

1. **Description**

This course teaches the implementation and development aspects of Microsoft SQL Server. It covers the implementation of databases and database objects as well as tools and features used for development in SQL Server. In each topic, the students will learn the best practices as well as performance and optimization considerations. Throughout the course the students will practice each topic learned.

At the end of this course the students will be familiar with the various properties of a database in SQL Server as well as the various database objects. In addition, the students will be able to participate in database development by utilizing all the tools and features that SQL Server has to offer for developers.

The course is based on SQL Server 2012, but it is relevant also for SQL Server 2005/2008/R2.

2. **Target Audience**

The course is intended for database developers who need to participate in the implementation and development activities of SQL Server databases. Students should be familiar with relational database concepts, basic programming and the syntax of Transact-SQL.

3. **Objectives**

- Be familiar with SQL Server architecture and objects
- Be able to design and implement efficient and reliable databases
- Learn to work with SQL Server client tools

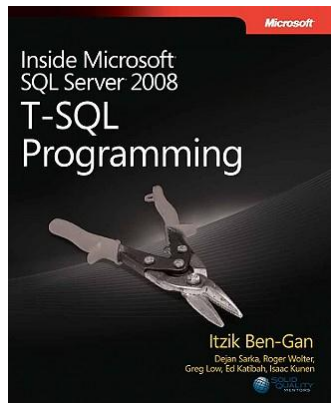
4. **Schedule**

- 5 days
- 09:00-16:30
- 40 academic hours

5. **Materials**

- Disk-on-key including all the course materials:
 - ✓ Presentations
 - ✓ Demonstrations
 - ✓ Class exercises & solutions
 - ✓ Homework
 - ✓ Additional resources
 - DVD with SQL Server 2012 RTM evaluation edition
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- Course book:



6. Outline

a. **Course Introduction (0.5 hour)**

- 1) About the Instructor
- 2) About the Students
- 3) Course Objectives
- 4) Course Schedule
- 5) Course Materials
- 6) Course Outline

b. **Introduction to Microsoft SQL Server (1.5 hours)**

- 1) Databases – Relational and Others
 - 2) The Database as Part of the System Architecture
 - 3) The Role of the Database Administrator (DBA)
 - 4) SQL Server Versions and Editions
 - 5) SQL Server Services and Components
 - 6) SQL Server Client Tools
 - 7) Practice
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c. All about Databases (2.5 hours)

- 1) Overview of System Databases
- 2) Filegroups and Files
- 3) Introducing the Transaction Log
- 4) Database Configuration Options
- 5) Creating a Database
- 6) Database Snapshots
- 7) Schemas and Database Objects
- 8) Practice

d. All about Tables (6 hours)

- 1) System Tables and System Views
- 2) System Data Types
- 3) The Use of NULL
- 4) Creating a Table
- 5) Special Data Types
- 6) User-Defined Data Types
- 7) Table @Variables vs. #Temporary Tables
- 8) Table Types
- 9) Sparse Columns
- 10) Using FILESTREAM and FileTables
- 11) Working with Spatial Data
- 12) Practice

e. Indexes and Statistics (5.5 hours)

- 1) Introduction to Indexes
 - 2) Physical Structures
 - 3) Special Types of Indexes
 - 4) Creating an Index
 - 5) Guidelines for Planning Indexes
 - 6) The Database Engine Tuning Advisor
 - 7) Introducing Statistics
 - 8) Understanding Execution Plans
 - 9) Guidelines for Writing Efficient Queries
 - 10) Indexes and Statistics Maintenance
 - 11) Practice
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f. Table Constraints (2 hours)

- 1) Data Integrity Overview
- 2) Primary Key and Unique Constraint
- 3) Foreign Key
- 4) Check and Default Constraints
- 5) Creating Constraints
- 6) Disabling Constraints
- 7) Practice

g. Partitioning (2.5 hours)

- 1) Introduction to Partitioning
- 2) Partitioning Setup
- 3) Operations on a Partitioned Table
- 4) Partitioned Indexes
- 5) Special Guidelines
- 6) Practice

h. Transactions and Locks (2 hours)

- 1) Transactions Overview
- 2) Lock Types
- 3) Concurrency Issues
- 4) Transaction Isolation Levels
- 5) Locking Hints
- 6) Deadlocks
- 7) Nesting Transactions
- 8) Practice

i. Views (2.5 hours)

- 1) Introduction to Views
 - 2) Creating a View
 - 3) Modifying Data through a View
 - 4) Indexed Views
 - 5) Partitioned Views
 - 6) Practice
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- j. User-Defined Functions (3 hours)**
 - 1) Introduction to User-Defined Functions
 - 2) Scalar Functions
 - 3) Table-Valued Functions
 - 4) Joining with APPLY
 - 5) Practice

 - k. Stored Procedures (3 hours)**
 - 1) Introduction to Stored Procedures
 - 2) Stored Procedure Interfaces
 - 3) Creating and Executing Stored Procedures
 - 4) Compilation Sequence
 - 5) Practice

 - l. Triggers (3 hours)**
 - 1) Introduction to Triggers
 - 2) The INSERTED and DELETED Tables
 - 3) Creating a Trigger
 - 4) Nested and Recursive Triggers
 - 5) Triggers Pros and Cons
 - 6) Scenarios for Using Triggers
 - 7) Practice

 - m. XML (5.5 hours)**
 - 1) Introduction to XML
 - 2) XPath and XQuery
 - 3) The XML System Data Type
 - 4) XML Schema Collections
 - 5) XML Indexes
 - 6) Converting Relational Data to XML
 - 7) Converting XML to Relational Data
 - 8) Practice
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n. **Summary (0.5 hour)**

- 1) Course Summary
- 2) Additional Resources
- 3) Feedback