



Module Presenter's Manual

For

Database Management (SQL Server)

*Effective from: March 2017
Ver 1.0*

Amendment Record

Version No.	Effective Date	Change	Replaced Pages
1.0	March 2017	New	-

Table Of Contents

Sr. No.	Details	Page No.
1.	Introduction	1
2.	Information on Session Allocation	4
3.	Module Deliverables	4
4.	Week-wise Session Schedule	6
5.	Session Coverage	7
6.	Library References	15

1. Introduction

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

- Describe the architecture and editions of SQL Server 2012.
- Work with SQL Server Management Studio.
- Describe the basic architecture, versions, and editions of SQL Server 2012.
- 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 an overview of SQL Server 2017.
- Describe the architecture of SQL Server 2017.
- List and describe the different editions and versions of SQL Server.
- Outline the new features of SQL Server 2017.
- Explain In-database Advanced Analytics.
- Explain JSON support in SQL Server 2017.
- Describe SQL Server 2017 In-memory enhancements.
- Explain support for in-database analytics with R integration.
- Describe how to configure the number of tempdb data files.
- Explain Multiple TempDB data files.
- Outline the Execution Plans feature in SQL Server 2017.
- 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 2017.
- 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 2017.
- Explain the set of tools for monitoring events in SQL Server 2017 and for tuning the physical database design.
- Outline the enhancements in T-SQL.

2. Information on Session Allocation

Module	Online (No. of Hrs)
SQL	40

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

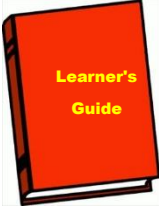
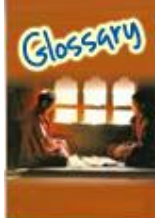


3. Module Deliverables







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 eBook - 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.
	Download Source code / Files – Student can download courseware related source files.
	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 has duration of 2 hrs.

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

TL – Online Session

SQL – Database Management (SQL Server)

