Database Administration Security

Cybersecurity Department

Course Code: ***CBS 214***

Practical Lecture 1 : Introduction to Microsoft SQL Server

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Lecture Outlines

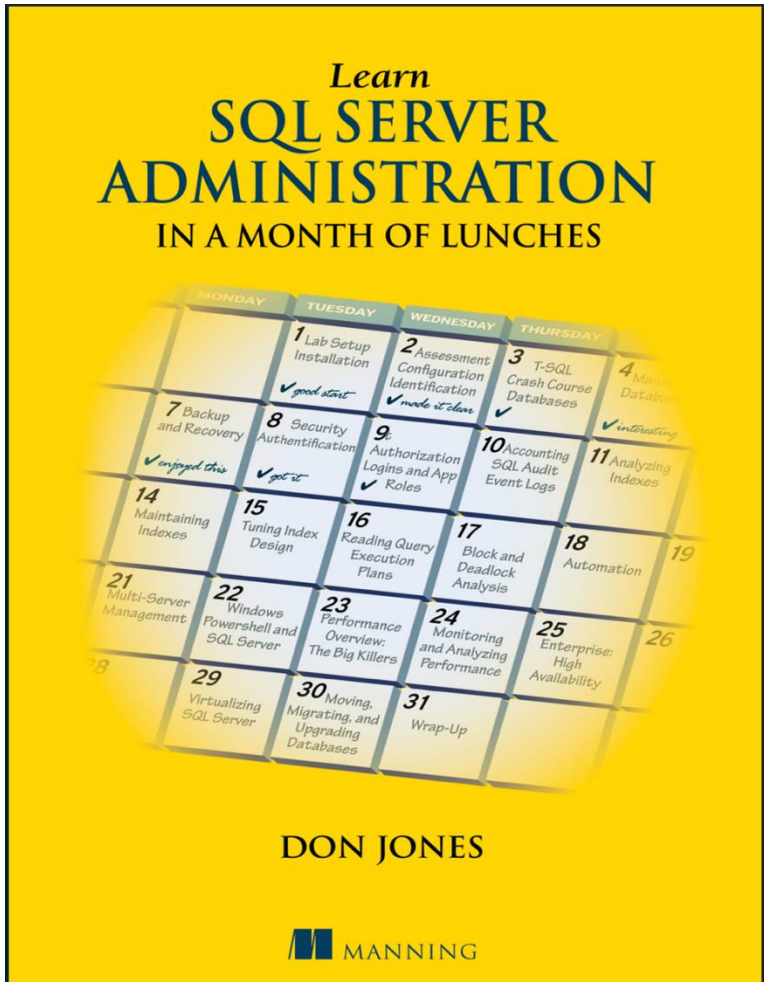
- Course overview
- Introduction to **Microsoft SQL Server (MSSQL)** and where it is used
- SQL Server ecosystem: **Database Engine + SSMS + connection concept**
- MSSQL basics: **SQL/T-SQL**, transactions, and core components (DB/Relational/Storage engines)
- Installation overview: **SQL Server Engine + SSMS** (Developer/Express for learning)

