Advanced .NET Framework Programming Using C#

**Duration:** 5 Days (*Face-to-Face & Remote-Live*), or 35 Hours (*On-Demand*)

**Price:** $2495 (*Face-to-Face & Remote-Live*), or $1495 (*On-Demand*)

**Discounts:** We offer multiple discount options. [Click here](#) for more information.

**Delivery Options:** Attend face-to-face in the classroom, [remote-live](#) or [on-demand training](#).

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**Students Will Learn**

- Designing object-oriented applications that use class hierarchies
- Implementing user-defined classes
- Implementing .NET interfaces and custom interfaces
- Working with strings and `StringBuilders` to efficiently process string data
- Using .NET collections to manage data
- Using delegates for late binding, using callback behavior and responding to events
- Working with data using ADO.NET and XML
- Using LINQ and PLINQ to make queries
- Creating multithreaded applications
- Building and applying attributes to code elements
- Using reflection effectively to query metadata and perform dynamic object creation
- Building and using private and shared assemblies
- Using the Parallel Task Library
- How to fire custom events
- How to build WCF services and consume them from client applications
- Working with object-based collections and generics collections

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**Course Description**

This hands-on course examines how to utilize advanced features of C# and the .NET Framework in order to build sophisticated, scalable, high-performing applications. The course includes coverage of features available in .NET 2.0 through .NET 4.5.

The course begins by reviewing .NET's Common Type System, and then examines nullable types, inferred types and dynamic data. Advanced object-oriented programming topics include auto-implemented properties, inheritance, abstract classes, sealed classes, and generics, as well as how to implement many of the .NET interfaces in order to take advantage of .NET functionality.
Students learn how to use synchronous and asynchronous delegates to call methods using late binding, as well as how to use delegates to define and fire custom events and manage callbacks. The course shows how to build multithreaded applications and synchronize access to shared resources, including the Thread and ThreadPool classes as well as .NET 4.0's Task class and the Parallel Task Library. Coverage of the new .NET 4.5 Async and Await features is included.

Students learn how to work with data in .NET's collections, as well as how to create and use custom generic methods and collections. Database topics include how to use ADO.NET to manipulate data in databases and how advanced ADO.NET features provide support for transaction management, connection pooling, and the management of disconnected DataSets. Coverage includes how to work with XML documents and make XPath queries.

The course includes the use of LINQ to make queries of data, regardless of its location. Coverage includes using LINQ to Objects, LINQ to SQL, LINQ to DataSets and LINQ to XML, as well as how PLINQ can be used to make efficient queries on large sets of data located in memory.

Students learn about .NET's support for n-tiered application development, including encapsulating functionality in private and shared assemblies. Students also explore how to create and consume WCF services to build distributed systems.

The course includes coverage of attributes and reflection, and how to leverage attributes and reflection to design creative, robust solutions to common design problems.

Other topics include: overriding System.Object methods; boxing and unboxing issues; when to use the String vs. StringBuilder types; working with data in other cultures (internationalization); and pattern matching using regular expressions.

Comprehensive labs provide students with extensive experience coding with Visual Studio to practice with the topics presented throughout the course.

Course Prerequisites

C# programming experience.

Course Overview

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### Working with Delegates
- Understanding Delegates
- Single-cast vs. Multi-cast Delegates
- Defining and Using Delegates
- Working with Synchronous and Asynchronous Delegates
- Understanding the Relationship Between Delegates and Events
- Defining and Raising Custom Events
- Handling Custom Events

### Managing Data with ADO.NET
- ADO.NET Object Model
- Connected vs. Disconnected Access
- Working with Data in Databases
- Calling Stored Procedures
- Working with Transactions
- Managing Connection Pooling
- Using the ADO.NET Provider Factory
- Working with Untyped DataSets
- Working with Typed DataSets
- Managing DataViews

### Working with XML Data
- Understanding XML and XML Schemas
- Using XML with DataSets
- Using XmlReader and XmlWriter
- Manipulating XML Data Using XmlDocument
- Querying XML Data Using XPath
- Working with XPathDocument

### Working with LINQ
- Understanding LINQ
- Building LINQ Queries
- LINQ and Extension Methods
- Defining Data Layers Using LINQ
- Using LINQ to Objects
- Using LINQ to SQL
- Using LINQ to DataSets
- Using LINQ to XML

### Working with Threads
- Overview of Threading
- Creating Threads
- Passing Data to Threads
- Returning Data from Threads
- Managing Threads
- Problems with Threads
- Synchronizing Threads
- Debugging Threads
- Using Async and Await

### Working with the ThreadPool
- Understanding Thread Pooling
- Managing the ThreadPool
- Creating Threads Using the ThreadPool Class
- Working with the Task Class
- Managing Tasks

### Working with the Parallel Task Library
- Overview of Parallel Programming
- Using the Parallel Class
- Making PLINQ Queries
- Using Concurrent Collections

### Assemblies
- Understanding .NET Assemblies
- Private vs. Shared Assemblies
- Where is the Global Assembly Cache (GAC)?
- Building and Using Private Assemblies
- Defining Strong Names
- Building, Installing and Using Shared Assemblies
- Configuring Assemblies
- Targeting Multiple Versions of .NET

### Working with Attributes
- Understanding Attributes

### Using Reflection
- Understanding Reflection
Using .NET Attributes
Designing Custom Attributes
Using Custom Attributes

Windows Communication Foundation (WCF)

- Understanding WCF
- Defining Service and Data Contracts
- Building a Service
- Hosting a Service
- Managing Endpoints
- Exposing Metadata
- Calling a WCF Service