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 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 2014 with .NET 4.5.1 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.

**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 XmlReader Settings
   - XmlReader Properties
   - Accessing Nodes
   - Reading Attributes
   - MoveToNextAttribute
   - XmlReader.Create()
   - Catching the Exceptions
   - Moving Around the Document
   - Handling Whitespace
   - Parsing a Specific Document
   - Parsing the Top-Level Elements

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 Schema
   - 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
   WriteMovie Output
   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 XmlElement Class
   The XmlAttribute Class
   The XmlAttributeCollection Class
   The XmlText 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
   CLR versus XML Serialization
   Circular List and XML Serialization
   XML Serialization Infrastructure
   What Will Not Be Serialized
   XML Schema
   XSD Tool

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
   DataTypes and XML Schema
   CourseSchema.xsd
   Reading XML Schema
   XmlReadMode
   Writing Data as Attributes
   XML Data in DataTables
   Typed DataSets
   Table Adapter
   Using a TypedDataSet
   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
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
   HTML Transform
   XML Transform
   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 Stores
   LINQ to Objects
   LINQ to XML
   Creating an XML Document
   Parsing an XML Document
   XElement
   XML Axes
   Basic LINQ Query Operators
   Obtaining a Data Source
   Books.xml
   Filtering
   Ordering
   Aggregation

12. **Appendix A - Zenith Courseware Case Study**

13. **Appendix B – Learning Resources**