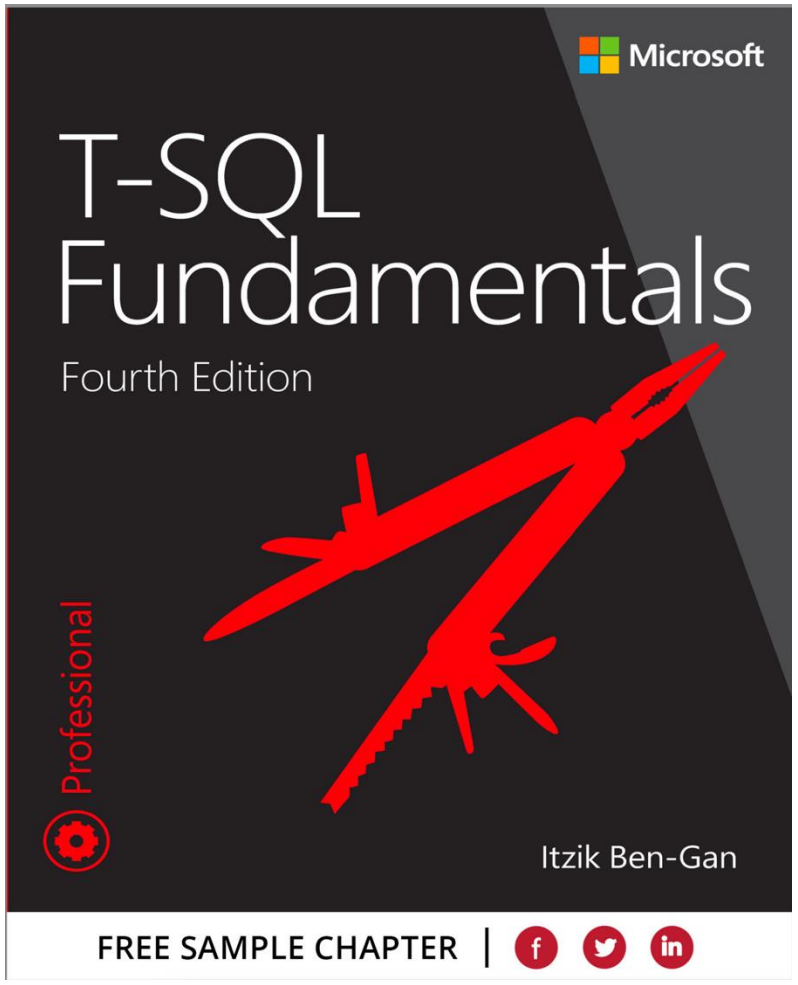
Learning Outcomes

By the end of this lecture, students will be able to:

- Explain what **Microsoft SQL Server (MSSQL)** is and its main purpose as an RDBMS
- Distinguish between **SQL Server Database Engine** and **SSMS**, and describe how a client connects to an engine instance
- Identify the main components of SQL Server (Database/Relational/Storage engines) and their roles
- Prepare a working lab setup by stating the required installations: **SQL Server Engine + SSMS** (Developer/Express)

Materials


Learn
SQL SERVER ADMINISTRATION
IN A MONTH OF LUNCHES
DON JONES
MANNING


Microsoft
T-SQL Fundamentals
Fourth Edition
Professional
Itzik Ben-Gan
FREE SAMPLE CHAPTER

Assessment and Grading

Assessment Type	Weight	Quantity
Midterm Exam	20%	1
Quiz	10%	2
Lab Quiz	15%	2-3
Presentation	15%	1
Final Exam	40%	1

Group Presentation Assignment (15 Marks)

As part of the course requirements, you must complete a **group presentation** worth **15 marks**.

Form a team of **6 students** and deliver a **15-minute** presentation on a **Database Security** topic.

Each team must choose a **different topic** from the other teams (topics cannot be repeated).

Submit your **team list + selected topic** by 1st of March, and submit the presentation by **05 April**.

Bonus Project (Group Work)

This is an optional **Bonus Project** to earn extra marks in this course. You will work in a **group of 2 students** and submit your work as an **Overleaf (LaTeX) report**. The **aim** of this project is to help you **learn how to use Overleaf and LaTeX** for academic writing, and to improve your skills in **reading, understanding, and reviewing research papers** in the field of **Database Security**. You must choose **one** option from the next slides. The deadline for submission is **15 April.**

Option A: Technical Report (3 Marks)

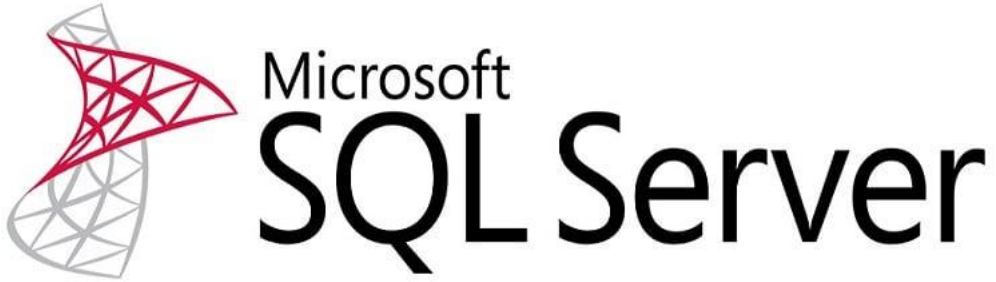
In this option, your group will write a structured report in **Overleaf** about **any topic related to Database Security.** Your report must contain a **Table of Contents**, clear **titles and subtitles**, and good academic writing in your own words. You must include **at least one figure** and **at least one table**, and finish with a **References** section using correct citations. This option is worth **3 marks**.