5. Session Coverage

Session No.	Session Title	Session Details	Deliverables' Mapping
1	SQL – TL1	<p>All the topics from Session 1, Session 2, and Session 3 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 1 – RDBMS Concepts</u></p> <ul style="list-style-type: none"> ➤ 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 <p><u>Session 2 – Entity-Relationship (E-R) Model and Normalization</u></p> <ul style="list-style-type: none"> ➤ 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 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 1 & 2 XP - Session 1 & 2 TG - Session 1 & 2</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
2	SQL – TL2	<p>All the topics from Session 3, and Session 4 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 3 – Introduction to SQL Server 2012</u></p> <ul style="list-style-type: none"> ➤ Describe the basic architecture of SQL Server 2012 ➤ List the various versions of SQL Server ➤ List the different editions of SQL Server ➤ Explain the role and structure of SQL Server databases ➤ List the new features of SQL Server 2012 ➤ Describe an overview of SSMS ➤ Describe connecting to SQL Server instances through SSMS ➤ Explain the use of Object Explorer ➤ Describe script files ➤ Explain executing T-SQL queries <p><u>Session 4 – SQL Azure</u></p> <ul style="list-style-type: none"> ➤ Define and Explain SQL Azure ➤ List the benefits of SQL Azure ➤ State the differences between the SQL Azure and On-premises SQL Server ➤ Describe connecting to SQL Azure with SSMS 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 3 & 4 XP - Session 3 & 4 TG - Session 3 & 4</p>
3	SQL – TL3	<p>All the topics as listed below from Session 5 and Session 6 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 5 – Transact-SQL</u></p> <ul style="list-style-type: none"> ➤ Explain Transact-SQL ➤ Describe the different 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 5 & 6 XP - Session 5 & 6 TG - Session 5 & 6</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
		<p>categories of T-SQL statements</p> <ul style="list-style-type: none"> ➤ Explain the various data types supported by T-SQL ➤ Explain T-SQL Language elements ➤ Explain Sets and Predicate Logic ➤ Describe the logical order of operators in SELECT statements <p><u>Session 6 – Creating and Managing Databases</u></p> <ul style="list-style-type: none"> ➤ Describe system and user-defined databases ➤ List the key features of the AdventureWorks sample database ➤ Describe adding of filegroups and transaction logs ➤ Describe the procedure to create a database ➤ List and describe types of database modifications ➤ Describe the procedure to drop a database ➤ Describe database snapshots 	
4	SQL – TL4	The workshop lessons of Session 3 to Session 6 of <i>SQL Server Inside Out</i> course should be covered in this session.	<p><u>SQL Server Inside Out</u></p> <p>Session 3, 4, 5, & 6</p> <p>(OnlineVarsity)</p>
5	SQL – TL5	<p>All the topics as listed below from Session 7 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 7 – Creating Tables</u></p> <ul style="list-style-type: none"> ➤ List SQL Server 2012 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 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 7 XP - Session 7 TG - Session 7</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
6	SQL – TL6	<p>All the topics as listed below from Session 8 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 8 – Accessing Data</u></p> <ul style="list-style-type: none"> ➤ Describe the SELECT statement, its syntax, and use ➤ Explain expressions with SELECT statement ➤ Explain the various clauses used with SELECT ➤ State the use of ORDER BY clause ➤ Describe working with typed and untyped XML ➤ Explain XML namespaces ➤ Explain the procedure to create, use, and view XML schemas <p>Explain use of XQuery to access XML data</p>	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 8 XP - Session 8 TG - Session 8</p>
7	SQL – TL7	<p>All the topics as listed below from Session 9 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 9 – Advanced Queries and Joins</u></p> <ul style="list-style-type: none"> ➤ Explain grouping and aggregating data ➤ Describe subqueries ➤ Describe table expressions ➤ Explain joins ➤ Describe various types of joins ➤ Explain the use of various set operators to combine data ➤ Describe pivoting and grouping set operations 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 9 XP - Session 9 TG - Session 9</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
8	SQL – TL8	<p>All the topics as listed below from Session 10 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 10 – Using Views, Stored Procedures, and Querying Metadata</u></p> <ul style="list-style-type: none"> ➤ Define views ➤ Describe the procedure to create, alter, and drop views ➤ Define stored procedures ➤ Explain the types of stored procedures ➤ Describe the procedure to create, alter, and execute stored procedures ➤ Describe nested stored procedures ➤ Describe querying SQL Server metadata 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 10 XP - Session 10 TG - Session 10</p>
9	SQL – TL9	<p>The workshop lessons of Session 7 to Session 10 of <i>SQL Server Inside Out</i> course should be covered in this session.</p>	<p><u>SQL Server Inside Out</u></p> <p>Session 7, 8, 9, & 10</p> <p>(OnlineVarsity)</p>
10	SQL – TL10	<p>All the topics as listed below from Session 11 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 11 – Indexes</u></p> <ul style="list-style-type: none"> ➤ Define and explain indexes ➤ Describe the performance of indexes ➤ Explain clustered indexes ➤ Explain nonclustered indexes ➤ Explain partitioning of data ➤ Explain the steps to display query performance data using indexes 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 11 XP - Session 11 TG - Session 11</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
11	SQL – TL11	<p>All the topics as listed below from Session 12 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 12 – Triggers</u></p> <ul style="list-style-type: none"> ➤ Explain triggers ➤ Explain the different types of triggers ➤ Explain the procedure to create DML triggers ➤ Explain the procedure to alter DML triggers ➤ Describe nested triggers ➤ Explain the handling of multiple rows in a session ➤ Explain the performance implication of triggers 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 12 XP - Session 12 TG - Session 12</p>
12	SQL – TL12	<p>All the topics as listed below from Session 13 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 13 – Programming Transact-SQL</u></p> <ul style="list-style-type: none"> ➤ Describe an overview of programming with Transact-SQL ➤ Describe the Transact-SQL programming elements ➤ Describe program flow statements and functions ➤ 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 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 13 XP - Session 13 TG - Session 13</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
13	SQL – TL13	<p>All the topics as listed below from Session 14 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 14 – Transactions</u></p> <ul style="list-style-type: none"> ➤ Define and describe transactions ➤ Explain the procedure to implement transactions ➤ Explain the process of controlling transactions ➤ Explain the steps to mark a transaction ➤ Distinguish between the Implicit and Explicit transactions ➤ Distinguish between the Implicit and Explicit transactions 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 14 XP - Session 14 TG - Session 14</p>
14	SQL – TL14	<p>The workshop lessons of Session 11 to Session 14 of <i>SQL Server Inside Out</i> course should be covered in this session.</p>	<p><u>SQL Server Inside Out</u></p> <p>Session 11, 12, 13, & 14</p> <p>(OnlineVarsity)</p>
15	SQL – TL15	<p>All the topics as listed below from Session 15 and Session 16 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 15 – Error Handling</u></p> <ul style="list-style-type: none"> ➤ Explain the various types of errors ➤ Explain error handling and the 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 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 15 & 16 XP - Session 15 & 16 TG - Session 15 & 16</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
		<p>ERROR_NUMBER, ERROR_MESSAGE, and ERROR_LINE</p> <ul style="list-style-type: none"> ➤ Describe the THROW statement <p><u>Session 16 – Introduction to SQL Server 2017</u></p> <ul style="list-style-type: none"> ➤ Describe an overview of SQL Server 2017 ➤ Outline the new features of SQL Server 2017 ➤ List and describe the different editions of SQL Server 2017 	
16	SQL – TL16	<p>All the topics from Session 17 and Session 18 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 17 – New Features of SQL Server 2017</u></p> <ul style="list-style-type: none"> ➤ List new features of SQL Server 2017 ➤ Explain Real-time Operational Analytics ➤ Describe native JSON support ➤ Explain AlwaysOn feature ➤ Describe the enhancements made to In-Memory OLTP (Hekaton) ➤ Explain support for in-database analytics with R integration <p><u>Session 18 – Enhancements in SQL Server 2017</u></p> <ul style="list-style-type: none"> ➤ Describe the importance of configuring tempdb database files ➤ Describe how to configure tempdb during installation of an instance of SQL Server 2017 ➤ Outline the allocation and autogrowth of tempdb files in SQL Server 2017 ➤ List the differences between 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 17 & 18 XP - Session 17 & 18 TG - Session 17 & 18</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
		<p>the two execution plans</p> <ul style="list-style-type: none"> ➤ Explain how to enable system-versioning on tables 	
17	SQL – TL17	<p>The workshop lessons of Session 16 to Session 18 of <i>SQL Server Inside Out</i> course should be covered in this session.</p>	<p><u>SQL Server Inside Out</u></p> <p>Session 15, 16, 17, & 18</p> <p>(OnlineVarsity)</p>
18	SQL – TL18	<p>All the topics from Session 19 and Session 20 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 19 – Security Upgrades and Working with JSON</u></p> <ul style="list-style-type: none"> ➤ Explain how to use SQL Server features to protect data at rest and in motion ➤ Describe security enhancements in SQL Server 2017 ➤ Explain how to work with JSON data <p><u>Session 20 – PolyBase, Query Store, and Stretch Database</u></p> <ul style="list-style-type: none"> ➤ Define PolyBase ➤ Explain features and advantages of PolyBase ➤ 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 	<p><u>SQL Server Inside Out</u></p> <p>SG - Session 19 & 20 XP - