

6232 – Implementing a Microsoft SQL Server 2008 Database

Vendor Course Code: 6232

Course Length: 5 days

Overview: This five-day instructor-led course is intended for Microsoft SQL Server database developers who are responsible for implementing a database on SQL Server 2008 R2. In this course, students learn the skills and best practices on how to use SQL Server 2008 R2 product features and tools related to implementing a database server.

Skills Gained: After completing this course, students will be able to:

- Understand the product, its components, and basic configuration.
- Work with the data types supported by SQL Server.
- Design and implement tables and work with schemas.
- Design and implement views and partitioned views.
- Describe the concept of an index and determine the appropriate data type for indexes and composite index structures.
- Identify the appropriate table structures and implement clustered indexes and heaps.
- Describe and capture execution plans.
- Design and implement non-clustered indexes, covering indexes, and included columns.
- Design and implement stored procedures.
- Implement table types, table valued parameters, and the MERGE statement.
- Describe transactions, transaction isolation levels, and application design patterns for highly-concurrent applications.
- Design and implement T-SQL error handling and structured exception handling.
- Design and implement scalar and table-valued functions.
- Design and implement constraints.
- Design and implement triggers.
- Describe and implement target use cases of SQL CLR integration.
- Describe and implement XML data and schema in SQL Server.
- Use FOR XML and XPath queries.
- Describe and use spatial data types in SQL Server.
- Implement and query full-text indexes.

Key Topics: **Module 1: Introduction to SQL Server and its Toolset**

This module introduces you to the entire SQL Server platform and its major tools. This module also covers editions, versions, basics of network listeners, and concepts of services and service accounts.

Lessons

Introduction to SQL Server Platform
Working with SQL Server Tools
Configuring SQL Server Services

Lab : Introduction to SQL Server and its Toolset

Verifying SQL Server Component Installation
Altering Service Accounts for New Instance
Enabling Named Pipes Protocol for Both Instances
Creating Aliases for Adventure Works and Proseware
Ensuring SQL Browser is Disabled and Configure a Fixed TCP/IP Port

After completing this module, students will be able to:

- Describe the SQL Server Platform.
- Work with SQL Server Tools.
- Configure SQL Server Services.

Module 2: Working with Data Types

This module describes the data types supported by SQL Server and how to work with them.

Lessons

Using Data Types
Working with Character Data
Converting Data Types
Working with Specialised Data Types

Lab : Working with Data Types

Choosing Appropriate Data Types
Writing Queries With Data Type Conversions
Designing and Creating Alias Data Types

After completing this module, students will be able to:

- Work with data types.
- Work with character data.
- Convert between data types.
- Use specialised data types.

Module 3: Designing and Implementing Tables

This module describes the design and implementation of tables.

Lessons

Designing Tables
Working with Schemas
Creating and Altering Tables

Lab : Designing and Implementing Tables

Improving the Design of Tables
Creating a Schema
Creating the Tables

After completing this module, students will be able to:

- Design tables.
- Work with schemas.
- Create and alter tables.

Module 4: Designing and Implementing Views

This module describes the design and implementation of views.

Lessons

Introduction to Views
Creating and Managing Views
Performance Considerations for Views

Lab : Designing and Implementing Views

Designing, Implementing and Testing the WebStock Views
Designing and Implementing the Contacts View
Modifying the Available Models View

After completing this module, students will be able to:

- Explain the role of views in database development.
- Implement views.
- Describe the performance related impacts of views.

Module 5: Planning for SQL Server Indexing

This module describes the concept of an index and discusses selectivity, density, and statistics. It covers appropriate data type choices and choices around composite index structures.

Lessons

Core Indexing Concepts
Data Types and Indexes
Single Column and Composite Indexes

Lab : Planning for SQL Server Indexing

Exploring Existing Index Statistics
Designing Column Orders for Indexes

After completing this module, students will be able to:

- Explain core indexing concepts.
- Describe the effectiveness of each data type common used in indexes.
- Plan for single column and composite indexes.

Module 6: Implementing Table Structures in SQL Server

This module covers clustered indexes and heaps.

Lessons

SQL Server Table Structures
Working with Clustered Indexes
Designing Effective Clustered Indexes

Lab : Implementing Table Structures in SQL Server

Creating Tables as Heaps
Creating Tables with Clustered Indexes
Comparing the Performance of Clustered Indexes vs. Heaps

After completing this module, students will be able to:

- Explain how tables can be structured in SQL Server databases.
- Work with clustered indexes.
- Design effective clustered indexes

Module 7: Reading SQL Server Execution Plans

This module introduces the concept of reading execution plans.

Lessons

Execution Plan Core Concepts
Common Execution Plan Elements
Working with Execution Plans

Lab : Reading SQL Server Execution Plans

Actual vs. Estimated Plans
Identify Common Plan Elements
Query Cost Comparison

After completing this module, students will be able to:

- Explain the core concepts related to the use of execution plans.
- Describe the role of the most common execution plan elements.
- Work with execution plans.

Module 8: Improving Performance through Nonclustered Indexes

This module explains nonclustered indexes, covering indexes and included columns.

Lessons

Designing Effective Nonclustered Indexes
Implementing Nonclustered Indexes
Using the Database Engine Tuning Advisor

Lab : Improving Performance through Nonclustered Indexes

Reviewing Nonclustered Index Usage
Improving Nonclustered Index Designs
Using SQL Server Profiler and Database Engine Tuning Advisor
Nonclustered Index Design

After completing this module, students will be able to:

- Design effective nonclustered indexes.
- Implement nonclustered indexes.
- Use the Database Engine Tuning Advisor to design indexes.

Module 9: Designing and Implementing Stored Procedures

This module describes the design and implementation of stored procedures.

Lessons

Introduction to Stored Procedures
Working With Stored Procedures
Implementing Parameterised Stored Procedures
Controlling Execution Context

Lab : Designing and Implementing Stored Procedures

Creating Stored Procedures
Creating a Parameterised Stored Procedure
Altering the Execution Context of Stored Procedures

After completing this module, students will be able to:

- Describe the role of stored procedures and the potential benefits of using them.
- Work with stored procedures.
- Implement parameterised stored procedures.
- Control the execution context of a stored procedure.

Module 10: Merging Data and Passing Tables

This module covers table types, table valued parameters and the MERGE statement as used in stored procedures.

Lessons

Using the MERGE Statement
Implementing Table Types
Using Table Types as Parameters

Lab : Merging Data and Passing Tables

Creating a Table Type
Using a Table Type Parameter
Using a Table Type with MERGE

After completing this module, students will be able to:

- Use the MERGE statement.
- Implement table types.
- Use TABLE types as parameters.

Module 11: Creating Highly Concurrent SQL Server Applications

This module covers transactions, isolation levels, and designing for concurrency.

Lessons

Introduction to Transactions
Introduction to Locks
Management of Locking
Transaction Isolation Levels

Lab : Creating Highly Concurrent SQL Server Applications

Detecting Deadlocks
Investigating Transaction Isolation Levels

After completing this module, students will be able to:

- Describe the role of transactions.
- Explain the role of locks.
- Manage locking.
- Work with transaction isolation levels.

Module 12: Handling Errors in T-SQL Code

This module describes structured exception handling and gives solid examples of its use within the design of stored procedures.

Lessons

Designing T-SQL Error Handling
Implementing T-SQL Error Handling
Implementing Structured Exception Handling

Lab : Handling Errors in T-SQL Code

Replacing @@ERROR Based Error Handling With Structured Exception Handling
Adding Deadlock Retry Logic to the Stored Procedure

After completing this module, students will be able to:

- Design T-SQL error handling.
- Implement T-SQL error handling.
- Implement structured exception handling.

Module 13: Designing and Implementing User-Defined Functions

This module describes the design and implementation of functions, both scalar and table-valued.

Lessons

Designing and Implementing Scalar Functions
Designing and Implementing Table-valued Functions
Implementation Considerations for Functions
Alternatives To Functions

Lab : Designing and Implementing User-Defined Functions

Formatting Phone Numbers
Modifying an Existing Function
Resolving a Function-related Performance Issue

After completing this module, students will be able to:

- Design and implement scalar functions.
- Design and implement table-valued functions.
- Describe implementation considerations for functions.
- Describe alternatives to functions.

Module 14: Ensuring Data Integrity through Constraints

This module describes the design and implementation of constraints.

