This comprehensive and practical four-day course builds skills in .NET’s XML processing APIs—chiefly parsing using XmlReader and the Document Object Model (DOM), writing XML streams using XmlWriter, transformations using XPath and XSLT, and the new LINQ to XML, all using the .NET Framework XML classes and the C# language. It also covers XML serialization according to XML Schema and the tight coupling between XML and ADO.NET. The course is intended for students with a working knowledge of XML who want to build XML Web applications or components using .NET and the C# language. Everything in the course adheres to W3C and .NET standards for highly portable code. Visual Studio® 2008 with .NET 3.5 is used as the development environment. The course includes extensive programming examples, a progressively developed case study, and several tools for manipulating XML documents. All source code is in C# and is provided with the course. A separate Lab Manual provides detailed instructions for laboratory exercises with console and ASP.NET Web Forms client programs. Upon completion of this course the student will be equipped to program XML applications in .NET and understand which XML and .NET technologies to apply for the problem domain.

**Audience:** XML programmers who want to build XML applications or components using .NET and the C# language.

**Prerequisites:** Ability to read and to write well-formed XML. A working knowledge of programming the .NET Framework using C#. A working knowledge of ADO.NET is recommended for the portion of the course dealing with ADO.NET and XML.

**Number of Days:** 4 days

1. **.NET Framework XML Overview**
   XML
   Parsing XML
   Using XML in .NET Applications
   The .NET XML Classes
   Parsing Techniques
   .NET Parsing Techniques
   .NET DOM Parser Features
   Other XML Features in .NET
   LINQ to XML
   XML and the Web
   Internet Explorer and XML

2. **Reading XML Streams in .NET**
   XmlReader and XmlReaderSettings
   The XmlReader Properties
   Accessing Nodes
   Reading Attributes
   MoveToNextAttribute
   XmlReader.Create()
   Catching the Exceptions

3. **Validating XML Streams**
   Valid XML
   The Trouble with Well-Formed XML
   Formal Type Information
   DTDs and XML Schema
   XML Schema for a Stereo System
   DTD and XML Schema Comparison
   Invalid XML
   A Validation Tool
Creating Schema with Visual Studio
Editing Schemas
Validating XML Streams
Validation Settings
Validation Flags
.NET Validation Code
Validation Events
Schema Object Model
Validate Schema Tool
Validation Code

4. Writing XML Streams in .NET
Writing XML in .NET
The XmlWriter Class
The XmlTextWriter Class
Using XmlWriter
The State of Writer
Writing Elements
Writing Nested Elements
Writing Attributes

5. The Document Object Model in .NET
The Document Object Model (DOM)
Origins of the DOM
DOM2 Structure
DOM Tree Model
.NET DOM Classes
The XmlDocument Class
The XmlNode Class – Basic Parsing
Node Types
The XmlNode Class – Node Types
Basic Parsing
The XElement Class
The XAttribute Class
The XAttributeCollection Class
The XText Class
The XmlNodeList Class
Using a foreach Loop
Validation

6. Manipulating XML Information with the DOM
Modifying Documents
The XmlNode Class – Modifications
Legal and Illegal Modifications
Managing Children
Cloning
Modifying Elements
Splitting Text and Normalizing
Modifying Attributes

7. XML Serialization
Serialization in .NET
CLR Serialization
Circular List and XML Serialization
XML Serialization Infrastructure
What Will Not Be Serialized
XML Schema
XSD Tool
The XML Designer
A More Complex Schema
A Car Dealership
Deserializing According to a Schema
Type Infidelity
Customizing XML Serialization
XML Serialization and Web Services

8. XML and ADO.NET
ADO.NET
ADO.NET Architecture
.NET Data Providers
DataSet Architecture
Why DataSet?
DataSet Components
DataAdapter
Data Access Class
Retrieving the Data
Filling a DataSet
Accessing a DataSet
ADO.NET and XML
Rendering XML from a DataSet
XmlWriteMode
Reading XML into a DataSet
DataSets and XML Schema
CourseSchema.xsd
Reading XML Schema
XmlReadMode
XML Data in DataTables
Typed DataSets
Table Adapter
Using a Typed DataSet
Synchronizing DataSets and XML
Using XmlDataDocument
Windows Client Code
Web Client Code

9. XPath
Addressing XML Content
XPath
The XSLT/XPath Console
Using the XPath Console
The XML InfoSet
XPath Tree Structure
Document Order
XPath Expressions
Context
XPath Grammar, From the Top
Decomposing an Expression
Location Paths
Axis, Node Test, and Predicate
The Axis
The Node Test
The Predicate
Abbreviations
Using Abbreviations
XPath Functions
XPath and .NET
XPath and XmlNode
XPathNavigator
Evaluate Method
XPathNavigator Edit Capability

10. Introduction to XSLT
The Strange Ancestry of XSLT
Input and Output
Rule-Based Transformation
Stylesheets and Transforms
Applying a Transform to a Document
Referencing a Stylesheet
Templates
XSLT Tools and Setup
Using the XSLT Console
XSLT and XPath
Style Sheets in the Browser
A Style Sheet for Browser Display
Browser Display
XSLT in the .NET Framework
New XSLT Processor

11. LINQ to XML
Language Integrated Query (LINQ)
LINQ Queries
LINQ Data Stored
LINQ to Objects
LINQ to XML
Creating an XML Document
Parsing an XML Document
XElement

12. Appendix A - Zenith Courseware
Case Study

XML Axes
Basic LINQ Query Operators
Obtaining a Data Source
Books.xml
Filtering
Ordering
Aggregation
Obtaining Lists and Arrays
Deferred Execution
Modifying a Data Source
Performing Inserts via LINQ to XML
Performing Deletes via LINQ to XML
Performing Updates via LINQ to XML
A Sorted Summary
A Transformation