Option B: Research Review (5 Marks) 

In this option, your group will select **one database security topic** and choose **5 research papers** about the same topic. You must **read the full papers** (not only the abstract), then write a **review report** in Overleaf that summarizes and compares the papers. Your review should include the main idea of each paper, methods used, key results, and strengths/limitations, then provide a final comparison and conclusion. Your report must include a **Table of Contents**, clear **titles/subtitles**, **figures and tables** (for example: a comparison table of the 5 papers), and correct **References**. This option is worth **5 marks**. The deadline is **15 April.**

Introduction of MS SQL Server

Microsoft SQL Server (MSSQL) is a **relational database management system (RDBMS)** developed by Microsoft. Its primary function is to store and retrieve data as requested by other software applications, supporting a wide variety of transaction processing, business intelligence (BI), and data analytics applications.



Introduction to the Ecosystem

Before writing code, you need to understand the two main components you'll be using:

- **SQL Server Engine:** The "brain" that stores and processes data.
- **SQL Server Management Studio (SSMS):** The "face" or Graphical User Interface (GUI) where you write queries and manage the server.
- **The Connection:** You use SSMS to "connect" to a Database Engine instance (usually localhost for your own machine).

Introduction of MS SQL Server (cont.)

- Microsoft SQL Server or MS SQL Server for short is the query language provided for data definition and manipulation.
- SQL Server is a Relational Database Management Systems which was developed and marketed by the Microsoft company.
- SQL and SQL servers are built as two layers where the SQL server is on the top for interacting with the relational databases.
- MS SQL Server also has T-SQL or Transact-SQL and the main focus of T-SQL is to handle the transactions.

Introduction of MS SQL Server (cont.)

- As it is a Microsoft's developed system, it worked only on Microsoft's environment until it was made available on Linux platforms in the year 2016.
- SQL Server is composed of: **Database engine, and Relational engine, and Storage engine.**

1. Database Engine:

Database is a collection of various data items on which the user can perform any kind of manipulations.

- The database engine has a relational engine on which a user can perform queries and it also comes with a storage engine which manages the data files, indexes and procedures.
- The database engine also creates and executes objects like triggers, views, procedures etc.

Introduction of MS SQL Server (cont.)

The Database Engine is the core service for storing, processing, and securing data. The Database Engine provides controlled access and transaction processing to meet the requirements of the most demanding data consuming applications within your enterprise. The Database Engine also provides rich support for sustaining business continuity through Business continuity and database recovery.

Introduction of MS SQL Server (cont.)

2. Relational Engine:

Relations are the connections between the two different databases or within the same database. It is stored in the form of a row and column intersection named tables.

- It manages query processing, memory management, buffer management, threads, and much more.
- It has another layer named storage engine.

Introduction of MS SQL Server (cont.)

3. Storage Engine:

- It looks upon the storage of data.
- It is done using systems like disks and Storage Area Network or SAN.

Installation of Microsoft SQL Server

To install Microsoft SQL Server and its management tools, you'll need to complete two main phases: installing the SQL Server database engine and installing **SQL Server Management Studio (SSMS)**, the graphical interface used to manage it. The free **Developer Edition** or **Express Edition** are suitable for learning and development environments.

Microsoft SQL Server Installation Guide

- Microsoft SQL Server 2019 Installation Guide
- Installing SQL Server – A step-by-step tutorial (with screenshots) | Storm Internet
- How to Install SQL Server 2025 on Windows 10/11 [2026] with SQL Server Management Studio 22 (SSMS)

- To set up your environment for the practical lecture, you need to install two separate components: the **Database Engine** (SQL Server) and the **Management Tool** (SSMS).

Download Links (Official)

- **SQL Server Engine:** Microsoft SQL Server Downloads
  - *Recommendation:* Download the **Developer Edition**. It is free for development/learning and includes every feature of the Enterprise edition.
- **SQL Server Management Studio (SSMS):** Download SSMS
  - *Note:* As of 2026, the latest version is **SSMS 22**, which now uses a "stub installer" through the Visual Studio Installer.


Any
Question