Lessons

Enforcing Data Integrity
Implementing Domain Integrity
Implementing Entity and Referential Integrity

Lab : Ensuring Data Integrity through Constraints

Designing Constraint
Testing the Constraints

After completing this module, students will be able to:

- Explain the available options for enforcing data integrity and the levels at which they should be applied.
- Describe how domain integrity can be maintained.
- Describe how entity and referential integrity can be maintained.

Module 15: Responding to Data Manipulation via Triggers

This module describes the design and implementation of triggers.

Lessons

Designing DML Triggers
Implementing DML Triggers
Advanced Trigger Concepts

Lab : Responding to Data Manipulation via Triggers

Creating the Audit Trigger
Improving the Audit Trigger

After completing this module, students will be able to:

- Design DML triggers.
- Implement DML triggers.
- Explain advanced DML trigger concepts.

Module 16: Implementing Managed Code in SQL Server

This module describes the implementation of and target use-cases for SQL CLR integration.

Lessons

Introduction to SQL CLR Integration
Importing and Configuring Assemblies
Implementing SQL CLR Integration

Lab : Implementing Managed Code in SQL Server

Assessing Proposed CLR Code
Implementing a CLR Assembly
Implementing a CLR User-defined Aggregate and User-defined Type

After completing this module, students will be able to:

- Explain the importance of SQL Server CLR Integration.
- Import and configure assemblies.
- Implement objects that have been created within .NET assemblies.

Module 17: Storing XML Data in SQL Server

This module covers the XML data type, schema collections, typed and untyped columns and appropriate use cases for XML in SQL Server.

Lessons

Introduction to XML and XML Schemas
Storing XML Data and Schemas in SQL Server
Implementing the XML Data Type

Lab : Storing XML Data in SQL Server

Appropriate Usage of XML Data Storage in SQL Server
Investigating the Storage of XML Data in Variables
Investigating the Use of XML Schema Collections
Investigating the Creation of Database Columns Based on XML

After completing this module, students will be able to:

- Describe XML and XML schemas.
- Store XML data and associated XML schemas in SQL Server.
- Implement the XML data type within SQL Server

Module 18: Querying XML Data in SQL Server

This module covers the basics of FOR XML and XPath Queries.

Lessons

Using the T-SQL FOR XML Statement
Getting Started with XQuery
Shredding XML

Lab : Querying XML Data in SQL Server

Learning to Query SQL Server Data as XML
Writing a Stored Procedure Returning XML
Writing a Stored Procedure that Updates Using XML

After completing this module, students will be able to:

- Use the T-SQL FOR XML statement.
- Work with basic XQuery queries.
- Shred XML to a relational form.

Module 19: Working with SQL Server Spatial Data

This module describes spatial data and how this data can be implemented within SQL Server.

Lessons

Introduction to Spatial Data
Working with SQL Server Spatial Data Types
Using Spatial Data in Applications

Lab : Working with SQL Server Spatial Data

Familiarity With Geometry Data Type
Adding Spatial Data to an Existing Table
Business Application of Spatial Data

After completing this module, students will be able to:

- Describe the importance of spatial data and the industry standards related to it.
- Explain how to store spatial data in SQL Server.
- Perform calculations on and query SQL Server spatial data.

Module 20: Working with Full-Text Indexes and Queries

This module covers full text indexes and queries.

Lessons

Introduction to Full-Text Indexing
Implementing Full-Text Indexes in SQL Server
Working with Full-Text Queries

Lab : Working with Full-Text Indexes and Queries

Implementing a Full-Text Index

Implementing a Stoplist
Creating a Stored Procedure to Implement a Full-Text Search

After completing this module, students will be able to:

- Describe why user interfaces in existing applications are not sufficient for end user search needs.
- Implement full-text indexes in SQL Server.
- Query SQL Server using full-text queries

Target Audience:

This course is intended for IT Professionals who want to become skilled on SQL Server 2008 R2 product features and technologies for implementing a database. To be successful in this course, the student should have knowledge of basic relational database concepts and writing T-SQL queries.

Prerequisites:

Before attending this course, students must have:

- Working knowledge of Transact-SQL (ability to write Transact-SQL queries) or Course 2778A: Writing Queries Using Microsoft SQL Server 2008 Transact-SQL
- Working knowledge of relational databases (database design skills).
- Core Windows Server skills.
- Basic programming language.