

# .NET Framework Using C#

**Course No.**

9412

**Description**

Microsoft .NET is an advance in programming technology that greatly simplifies application development, both for traditional, proprietary applications and for the emerging paradigm of Web-based services. .NET is a complete restructuring of Microsoft's whole system infrastructure and represents a major learning challenge for programmers developing applications on Microsoft platforms. Part of .NET is a major new object-oriented programming language, C#. But learning the new programming language is only part of the challenge. The much greater challenge is learning the .NET Framework and all its capabilities. This three-day course is designed to provide a sound introduction to the .NET Framework for programmers who already know the C# language and the fundamentals of Windows Forms. The course focuses on core portions of the .NET Framework that are common across many application areas.

The course starts with an introduction to the architecture and key concepts of .NET. It then discusses class libraries, assemblies, versioning, and deployment, which constitute a major advance in the simplicity and robustness of deploying Windows applications, ending the notorious "DLL hell." The next two chapters discuss important topics in the .NET programming model, including metadata, reflection, I/O, and serialization. The following chapter continues the discussion of the .NET programming model, covering threading, contexts, application domains, marshal by value, marshal by reference, and memory management. .NET Security is introduced in some detail, including both code access security and role-based security. The next chapter covers interoperability of .NET with COM and with Win32 applications. The course concludes with an introduction to database programming using ADO.NET.

**Prerequisites**

The student should be an experienced application developer or architect with a working knowledge of C#, including building simple GUIs with Windows Forms.

**Objectives**

- Gain a thorough understanding of the philosophy and architecture of .NET
- Acquire a working knowledge of the .NET programming model and .NET Security
- Learn how to implement database applications using .NET

**Major Topics**

- NET Fundamentals
- Class Libraries
- Assemblies and Deployment
- Metadata and Reflection
- I/O and Serialization
- .NET Programming Model
- Security
- Interoperating with COM and Win32
- Database Programming Using ADO.NET

**Duration**

3 days

## Course Contents

### 1. .NET Fundamentals

- What is Microsoft .NET?
- Common Language Runtime
- Attribute-Based Programming
- Interface-Based Programming
- Metadata
- Common Type System
- Framework Class Library
- Language Interoperability
- Managed Code
- Assemblies and Deployment
- Web Services
- ASP.NET

### 2. Class Libraries

- Components in .NET
- Building Class Libraries at the Command Line
- Class Libraries Using Visual Studio .NET
- Using References

### 3. Assemblies and Deployment

- Assemblies
- Private Assembly Deployment
- Shared Assembly Deployment
- Assembly Configuration
- Multi-Course Assemblies

### 4. Metadata and Reflection

- Metadata
- Reflection
- Late Binding

### 5. I/O and Serialization

- Directories
- Files
- Serialization
- Attributes

### 6. .NET Programming Model

- Threading and Synchronization
- Contexts
- Application Domains
- Marshal by Value
- Marshal by Reference
- Memory Management and Garbage Collection

### 7. Security

- Authentication and Authorization
- Internet Security
- Configuring Security
- Code Access Security
- Permissions
- Role-Based Security
- Principals and Identities

### 8. Interoperating with COM and Win32

- .NET Client Calling a COM Server
- COM Client Calling a .NET Server
- PInvoke

### 9. Database Programming Using ADO.NET

- ADO.NET Overview
- .NET Data Providers
- Using DataReaders
- Using DataSets
- Interacting with XML Data

### Appendix A. Visual Studio .NET Database Testbed

- Server Explorer
- Query Analyzer
- OSQL

### Appendix B. Learning Resources

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