Aptech

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Module Presenter's Manual

For

Data Management with SQL Server

Effective from: March 2021
Ver 1.0

Amendment Record

Version No.	Effective Date	Change	Replaced Pages
1.0	March 2021	New	-

Table Of Contents

1. Introduction

At the end of this module, student will be able to:

- Describe the architecture and editions of SQL Server.
- Work with SQL Server Management Studio.
- Describe the basic architecture, versions, and editions of SQL Server.
- Describe the role of SQL Azure compared to on-premises SQL Server.
- Describe how to connect to SQL Azure with SSMS.
- Categorize SQL statements into their dialects.
- Identify the elements of T-SQL, including predicates, operators, expressions, and comments.
- Describe the elements of a SELECT statement.
- Write SELECT DISTINCT clauses.
- Describe the common join types in T-SQL queries.
- Write queries that use joins.
- Describe how to sort and filter data.
- Describe the difference between implicit and explicit data type conversion.
- Describe the character data types supplied by SQL Server.
- Describe the impact of collation on character data.
- Concatenate strings.
- Extract and manipulate character data using built-in functions.
- Write queries comparing dates and times.
- Write queries that use the HAVING clause to filter groups.
- Use Table Expressions.
- Use Set Operators.
- Write queries that use window aggregate, window ranking, and window offset functions.
- Describe the architecture of SQL Server 2019.
- Describe how to configure the number of tempdb data files.
- Explain Multiple TempDB data files.
- Outline the Execution Plans feature in SQL Server 2019.
- Explain how to automatically keep the history of the data in the table.
- Explain how to protect data at rest and in motion.
- Describe Security enhancements in SQL Server 2019.
- Explain how to work with JSON data.
- Explain how to work with PolyBase.
- Define and describe Query Store.
- Explain how to dynamically stretch warm and cold transactional data from SQL Server to Azure.
- Describe how to tune workload performance with Query Store.
- Explain how to start and use Database Engine Tuning Advisor in SQL Server 2019.
- Explain the set of tools for monitoring events in SQL Server 2019 and for tuning the physical database design.
- Outline the enhancements in T-SQL.

2. Information on Session Allocation

Module	Online (No. of Hours)
SQL	40

Throughout this Presenter's Manual, the module **Database Management with SQL Server** will be referred to as **SQL.**

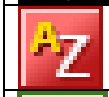
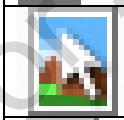
3. Module Deliverables

To aid the learning process, following are the deliverables:

(*Faculties can access eBooks and other components in Onlinevarsity through Aptrack*.)

Student Deliverables:

Resources available on Onlinevarsity:

Icons	Feature - Description/Functionality
	***Download Book -*** Student has the option to download the subject related e-book and read offline.
	***Glossary -*** Student can access a list of subject related specialized words with their definitions.
	***FAQ -*** Student can access frequently asked questions and their answers.
	***Show Me How -*** Student can view a step-wise simulation/demonstration of the module related topics.
	***Practice 4 Me -*** Student can test and evaluate their understanding of module related topics.
	***Work Assignments -*** Student can solve scenario based lab assignments (Hands-on). The faculty will evaluate and give their feedbacks.
	***References -*** Student can access additional subject related material for reading.
	***Feedback -*** Student can provide feedback on the course material.
	***Ask to Learn –*** Student can submit subject related technical queries. Queries submitted will be directed to the particular course coordinator/head.

4. Week-wise Session Schedule

- **A session is of 2 hours duration.**

Week	Day 1	Day 2	Day 3	Day 4
1	Session 1 SQL – TL1	Session 2 SQL – TL2	Session 3 SQL – TL3	Session 4 SQL – TL4
2	Session 5 SQL – TL5	Session 6 SQL – TL6	Session 7 SQL – TL7	Session 8 SQL – TL8
3	Session 9 SQL – TL9	Session 10 SQL – TL10	Session 11 SQL – TL11	Session 12 SQL – TL12
4	Session 13 SQL – TL13	Session 14 SQL – TL14	Session 15 SQL – TL15	Session 16 SQL – TL16
5	Session 17 SQL – TL17	Session 18 SQL – TL18	Session 19 SQL – TL19	Session 20 SQL – TL20

