



COURSE SYLLABUS

COURSE TITLE:	50578A MDX with Microsoft Analysis Services: How to Ask Questions and Get Accurate Answers from Your Data <i>Includes coverage of SQL 2012</i>
FORMAT:	Instructor-led
CERTIFICATION EXAMS:	None

This course syllabus should be used to determine whether the course is appropriate for the students, based on their current skills and technical training needs. Course content, prices, and availability are subject to change without notice.

ELEMENTS OF THIS SYLLABUS ARE SUBJECT TO CHANGE.

ABOUT THE COURSE

Using the current set of tools that Microsoft has available the average user can with minimum training utilize drag-and-drop to get the answers to questions such as: sales by quarter, reseller gross profit, and products purchased by geography. They can also create graphical reports and KPIs all without writing a single line of code! (Microsoft course 50561A)

But what if you need questions like this answered?

- ▶ What are the top 5 customers by country over the last 8 quarters?
- ▶ What is our reorder point based on inventory levels?
- ▶ What are our best customers in terms of volume and gross profit?
- ▶ What effect does shipping cost have on profitability on a geographical distribution?
- ▶ How do we calculate the year-to-date value?
- ▶ How do we do year-over-year growth?
- ▶ When looking at manufacturing how do we account only for workdays?

Enter Microsoft Multidimensional Expressions (MDX). This three-day instructor-led course is designed to take a person from the very beginning, think “Hello World” in programming to journeyman. The first chapters (1-4) get you well-grounded then from there we expand out. You won’t know how to do every MDX query. You won’t look at every function. But you will understand the patterns and from them you can examine examples and build on them to code your own sophisticated queries. The MBAs will love you!

AUDIENCE

If the past is any indicator of the future then this course will be attended mainly by SQL professionals, Microsoft Analysis Services cube and report developers, and business intelligence professionals coming from competing platforms. But you do not need those skills. The course was not written assuming those skills.

Why this course may be for you:

- ▶ Your company is moving or implementing Microsoft SQL Server Analysis Services.
- ▶ Your organization is implementing department business intelligence with a data mart.
- ▶ You want to develop a skillset in high demand.
- ▶ The current reports from the cubes do not provide the answers.
- ▶ Your organization wants you to get grounding in MDX so you can build out advanced analytics.
- ▶ Your boss said so.



AT COURSE COMPLETION

After completing this course, students will be able to:

- ▶ Be at a mid-level of competence in MDX.

PREREQUISITES

Before attending this course, students must have:

- ▶ A good idea of what direction their organization wants to go with business intelligence.
- ▶ Basic Microsoft interface skills such as working with Excel.

ADDITIONAL READING

To help you prepare for this class, review the following resources:

- ▶ Bruno Aziza and Joey Fitts, *Drive Business Performance: Enabling a Culture of Intelligent Execution* (Hoboken: John Wiley & Sons, Inc., 2008)

MODULE 1: COURSE OVERVIEW

Lessons

- ▶ Introduction
- ▶ Course Materials
- ▶ Facilities
- ▶ Prerequisites
- ▶ What We'll Be Discussing

Lab 1: COURSE OVERVIEW

- ▶ None

After completing this module, students will be able to:

- ▶ Successfully log into their virtual machine.
- ▶ Have a full understanding of what the course intends to cover.

MODULE 2: THE MICROSOFT BUSINESS INTELLIGENCE STACK

Lessons

- ▶ What Business Intelligence Can Do for Your Organization
- ▶ What to Watch Out for in Implementation
- ▶ The Scope and What Types of Tools Address Each

Lab 1: THE MICROSOFT BUSINESS INTELLIGENCE STACK

- ▶ Examine and Run a Pre-Built SQL Integration Services Package That Performs an Extract Transform and Load into a Data Mart

After completing this module, students will be able to:

- ▶ Have an overview of the Microsoft Business Intelligence Stack.
- ▶ Have an understanding of the available technologies.

MODULE 3: GETTING STARTED WITH MDX. WE WALK THEN RUN. LEARN THIS AND YOU WON'T TRIP.

