

## Fundamentals of C# / .NET

**Level:** beginner

**Length:** 35 hours

**Course Objective:** a solid introduction of the C# programming language and its ecosystem .NET platform

### What You Will Learn

- How the programs are organized, development cycle of writing software, using an integrated development environment (IDE)
- Code structure: data structures, control structures, fundamental, primitives types
- C# support for object oriented programming (OOP): data abstraction, relations between types, polymorphism, generic programming
- Basics regarding .NET framework
- Exercise OOP paradigm
- Enhance soft skills: communication, team work, presentation

**Who Can Attend:** programmers who want to learn the fundamentals of C# and .NET framework

### Prerequisites

- Fundamentals of programming (data structures, flow control, interaction with the host platform)
- It is helpful the knowledge of another object oriented language like Java or C++, the basics of object oriented programming

**Required Facilities:** VGA projector, white board, workstation, a version of Microsoft Visual Studio

**Related Courses:** Object oriented analysis and design, Design Patterns, Advanced C# / .NET Topics, specialized courses related to .NET – Windows Forms, WPF, ASP .NET, ASP .NET MVC

### Description

This course is designed to enter .NET programming by using C#, the main language for programming any specific technology built into the .NET platform. The language constructs are presented and exercised with focus on the support the language offers to the object oriented paradigm of solving the problems. Even the main goal is the C# programming language, there are covered .NET related issues due to the intimate bond between the language and the underlying platform.

Besides the language there are presented the main class packages.

The theory is illustrated by examples and it is exercised by solving practical problems.

This course is the foundation for more specialized courses related to the .NET technologies: Windows Forms, Windows Presentation Foundation (WPF), Active Server Pages (ASP .NET), etc.

**Note:** the course is personalized on the attendees' profile, their expertise and experience

### **Contents**

1. .NET Architecture – relation between C# and .NET, CLR – Common Language Runtime, Assemblies, framework .NET classes, namespaces, use of C# in enterprise applications
2. Introduction to C#, basics – variables, predefined types, program control, enumerations, arrays, use of namespaces, compilation, console input/output, preprocessor directives
3. Types and objects – classes and structs, class members, anonymous types, partial classes, static classes, Object class, extending the classes – extension methods
4. Inheritance – types of inheritance, implementation inheritance, virtual methods, methods hiding, abstract classes and abstract methods, sealed classes and methods, constructors, modifiers, interfaces
5. Arrays – simple arrays, multidimensional arrays, jagged arrays, Array class, array and collection interfaces, enumerations, IEnumerator, foreach, yield
6. Operators and casts – checked, unchecked, is, as, typeof, nullable types, type conversions, boxing and unboxing, comparing objects for equality, operator overloading, user defined casts
7. Delegates and events – declaring, using, multicast delegates, anonymous methods, Lambda expressions, use of events
8. Strings – System.String, StringBuilder, formatting strings
9. Generics – performance, type safety, creating, default values, constraints, inheritance, static members, generic interfaces, generic methods, generic delegates
10. Collections – collection interfaces and types, lists, queues, stacks, sorted lists, dictionaries, hashset, bit arrays
11. Exception handling – exception classes, catching exceptions, user defined exception classes
12. Basics of programming with threads
13. Manipulating files – files and directories, operations