SQL: Database Management (SQL Server)
TL: Online Session

5. Session Coverage

Session No.	Session Title	Session Details	Deliverables' Mapping
1	**SQL – TL1**	All the topics from Session 1 and Session 2 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 1 – RDBMS Concepts** ➢ Explain the concept of data and database ➢ Describe the approaches to data management ➢ Define a Database Management System and list its benefits ➢ Explain the different database models ➢ Define and explain RDBMS ➢ Describe entities and tables and list the characteristics of tables ➢ List the differences between a DBMS and RDBMS **Session 2 – Entity-Relationship (E-R) Model and Normalization** ➢ Define and describe data modeling ➢ Identify and describe the components of the E-R model ➢ Identify the relationships that can be formed between entities ➢ Explain E-R diagrams and their use ➢ Describe symbols used in an E-R diagram ➢ Define normalization ➢ Describe the various normal forms ➢ Outline the various relational operators used in relational data models	**Intelligent Data Management with SQL Server** SG - Session 1 & 2 XP - Session 1 & 2 TG - Session 1 & 2

Session No.	Session Title	Session Details	Deliverables' Mapping
2	**SQL – TL2**	The **Try It Yourself** section of Session 1 and Session 2 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 1 & 2
3	**SQL – TL3**	All the topics from Session 3 and Session 4 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 3 – Introduction to SQL Server 2019** ➢ Describe an overview of SQL Server 2019 ➢ Describe basic architecture and version history of SQL Server 2019 ➢ Outline the process of connecting to SQL Server instances ➢ Define databases and list the key features of AdventureWorks2019 sample database ➢ Explain the components of SQL Server Management Studio GUI ➢ Explain script file creation and organization ➢ Explain the process to execute Transact-SQL queries **Session 4 – Transact-SQL** ➢ Explain Transact-SQL ➢ List different categories of Transact-SQL statements ➢ Explain various data types supported by Transact-SQL ➢ Explain Transact-SQL language elements ➢ Explain sets and predicate logic ➢ Describe logical order of operators in the SELECT statement	**Intelligent Data Management with SQL Server** SG - Session 3 & 4 XP - Session 3 & 4 TG - Session 3 & 4

Session No.	Session Title	Session Details	Deliverables' Mapping
4	**SQL – TL4**	The **Try It Yourself** section of Session 3 and Session 4 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 3 & 4
5	**SQL – TL5**	All the topics from Session 5 and Session 6 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 5 – Creating and Managing Databases** ➢ Explain about modification of system data ➢ Describe adding of filegroups and transaction logs ➢ Outline the process to create a database ➢ Describe how to drop a database ➢ Explain database snapshots **Session 6 – Creating Tables** ➢ List SQL Server 2019 data types ➢ Describe the procedure to create, modify, and drop tables in an SQL Server database ➢ Describe the procedure to add, modify, and drop columns in a table	**Intelligent Data Management with SQL Server** SG - Session 5 & 6 XP - Session 5 & 6 TG - Session 5 & 6
6	**SQL – TL6**	The **Try It Yourself** section of Session 5 and Session 6 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 5 & 6
7	**SQL – TL7**	All the topics from Session 7 and Session 8 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 7 – Azure SQL**	**Intelligent Data Management with SQL Server** SG - Session 7 & 8 XP - Session 7 & 8

Session No.	Session Title	Session Details	Deliverables' Mapping
		➢ Explain Azure SQL ➢ List the features and benefits of Azure SQL ➢ State the differences between Azure SQL and on-premises SQL Server ➢ Explain steps to connect Azure SQL with SSMS **Session 8 – Accessing Data** ➢ Describe SELECT statement, its syntax, and use ➢ Explain various clauses used with SELECT ➢ State the use of ORDER BY clause ➢ Describe working with typed and untyped XML ➢ Explain the procedure to create, use, and view XML schemas	TG - Session 7 & 8
8	**SQL – TL8**	The **Try It Yourself** section of Session 7 and Session 8 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 7 & 8
9	**SQL – TL9**	All the topics from Session 9 and Session 10 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 9 – Advanced Queries and Joins** ➢ Explain grouping and aggregating data ➢ Describe subqueries ➢ Describe table expressions ➢ Explain Joins ➢ Describe various types of Joins ➢ Explain the use of various set	**Intelligent Data Management with SQL Server** SG - Session 9 & 10 XP - Session 9 & 10 TG - Session 9 & 10