Lessons

- ▶ Multidimensional VS. Tabular Space
- ▶ Data Warehouse Data Mart
- ▶ MDX Introduction
- ▶ The Editors



Lab 1: GETTING STARTED WITH MDX. WE WALK THEN RUN. LEARN THIS AND YOU WON'T TRIP.

- ▶ Familiarization with the SQL Server Management Studio Query Editor
- ▶ Familiarization with the Business Intelligence Development Studio Query Editor
- ▶ SQL Profiler
- ▶ Basic MDX

After completing this module, students will be able to:

- ▶ Understand the difference between multidimensional and flat or tabular space.
- ▶ Understand the importance of schemas in SQL Server Analysis Service.
- ▶ Understand basic syntax of MDX.

MODULE 4: THE ALL-IMPORTANT DIMENSIONS. THE BEARERS OF TRUTH.

Lessons

- ▶ Dimensions
- ▶ Dimension Attributes
- ▶ Hierarchies
- ▶ Referencing Members
- ▶ Tuples
- ▶ Cells
- ▶ Sets
- ▶ Set Functions

Lab 1: THE ALL-IMPORTANT DIMENSIONS. THE BEARERS OF TRUTH.

- ▶ Dimension Properties
- ▶ Dimension Attributes
- ▶ Single Dimension Hierarchies
- ▶ Multidimensional Hierarchies
- ▶ The AllMember Function
- ▶ The Members Function
- ▶ Referencing Members
- ▶ Syntax Errors
- ▶ Partial Tuple References
- ▶ Multiple Axis
- ▶ Crossjoin
- ▶ Autoexists
- ▶ Exists
- ▶ Removing Duplicate Tuples

After completing this module, students will be able to:

- ▶ Have a working knowledge of dimensions.
- ▶ Have the ability to explain what a tuple does.
- ▶ Understand why SSAS cells are important and their properties.
- ▶ Construct an MDX set.
- ▶ Utilize built-in set functions.

MODULE 5: NAVIGATION AND THE SECRETS OF RELATIVES!

Lessons

- ▶ Navigation in Reporting
- ▶ Relatives
- ▶ Navigational Functions
- ▶ Controlling Sorting
- ▶ Filtering the Results
- ▶ How to Combine a Set



Lab 1: NAVIGATION AND THE SECRETS OF RELATIVES!

- ▶ Navigating a Hierarchy
- ▶ Locating Immediate Relatives
 - Siblings
 - Cousin
 - Lead
 - Tail
 - Head
 - Predecessor
 - Lastchild
 - Firstchild
- ▶ Combining Relative Functions
- ▶ Using the Members Function Effectively
- ▶ Hierarchize Function

After completing this module, students will be able to:

- ▶ Understand the importance of navigation to reporting.
- ▶ Locate a cells relatives.
- ▶ Use navigational functions in reporting.
- ▶ Control sorting of reports.
- ▶ Filter the results of a report.
- ▶ Understand how to combine sets.

MODULE 6: MDX CALCULATIONS

Lessons

- ▶ Expressions
- ▶ Calculated Members
- ▶ Formatting Output Through the WITH Clause
- ▶ Dynamic Expressions
- ▶ IIF Function
- ▶ Statistical Functions
- ▶ Determining Which Tuples Satisfy a Parameter in a Report

Lab 1: MDX CALCULATIONS

- ▶ Explore Variations of the WITH Clause
- ▶ Create Members
- ▶ Calculate Percentages
- ▶ Advanced Formatting

After completing this module, students will be able to:

- ▶ Understand how to utilize expressions.
- ▶ Understand how to use MDX functions in calculations.
- ▶ Understand variances through the WITH clause.
- ▶ Understand how to use sets in expressions.
- ▶ Understand how to work with statistical functions.

MODULE 7: WORKING WITH TIME. MULTIPLE CALENDARS, DIVERGENT HORIZONS.

