C# The programming language Fundamentals Training

Duration: **3 Day**

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C# The Programming Language Fundamentals is an introductory course designed for learners who are new to C# and want to build a solid foundation in modern .NET application development. The programme provides the essential programming knowledge required to develop reliable and maintainable applications using both the .NET Framework and modern .NET platforms.

Throughout the course, participants will learn the core features of the C# language, including syntax, variables, data types, operators, control structures, and methods. They will also be introduced to fundamental object-oriented programming concepts such as classes, objects, constructors, and properties through practical coding exercises.

The programme includes hands-on development of console applications, class libraries, and an introduction to unit testing, providing an excellent foundation for more advanced C# development. Instructor-led presentations are supported by demonstrations and practical labs to help learners confidently apply their knowledge in real development environments.

Prerequisites

Participants are recommended to have:

- Basic programming knowledge equivalent to the **Programming Foundations** course.
- Familiarity with Visual Studio or another Integrated Development Environment (IDE) or code editor (recommended but not essential).

No previous experience with C# or object-oriented programming is required.

Who Should Attend

This course is designed for:

- Developers who are new to the C# programming language.
- Software professionals transitioning to the .NET platform from another programming language.
- Learners preparing to progress to **C# Intermediate** level training.
- Individuals beginning a career in .NET software development.

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What You Will Learn

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

- Develop C# applications using sequence, selection, and iteration programming constructs.
- Declare and manage variables, data types, and operators effectively.
- Create classes, structures, fields, properties, and methods.
- Apply access modifiers including private, internal, protected, and public appropriately.
- Work with generic types and collection classes such as List<T> and Dictionary<TKey, TValue>.
- Use lambda expressions to write cleaner and more maintainable code.
- Understand the principles of unit testing and apply the Arrange – Act – Assert methodology.
- Apply fundamental object-oriented programming concepts including abstraction and encapsulation.

Training Outline

Module 1 - Introduction to C# and .NET

- Fundamentals of the C# programming language
- Understanding the .NET Framework and modern .NET platforms
- Compilation, the Common Language Runtime (CLR), and the Common Type System (CTS)
- Using Top-Level Statements
- Working with namespaces and using directives
- Navigating Visual Studio
- Basic debugging techniques

Module 2 - Working with Variables and Data Types

- Comments and identifiers
- Declaring variables
- Built-in data types
- Working with strings
- Value types versus reference types
- Scope and access modifiers
- Operators
- Parsing and type casting

Module 3 - Creating and Using Methods

- Code blocks and C# syntax
- Defining and calling methods
- Parameters and return values
- Method overloading
- Expression-bodied methods
- Writing reusable code

Module 4 - Flow Control

- Using if statements
- Switch statements and switch expressions

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- Applying the ternary conditional operator
- Managing application flow

Module 5 - Arrays, Loops, and Collections

- Working with arrays
- for, foreach, while, and do-while loops
- Generic collections
- Using List<T> and Dictionary<TKey, TValue>
- Collection operations and data management

Module 6 - Introduction to Unit Testing

- Fundamentals of unit testing
- Benefits of automated testing
- The Green–Red development cycle
- Arrange – Act – Assert methodology
- Test-driven development principles

Module 7 - Object-Oriented Programming Fundamentals

- Introduction to object-oriented programming
- Abstraction
- Encapsulation
- Classes and objects
- Value type versus reference type behavior
- Handling null references

Module 8 - Methods, Properties, and Constructors

- Static versus instance methods
- Working with properties
- Backing fields
- Auto-implemented properties
- Calculated properties
- Creating and using constructors
- Object initializers
- Using the **this** keyword