

**Introduction to C#**

**Course Number:** CSHP-212  
**Duration:** 5 days

**Overview**

This Introduction to C# training course teaches attendees how C# works with the .NET Framework and includes an introduction to major classes for collections, delegates, and events. Attendees also learn how to use newer language features.

**Note:** The recommended IDE for this C# training course is Visual Studio 2022, but the course can also be taught using Visual Studio 2017, Visual Studio for Mac, or VS Code upon request.

**Prerequisites**

All students should have prior programming experience in a modern programming language.  If your students will have no prior modern programming experience, please let us know and we will tailor this course to their needs.

**Materials**

All C# training students receive comprehensive courseware.

**Software Needed on Each Student PC**

* Windows 10 or later with at least 8GB RAM
* Visual Studio 2022 or later
* Related lab files that Accelebrate will provide

**Objectives**

* Acquire a working knowledge of C# programming
* Learn how to implement programs using C# and classes from the .NET Framework
* Gain an understanding of the object-oriented programming paradigm
* Learn how to implement simple GUI programs using Windows Forms
* Gain a working knowledge of important newer features in C#

**Outline**

* Introduction to .NET
  + What is .NET?
  + .NET Framework, .NET Core, and .NET 5.0
  + Application Models
  + Managed Code
  + Visual Studio 2019
  + C# Console and GUI Programs
* First C# Programs
  + Hello, World
  + Namespaces
  + Variables and Expressions
  + Using C# as a Calculator
  + Input/Output in C#
  + .NET Framework Class Library
* Data Types in C#
  + Data Types
  + Integer Types
  + Floating Point Types
  + Decimal Type
  + Characters and Strings
  + Boolean Type
  + Conversions
  + Nullable Types
* Operators and Expressions
  + Operator Cardinality
  + Arithmetic Operators
  + Relational Operators
  + Logical Operators
  + Bitwise Operators
  + Assignment Operators
  + Expressions
  + Checked and Unchecked
* Control Structures
  + If Tests
  + Loops
  + Arrays
  + Foreach
  + More about Control Flow
  + Switch
* Object-Oriented Programming
  + Objects
  + Classes
  + Inheritance
  + Polymorphism
  + Object-Oriented Languages
  + Components
* Classes
  + Classes as Structured Data
  + Methods
  + Constructors and Initialization
  + Static Fields and Methods
  + Constant and Readonly
* More about Types
  + Overview of Types in C#
  + Value Types
  + Boxing and Unboxing
  + Reference Types
  + Implicitly Typed Variables
* Methods, Properties, and Operators
  + Methods
  + Parameter Passing
  + Method Overloading
  + Variable-Length Parameter Lists
  + Properties
  + Auto-Implemented Properties
  + Operator Overloading
* Characters and Strings
  + Characters
  + Strings
  + String Input
  + String Methods
  + StringBuilder Class
  + Programming with Strings
* Arrays and Indexers
  + Arrays
  + System.Array
  + Random Number Generation
  + Jagged Arrays
  + Rectangular Arrays
  + Arrays as Collections
  + Bank Case Study—Step 1
  + Indexers
* Inheritance
  + Single Inheritance
  + Access Control
  + Method Hiding
  + Initialization
  + Bank Case Study—Step 2
* Virtual Methods and Polymorphism
  + Virtual Methods and Dynamic Binding
  + Method Overriding
  + Fragile Base Class Problem
  + Polymorphism
  + Abstract Classes
  + Sealed Classes
  + Heterogeneous Collections
  + Bank Case Study—Step 3
* Formatting and Conversion
  + ToString
  + Format Strings
  + String Formatting Methods
  + Bank Case Study—Step 4
  + Type Conversions
* Exceptions
  + Exception Fundamentals
  + Structured Exception Handling
  + User-Defined Exception Classes
  + Inner Exceptions
  + Bank Case Study—Step 5
  + 16. Interfaces
  + Interface Fundamentals
  + Programming with Interfaces
  + Using Interfaces at Runtime
  + Bank Case Study—Step 6
  + Resolving Ambiguities
* .NET Interfaces and Collections
  + Collections
  + Bank Case Study—Step 7
  + IEnumerable and IEnumerator
  + Copy Semantics and ICloneable
  + Comparing Objects
  + Generic Types
  + Type-Safe Collections
  + Object Initializers
  + Collection Initializers
  + Anonymous Types
  + Bank Case Study—Step 8
* Delegates and Events
  + Delegates
  + Anonymous Methods
  + Lambda Expressions
  + Events
* Introduction to Windows Forms
  + Creating Windows Applications Using Visual Studio 2019
  + Partial Classes
  + Buttons, Labels and Textboxes
  + Handling Events
  + Listbox Controls
* Newer Features in C#
  + Dynamic Data Type
  + Named and Optional Arguments
  + Variance in Generic Interfaces
  + Asynchronous Programming Keywords
  + New Features in C# 6.0 and C# 7.0
  + Nullable Reference Types in C# 8.0
  + Immutable Record Types in C# 9.0
* Conclusion