Training Outline

Module 1 - Reviewing Object-Oriented Programming Principles

- Revisiting the core principles of object-oriented programming
- Reviewing abstraction, encapsulation, inheritance, and polymorphism
- Working with classes, objects, and the **this** keyword
- Handling null references
- Applying object-oriented design best practices

Module 2 - Inheritance and Abstract Classes

- Creating derived classes
- Implementing inheritance
- Using virtual and override members
- Calling base class functionality
- Designing and implementing abstract classes
- Applying up-casting, down-casting, and the **is/as** operators

Module 3 - Working with Interfaces

- Defining and implementing interfaces
- Applying interface-based design principles
- Achieving polymorphism through interfaces
- Implementing multiple interfaces
- Building flexible and extensible application architectures

Module 4 - Delegates and Lambda Expressions

- Understanding delegates and their purpose
- Using built-in delegate types including Func, Action, and Predicate
- Creating and applying lambda expressions
- Combining delegates and lambda expressions in real-world scenarios
- Writing cleaner and more maintainable code

Module 5 - Database Access with Entity Framework

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- Understanding Object Relational Mapping (ORM)
- Comparing Database-First and Code-First approaches
- Creating Entity Framework models
- Configuring connection strings and DbContext
- Querying and updating data
- Using LINQ within Entity Framework
- Managing configuration with appsettings.json
- Understanding IEnumerable and IQueryable

Module 6 - Language Integrated Query (LINQ)

- LINQ syntax and query fundamentals
- Data querying techniques
- Projections and data transformations
- Deferred versus Immediate Execution
- Joins and Group Joins
- Using the let clause and OfType method
- LINQ performance and recommended practices

Module 7 - Exception Handling

- Using try, catch, finally, and throw
- Understanding exception execution flow
- Throwing and rethrowing exceptions
- Creating custom exception classes
- Implementing effective exception handling strategies for reliable applications