This course covers important topics in the .NET Framework for experienced Visual C++ programmers. Students learn important topics such as Managed Extensions, .NET classes and web programming, and how they differ from traditional C++ development.

**Audience:** Experienced C++ application developers or architects.

**Prerequisites:** Experience in application development or architecture, with a good knowledge of object-oriented programming in C++. The student should also have basic Internet literacy.

**Number of Days:** 4 days

1. **What is Microsoft .NET?**
   - What Is Microsoft .NET?
   - Windows Development Problems
   - Common Language Runtime
   - Open Standards and Interoperability
   - Communications Protocols
   - The Roles of XML
   - XML, SOAP, and Web Services
   - ASP.NET
   - .NET vs. Win32
   - The .NET Framework
   - Managed Code and Data
   - Multiple Language Development
   - Visual Studio .NET

2. **.NET Fundamentals**
   - The Magic of Metadata
   - Attribute-Based Programming
   - Metadata Types
   - .NET Framework Class Library
   - Interface-Based Programming
   - Custom Serialization
   - Everything Is an Object
   - Common Type System
   - ILDASM
   - Language Interoperability
   - Managed Code
   - Assemblies
   - Assembly Deployment
   - JIT Compilation
   - Web Services
   - ASP.NET
   - The Role of XML

3. **Managed C++ Programming**
   - C++ Managed Extensions
   - The Hello World Program
   - Compile at the Command Prompt
   - The #using Directive
   - Standard Input/Output
   - Formatting Strings
   - The System::String Class
   - Comparing Strings
   - ToString Method
   - The System::Array Class
   - IndexOutOfRangeException
   - Managed Array Initialization
   - How to Create a Managed C++ Class Library
   - Managed and Unmanaged Types
   - The __gc Keyword
   - Value Types
   - Abstract Types
   - Interfaces
   - Boxing and Unboxing Primitive Data Types
   - Delegates
   - Properties
   - Sealed Classes
   - Managed Type Casting

4. **Object-Oriented Programming in Managed C++**
   - Object-Oriented Concepts
   - Acme Travel Agency Case Study
   - Case Study Design
   - Reservable Abstract Class
Reservation Abstract Class
Broker Abstract Class
ReservationResult Structure
Broker::Reserve Method
Lists of Reservations and Reservables
Designing with Encapsulation
Inheritance Hierarchy
Running the Case Study
HotelReservation Class
HotelBroker Class
Customers Class
Customer Class
TestHotel Class

5. Managed C++ and the .NET Framework
   System::Object Class
   Predefined .NET Interfaces
   ICloneable
   IComparable
   System::Array
   .NET Collections
   Using Queue
   Using Stack
   Using SortedList
   Delegates
   Delegates and Events

6. User Interface Programming Using Windows Forms
   Visual C++ GUI Limitations
   Windows Forms
   Demo: Creating a Windows Forms Application

7. Assemblies and Deployment
   Objects and Components
   Limitation of COM Components
   Components in .NET
   Assemblies
   Class Libraries Using Visual Studio
   Creating a Class Library
   Using a Class Library in Visual Studio
   References at Compile Time and Runtime
   Assemblies
   ILDASM
   Assembly Manifest
   Assembly Metadata
   Versioning an Assembly

8. .NET Framework Classes
   Metadata
   Reflection
   Processes
   Threads
   .NET Threading Model
   Race Conditions
   Thread Synchronization Programming
   Monitor
   Synchronization of Collections
   Attributes
   Synchronization Attribute
   Input and Output in .NET
   Directories
   Files and Streams
   Read Command
   Write Command
   Serialization
   Garbage Collection

9. Programming with ADO.NET Using ADO.NET
   ADO.NET
   ADO.NET Architecture
   .NET Data Providers
   Programming with ADO.NET Interfaces
   .NET Namespaces
   Connected Data Access
   Connecting to SQL Server
   Connecting to an OLE DB Data Provider
Using Commands
Creating a Command Object
ExecuteNonQuery
Using a Data Reader
Disconnected Datasets
Data Adapters
Command Builder
Creating a Data Adapter and Generating Commands
Filling the Dataset
Displaying the Dataset
Adding a Row to the Dataset
Deleting a Row
Changing a Row
Updating the Database
Creating a Dataset Manually
Using XML Data
XML Schema and Data
Using XML with a Dataset

10. **ASP.NET and Web Forms**
Limitations with C++
What Is ASP.NET?
Web Application Fundamentals
Creating a Virtual Directory
An Echo Program
ASP.NET Features
Compiled Code
Server Controls
Browser Independence
Separation of Code and Content
State Management
Web Forms Architecture
Page Class
Inheriting from Page Class
Web Forms Page Life Cycle
View State
Web Forms Event Model
Page Processing
Page Events
Page Properties
Page Directive
Tracing

11. **ASP.NET and Web Services**
Web Service Protocols
IIS and .NET Web Services
A Client for the Add Web Service

12. **ATL Server Applications**
ATL Server vs. ASP.NET
ATL Server Architecture
Creating an ATL Server Project
ISAPI Extension DLL
Web Application DLL
Server Response Files
Building the Project
Running the Project
Adding Another Handler
Adding Programmatic Structures
Additional Programming Features

13. **.NET Security**
.NET Security and the Operating System
The Security Story
User-Based Security: Authentication
User-Based Security: Authorization
User-Based Security: Impersonation
Code Access Security
Security Policy
Permissions
Attributes
Demanding Permissions
Restricting Permissions
Code Access Security Identity
Internet Security
Internet Information Server
Passport Security
SOAP Security
.NET Role-Based Security
Principals and Identities
Identity
WindowsIdentity
.NET Windows Roles
User Groups and Roles
Creating Groups
Modifying a Group
Groups as Roles
Checking for Roles
Identity Classes
Code Access Permissions
Simple Permission Code Request
Demanding Permission
Passing Objects and Security
How a Permission Request Works
Strategy for Requesting Permissions
More about .NET Security
14. Mixing Managed and Unmanaged Code

Interoperating Between Managed and Unmanaged Code
COM Interop and PInvoke
Calling COM Components from Managed Code
The TlbImp.exe Utility
Wrapping a Legacy COM Server
Register the COM Server
OLE/COM Object Viewer
Run the COM Client
Import the Type Library (TlbImp.exe)
The .NET Client Program
Calling Managed Components from Legacy
COM Client
COM Callable Wrapper
COM Binding
The Managed COM Component
Using Tlbexp.exe
Using RegAsm.exe
.NET COM Registry Entries
The Legacy COM Client
Platform Invocation Services
Marshalling Out Parameters
Translating Types