Session No.	Session Title	Session Details	Deliverables' Mapping
		operators to combine data ➢ Describe pivoting and grouping set operations **<u>Session 10 – Views, Stored Procedures, and Querying Metadata</u>** ➢ Define views ➢ Describe the technique to create, alter, and drop views ➢ Define stored procedures and its types ➢ Describe the procedure to create, alter, and execute stored procedures ➢ Describe nested stored procedures ➢ Describe querying SQL Server metadata System Catalog views and functions	
10	**SQL – TL10**	The **Try It Yourself** section of Session 9 and Session 10 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**<u>Intelligent Data Management with SQL Server</u>** Session 9 & 10
11	**SQL – TL11**	All the topics from Session 11 of *Intellgent Data Management with SQL Server* book should be covered in this session. **<u>Session 11 – Indexes</u>** ➢ Define and explain Indexes ➢ Explain Storage Structure ➢ Explain types of Indexes ➢ Understand Index Management	**<u>Intelligent Data Management with SQL Server</u>** SG - Session 11 XP - Session 11 TG - Session 11
12	**SQL – TL12**	All the topics from Session 12 of *Intellgent Data Management with SQL Server* book should be covered in this session.	**<u>Intelligent Data Management with SQL Server</u>** SG - Session 12

Session No.	Session Title	Session Details	Deliverables' Mapping
		Session 12 – Triggers ➢ Explain triggers ➢ Explain the procedure to create and alter DML triggers ➢ Describe nested triggers ➢ Describe update functions ➢ Explain the handling of multiple rows in a session ➢ Explain the performance implication of triggers implication	XP - Session 12 TG - Session 12
13	**SQL – TL13**	The **Try It Yourself** section of Session 11 and Session 12 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 11 & 12
14	**SQL – TL14**	All the topics from Session 13 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 13 – Programming Transact-SQL** ➢ Describe Transact-SQL programming ➢ Describe program flow statements ➢ Describe various Transact-SQL functions ➢ Explain the procedure to create and alter User-Defined Functions (UDFs) ➢ Explain creation of windows with OVER ➢ Describe window functions	**Intelligent Data Management with SQL Server** SG - Session 13 XP - Session 13 TG - Session 13
15	**SQL – TL15**	All the topics from Session 14 of *Intellgent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** SG - Session 14

Session No.	Session Title	Session Details	Deliverables' Mapping
		Session 14 – Transactions ➢ Define and describe transactions ➢ Explain the procedure to implement transactions ➢ Explain the steps to mark a transaction ➢ Distinguish between implicit and explicit transactions ➢ Explain isolation levels ➢ Explain the scope and different types of locks ➢ Explain transaction management	XP - Session 14 TG - Session 14
16	**SQL – TL16**	The **Try It Yourself** section of Session 13 and Session 14 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 13 & 14
17	**SQL – TL17**	All the topics from Session 15 and Session 16 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 15 – Error Handling** ➢ Explain error handling and its implementation ➢ Describe the TRY-CATCH block ➢ Explain the procedure to display error information ➢ Describe the @@ERROR and RAISERROR statements ➢ Explain the use of ERROR_STATE, ERROR_SEVERITY, and ➢ ERROR_PROCEDURE ➢ Explain the use of ERROR_NUMBER, ERROR_MESSAGE, and ERROR_LINE ➢ Describe the THROW statement	**Intelligent Data Management with SQL Server** SG - Session 15 & 16 XP - Session 15 & 16 TG - Session 15 & 16

Session No.	Session Title	Session Details	Deliverables' Mapping
		Session 16 – Enhancements in SQL Server 2019 ➢ Describe the importance of new error messages ➢ Describe how to perform vulnerability assessment ➢ Explain Big Data clusters ➢ Explain how to use JSON data with SQL Server 2019	
18	**SQL – TL18**	The **Try It Yourself** section of Session 15 and Session 16 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 15 & 16
19	**SQL – TL19**	All the topics from Session 17 of *Intellgent Data Management with SQL Server* book should be covered in this session. **Session 17 – PolyBase, Query Store, and Stretch Database** ➢ Describe PolyBase ➢ Explain features and advantages of PolyBase ➢ Define and describe Query Store ➢ ➢ Explain how to dynamically stretch warm and cold transactional data from SQL Server to Azure ➢ Describe how to tune workload performance with Query Store	**Intelligent Data Management with SQL Server** SG - Session 17 XP - Session 17 TG - Session 17
20	**SQL – TL20**	The **Try It Yourself** section of Session 17 of *Intelligent Data Management with SQL Server* book should be covered in this session.	**Intelligent Data Management with SQL Server** Session 17

6. Library References

- **Microsoft SQL Server 2019: A Beginner's Guide, Seventh Edition** by Dusan Petkovic
- **Expert T-SQL Window Functions in SQL Server 2019 The Hidden Secret to Fast Analytic and Reporting Queries b**y Kathi Kellenberger, Clayton Groom, Ed Pollack
- **Querying Microsoft SQL Server 2019** by Adam Wilbert
- **Query Store for SQL Server 2019: Identify and Fix Poorly Performing Queries** by Grant Fritchey and Tracy Boggiano

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