



C# Programming in the .NET Framework– 40 Hours

Course Overview

C# is a beautiful cross-platform language that can be used to build variety of applications. With C#, you can build mobile apps (for Windows, Android and iOS), games, web sites and desktop applications.

Course prerequisites

Experience in object-oriented programming is highly beneficial.

Course attendees

The course is intended for anyone migrating to the .NET framework, and wants to gain a solid, robust understanding of the technology and its application with the C# language

Course Title	Course Description
C# Programming in the .NET Framework	<ul style="list-style-type: none"> ▪ Module 1: Introduction to .NET and C# ▪ Module 1: Introduction to .NET and C# ▪ Module 3: Types ▪ Module 4: Inheritance ▪ Module 5: Abstract Classes and Interfaces ▪ Module 6: Arrays, Collections and Strings ▪ Module 7: Exceptions ▪ Module 8: Generics ▪ Module 9: Reflection and Attributes ▪ Module 10: Delegates and Events ▪ Module 11: Managing Resources ▪ Module 12: Namespace and Assemblies ▪ Module 13: Advanced Language Constructs ▪ Module 14: C# 4.0 ▪ Module 15: Data Streams and Files ▪ Module 16: Debugging and Tracing ▪ Module 17: Threading
Basic SQL	<ul style="list-style-type: none"> ▪ Introduction to SQL ▪ Select ▪ Delete ▪ Update ▪ Insert ▪ Data filtering conditions

Course syllabus

Module 1: Introduction to .NET and C#

- What is .NET?
 - The Common Language Runtime (CLR)
- The Common Type System (CTS)
- Introduction to C#
- Namespace and Assemblies basics
- Viewing metadata with ILDasm and Reflector
- Introduction to Visual Studio 2010
- Creating a simple C# Console Application
- .NET Overview – from .NET 1.0 to .NET 4.0

Module 2: C# Language Fundamentals

- Procedures and Statements
- Data Types

- Declaring Variables
- The var keyword
- Assignments
- Conversions
- Arithmetic and Other Operators
- Control Constructs

Module 3: Types

- Type Concepts
- Value Types vs. Reference Types
- Fields, Properties and Methods
- Method Overloading
- Default and Optional Arguments
- Accessibility Modifiers
- Automatic Properties
- Construction and Assignment
- The Simple Types
- The null Reference
- Static and Instance Members
- Enumerated Types
- Partial Classes
- Static Classes
- Nested Types

Module 4: Inheritance

- What is Inheritance?
- Extending a Class
- Polymorphism
- Upcasts and Downcasts
- Virtual and Override Modifiers
- New and Sealed Modifiers

Module 5: Abstract Classes and Interfaces

- Abstract Classes

- Abstract Methods and Properties
- Interfaces
- Interfaces and Polymorphism
- Standard Interfaces: IEnumerable, IComparable, IComparer
- Side Casts
- The is and as Operators
- Multiple Interfaces
- Explicit Interface Implementation

Module 6: Arrays, Collections and Strings

- Arrays
- Initializing Arrays
- The Array Class
- Multi-dimensional Arrays
- Jagged Arrays
- Indexers
- Standard Collections: ArrayList, Stack, Queue, Hashtable
- The String Type
- String Members
- The StringBuilder Type
- String Literals

Module 7: Exceptions

- Errors vs. Exceptions
- Error Handling Options
- The try block
- The catch block
- The throw statement
- The finally block
- Standard Exception Classes
- Custom Exceptions
- Checked and Unchecked Expressions
- Exception Handling Guidelines

Module 8: Generics

- The Need for Generics
- Generic Types
- Standard Generic Collections
- Generic Methods
- Generic Interfaces
- Generic Constraints
- Nullable Types
- Other Aspects of Generics

Module 9: Reflection and Attributes

- Metadata and Reflection
- Getting Information about Types
- The Type Class
- Dynamic Invocation
- Dynamic Creation
- Custom Attributes
- Applying Attributes
- Setting and Querying Attributes
- Introduction to the Managed Extensibility Framework (MEF)

Module 10: Delegates and Events

- Delegate Basics
- Creating Delegates
- Invoking Delegates
- The Delegate and MultiCastDelegate Types
- Anonymous Delegates
- Generic Delegates
- Events
- The Publisher / Subscriber Pattern

Module 11: Managing Resources

- Garbage Collection and its Impacts

- The Managed Heap
- Object Creation and Destruction
- The Garbage Collection Process
- Finalization
- Deterministic Finalization
- The IDisposable Interface
- The Dispose Pattern
- The using keyword
- The GC Class
- GC Types
- Other issues with Resource Management

Module 12: Namespace and Assemblies

- Namespaces
- The using keyword (with namespaces)
- Assemblies
- Assembly loading
- The Global Assembly Cache (GAC)
- Deploying Assemblies
- Versioning and Probing

Module 13: Advanced Language Constructs

- Partial Methods
- Iterators
- Extension Methods
- Lambda Expressions
- Object and Collection Initializers
- Anonymous Types
- Introduction to LINQ

Module 14: C# 4.0

- Default and Named Arguments
- Dynamic Binding and dynamic keyword
- Custom Binding

- Generic Co- and Contra-Variance

Module 15: Data Streams and Files

- The Stream Abstract Class
- The FileStream Class
- File I/O
- The File and FileInfo Classes
- The Path Class
- The Directory and DirectoryInfo Classes
- Stream Readers and Writers

Module 16: Debugging and Tracing

- The Debug Class
- The Trace Class
- Debug vs. Release Builds
- The AnyCPU Configuration
- Advanced Tracing
- The DebugView Tool

Module 17: Threading

- Processes and Threads
- Threading Basics
- The Thread Class
- Starting Threads
- Synchronization Basics
- The lock keyword
- Other Threading Issues
- The Asynchronous Programming Model (APM)
- Asynchronous Delegates

Basic SQL:

- Introduction to SQL
- Select

- Delete
- Update
- Insert
- Data filtering conditions