

## Course 2389B: Programming with Microsoft ADO.NET

### Introduction

This course will teach developers to build data-centric applications and Web services with Microsoft ADO.NET, Microsoft SQL Server 2000, and the Microsoft .NET Framework.

### Audience

This course is designed for the professional platform developer who is responsible for designing and building data-centric, distributed applications for his or her organization. It is designed for developers who have component and Web application development skills, and who have previously built solutions by using Microsoft Visual Studio.

Typically, these individuals will have the following skills: Experience with a .NET language such as Microsoft Visual Basic .NET, Microsoft Visual C#, or Microsoft Visual C++; an understanding of object-oriented concepts and terminology; experience developing distributed applications; and experience developing Web-based applications hosted on Internet Information Server.

### At Course Completion

After completing the course, students will be able to:

- Describe data-centric applications, ADO.NET architecture, and ADO.NET and XML.
- Connect to SQL Server and other data sources.
- Perform connected database operations including executing SELECT commands, database definition commands, dynamic SQL commands, and commands that return data from a SQL Server database in XML.
- Build a DataSet schema, populate it with data, and modify the data programmatically.
- Build a DataSet from an existing data source.
- Use XML techniques while working with DataSets, including mapping tables and columns, creating XSD schemas, building strongly typed DataSets, and interacting with XMLDataDocuments.
- Build a Web service that uses ADO.NET to query and update a data source.
- Troubleshoot errors within an ADO.NET application.

### Prerequisites

The course assumes that students have the following skills:

- Understanding of relational database concepts: table, row, column, primary keys, foreign keys, constraints, and views
- Data query and modification experience, including experience with SELECT, INSERT, UPDATE, and DELETE commands
- Exposure to XML documents, style sheets, and schemas
- Experience with Visual Basic .NET, Visual Basic for Applications, or previous versions of Visual Basic
- Experience building user interfaces, including Web applications or Microsoft Windows applications

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## Microsoft Certification exams

This course will help the student prepare for the following Microsoft Certification exams:

- [\*Exam 70-305: Developing and Implementing Web Applications with Microsoft Visual Basic .NET and Microsoft Visual Studio .NET\*](#)
- [\*Exam 70-306: Developing and Implementing Windows based Applications with Microsoft Visual Basic .NET and Microsoft Visual Studio .NET\*](#)
- [\*Exam 70-315: Developing and Implementing Web Applications with Microsoft Visual C# .NET and Microsoft Visual Studio .NET\*](#)
- [\*Exam 70-316: Developing and Implementing Windows based Applications with Microsoft Visual C# .NET and Microsoft Visual Studio .NET\*](#)

## Course Materials

The course materials are yours to keep. You will be provided with the following software for use in the classroom:

- Microsoft Windows 2000 Server
- Microsoft SQL Server 2000 Developer Edition
- XML for SQL Server 2000 Web Release 2 (WR2)
- Microsoft Visual Studio .NET
- Microsoft Access 2002

## Course Outline

### Module 1: Data-Centric Applications and ADO.NET

Take a closer look: [Download Sample Module 1](#) (Portable Document Format, 1.12 MB).

The following topics are covered in this module:

- Design of Data-Centric Applications
- ADO.NET Architecture
- ADO.NET and XML

After completing this module, students will be able to:

- Give examples of storage options.
- Diagram the architecture of data-centric applications.
- Choose a connected, disconnected, or mixed environment based on application requirements.
- Use the System.Data namespaces in applications.
- Diagram the ADO.NET object model.
- Analyze typical business scenarios.
- Explain how to use ADO.NET with XML.

Lab 1.1: Data-Centric Applications and ADO.NET

## Module 2: Connecting to Data Sources

Take a closer look: [Download Sample Module 2](#) (Portable Document Format, 1.02 MB).

The following topics are covered in this module:

- Choosing a .NET Data Provider
- Defining a Connection
- Managing a Connection
- Handling Connection Exceptions
- Connection Pooling

After completing this module, students will be able to:

- Choose a .NET data provider.
- Connect to SQL Server.
- Connect to OLE DB data sources.
- Manage a connection.
- Handle common connection exceptions.
- Implement and control connection pooling.

Lab 2.1: Connecting to Data Sources

## Module 3: Performing Connected Database Operations

The following topics are covered in this module:

- Working in a Connected Environment
- Building Command Objects
- Executing Commands That Return a Single Value
- Executing Commands That Return Rows
- Executing Commands That Do Not Return Rows
- Using Transactions

After completing this module, students will be able to:

- Build a command object.
- Execute a command that returns a single value.
- Execute a command that returns a set of rows, and process the result.
- Execute a command that defines database structure and permissions by using the data definition language (DDL) and data control language (DCL).
- Execute a command that modifies data.
- Use transactions.

Lab 3.1: Performing Connected Database Operations

## Module 4: Building DataSets

The following topics are covered in this module:

- Working in a Disconnected Environment
- Building DataSets and DataTables
- Binding and Saving a DataSet
- Defining Data Relationships
- Modifying Data in a DataTable
- Sorting and Filtering

After completing this module, students will be able to:

- Describe the disconnected environment.
- Build a DataSet and a DataTable.
- Bind a DataSet to a DataGrid.
- Open and save a DataSet.
- Define a data relationship.
- Modify data in a DataTable.
- Find and select rows in a DataTable.
- Sort and filter a DataTable by using a DataView.

Lab 4.1: Building, Binding, Opening, and Saving DataSets

Lab 4.2: Manipulating DataSets

## Module 5: Reading and Writing XML with ADO.NET

The following topics are covered in this module:

- Creating XSD Schemas
- Loading Schemas and Data into DataSets
- Writing XML from a DataSet

After completing this module, students will be able to:

- Generate an XSD schema from a DataSet by using graphical tools.
- Save a DataSet structure to an XSD schema file.
- Create and populate a DataSet from an XSD schema and XML data.
- Save DataSet data as XML.
- Write and load changes by using a DiffGram.

Lab 5.1: Working with XML Data in ADO.NET

## **Module 6: Building DataSets from Existing Data Sources**

The following topics are covered in this module:

- Configuring a DataAdapter to Retrieve Information
- Populating a DataSet Using a DataAdapter
- Configuring a DataAdapter to Update the Underlying Data Source
- Persisting Changes to a Data Source
- How to Handle Conflicts

After completing this module, students will be able to:

- Configure a DataAdapter to retrieve information.
- Populate a DataSet by using a DataAdapter.
- Configure a DataAdapter to modify information.
- Persist data changes to a data source.
- Manage data conflicts.

Lab 6.1: Retrieving Data into a Disconnected Application

Lab 6.2: Retrieving and Updating Customers and Orders Data

## **Module 7: Building and Consuming a Web Service That Uses ADO.NET**

The following topic is covered in this module:

- Building and Consuming a Web Service That Returns Data

After completing this module, students will be able to:

- Build a Web service.
- Consume a Web service in a client application.
- Troubleshoot errors in an ADO.NET application.

Lab 7.1: Troubleshooting an ADO.NET Application