Lessons

- ▶ Time Dimension
- ▶ Multiple Calendars
- ▶ Time-Based Functions
- ▶ ParallelPeriod
- ▶ OpeningPeriod
- ▶ ClosingPeriod
- ▶ LastPeriod



- ▶ Year-To-Date
- ▶ Calculated Measures and a Time Dimension
- ▶ Comparing Periods
- ▶ Sum Function
- ▶ Aggregate Function
- ▶ Max and Min Function in Time

Lab 1: WORKING WITH TIME. MULTIPLE CALENDARS, DIVERGENT HORIZONS.

- ▶ ParallelPeriod
- ▶ OpeningPeriod
- ▶ ClosingPeriod
- ▶ LastPeriod
- ▶ Year-To-Date
- ▶ Calculated Measures and a Time Dimension
- ▶ Comparing Periods
- ▶ Sum Function
- ▶ Aggregate Function
- ▶ Max
- ▶ Min
- ▶ Use Crossjoin and ParallelPeriod

After completing this module, students will be able to:

- ▶ Understand the use of time in SSAS.
- ▶ Understand how to perform time-based calculations.
- ▶ Navigate time dimensions.
- ▶ Use a calculated measure in a time dimension.
- ▶ Understand how to sum and aggregate data over time.

MODULE 8: BUSINESS INSIGHTS. NOW LET’S PUT IT TO WORK AND GET SOME SITUATIONAL ANSWERS.

Lessons

- ▶ OR Logic
- ▶ AND Logic
- ▶ Combining OR and AND Logic From Different Hierarchies
- ▶ Logical AND with Members From the Same
- ▶ Using the NonEmpty Function
- ▶ Moving Averages
- ▶ Last Date with Data
- ▶ ParallelPeriod for Multiple Dates
- ▶ Testing Current Context
- ▶ Options of the Descendants Function
- ▶ Ranking Values

Lab 1: THE BUSINESS INTELLIGENCE STACK

- ▶ OR Logic
- ▶ AND Logic
- ▶ Combining OR and AND Logic From Different Hierarchies
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- ▶ Using the NonEmpty Function
- ▶ Moving Averages
- ▶ Last Date with Data
- ▶ ParallelPeriod for Multiple Dates
- ▶ Testing Current Context
- ▶ Options of the Descendants Function
- ▶ Ranking Values



After completing this module, students will be able to:

- ▶ Combine techniques from the other modules and expand where necessary.
- ▶ Understand how to approach and solve MDX problems.

MODULE 9: WHERE ELSE WILL MDX WORK? SQL REPORTS

Lessons

- ▶ Create a SSRS Report
- ▶ Create a Connection into the Cube
- ▶ Create a MDX Query with the Query Designer
- ▶ Create a Custom Query
- ▶ Pass a Parameter
- ▶ PerformancePoint Services Dashboard Designer (not installed PowerPoint and video demonstration)

Lab 1: PERFORMANCEPOINT SERVICES

- ▶ Create a SSRS Report
- ▶ Create a Connection into the Cube
- ▶ Create a MDX Query with the Query Designer
- ▶ Create a Custom Query
- ▶ Pass a Parameter

After completing this module, students will be able to:

- ▶ Understand how to use MDX in a SQL Server Reporting Services report.
- ▶ Understand MDX in PerformancePoint Services 2010.

MODULE 10: KPIS AND MDX IN THE BUSINESS INTELLIGENCE DEVELOPMENT STUDIO EDITOR

Lessons

- ▶ Use Business Intelligence Development Studio to Create a Named Calculation in the Cube
- ▶ Use Business Intelligence Development Studio to Create KPIS

Lab 1: KPIS AND MDX IN THE BUSINESS INTELLIGENCE DEVELOPMENT STUDIO EDITOR

- ▶ Create a Named Calculation
- ▶ Create a Leaf KPI
- ▶ Create an Objective KPI
- ▶ Utilize IIF Logic in a KPI

After completing this module, students will be able to:

- ▶ Understand how to use MDX in a Business Intelligence Development Studio editor.
- ▶ Understand MDX calculations in Form view.
- ▶ Understand how to create KPIS.

Appendix A: Key Terms

Appendix B: Various Tables

