

**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