## Introduction to XML, XSL, and XML Schema Courseware (XML100)

### Length: 3 days

In this course, students will learn the fundamental concepts of XML, XML Schema, and XSLT. XML, or Extensible Markup Language, is a flexible text format widely used in data interchange and storage. Students will explore how XML forms the backbone of many web and data applications, providing structure and meaning to a wide range of content.

The course will also cover XML Schema, a powerful tool for defining the structure and constraining the content of XML documents. Through XML Schema, students will learn how to validate the correctness of XML data and enforce specific data formats and structures.

Additionally, students will learn the basics of XSLT, or Extensible Stylesheet Language Transformations. XSLT is used to transform XML documents into other formats like HTML, text, or other XML formats. This part of the course will focus on how XSLT enables the dynamic rendering and manipulation of XML data for various purposes.

By the end of this course, students will have a solid understanding of how XML, XML Schema, and XSLT are used in real-world applications to manage, structure, and transform data.

## Benefits

- Understand XML basics for effective data representation.
- Learn the advantages of XML in various applications.
- Learn to work with DTDs for ensuring XML document validity.
- Understand the purpose and power of XML Schema.
- Acquiring skills in defining and using simple-type elements in XML.
- Explore complex-type elements for advanced XML structuring.
- Gain proficiency in the use of attributes in XML documents.
- Understand the basics of XSLT for XML transformations.
- Learn XPath for efficient XML data navigation and manipulation.
- Learn flow control in XSLT for dynamic content generation.
- Explore advanced techniques in templates, parameters, and variables in XSLT.

## Outline

- XML Basics
    1. **What is XML?**
    2. **XML Benefits**
    3. **XML in Practice**
    4. **XML Documents**
    5. **A Simple XML File**
    6. **Editing an XML File (exercise)**
    7. **Recognizing XML (exercise)**
- DTDs
    1. **Well-formed vs. Valid**
    2. **The Purpose of DTDs**
    3. **Creating DTDs**
    4. **Validating an XML Document with a DTD**

5. **Writing a DTD (exercise)**

- XML Schema Basics
  1. **The Purpose of XML Schema**
  2. **The Power of XML Schema**
  3. **A First Look**
  4. **Validating an XML Instance Document**
- Simple-Type Elements
  1. **Overview**
  2. **Built-in Simple Types**
  3. **Building a Simple Schema (exercise)**
  4. **User-derived Simple Types**
  5. **Restricting Element Content (exercise)**
  6. **Specifying Element Type Locally**
  7. **Nonatomic Types**
  8. **Adding Nonatomic Types (exercise)**
  9. **Declaring Global Simple-Type Elements**
  10. **Converting Simple-Type Element Declarations from Local to Global (exercise)**
  11. **Default Values**
  12. **Fixed Values**
  13. **Nil Values**
- Complex-Type Elements
  1. **Overview**
  2. **Content Models**
  3. **Complex Model Groups**
  4. **Occurrence Constraints**
  5. **Adding Complex-Type Elements (exercise)**
  6. **Declaring Global Complex-Type Elements**
  7. **Converting Complex-Type Elements from Local to Global (exercise)**
  8. **Mixed Content**
  9. **Defining Complex Types Globally**
- Attributes
  1. **Empty Elements**
  2. **Adding Attributes to Elements with Complex Content**
  3. **Adding Attributes to Elements with Simple Content**
  4. **Restricting Attribute Values**
  5. **Default and Fixed Values**
  6. **Requiring Attributes**
  7. **Adding Attributes to Elements (exercise)**
- XSLT Basics
  1. **eXtensible Stylesheet Language**
  2. **The Transformation Process**
  3. **Performing the Transform**
  4. **An XSLT Stylesheet**
  5. **Whitespace**
  6. **Output Types**
  7. **Elements and Attributes**
- XPath
  1. **XPath in XSLT**
  2. **XPath Expression**
  3. **Path Expressions**

4. **Node Test**
5. **Axis**
6. **Predicate**
7. **Accessing Nodes (exercise)**
8. **Abbreviated Syntax**
9. **Accessing Nodes with Abbreviated Syntax (exercise)**
10. **Understanding the Enhanced Data Model in XPath 2.0 and Beyond**
11. **XPath Functions**
12. **XPath Operators**
13. **Using XPath Functions and Operators (exercise)**

- Flow Control
    1. **Looping in XSLT**
    2. **Looping with xsl:for-each (exercise)**
    3. **Sorting with XSLT**
    4. **Looping and Sorting (exercise)**
    5. **Conditions with XSLT**
    6. **Conditionals (exercise)**
- Templates, Parameters, and Variables
    1. **xsl:apply-templates**
    2. **Using xsl:apply-templates (exercise)**
    3. **xsl:call-template**
    4. **Passing Parameters**
    5. **Using xsl:call-template (exercise)**
    6. **Removing Content**
    7. **Template Modes**
    8. **Template Priority**
    9. **XSLT Variables**

## Required Prerequisites

None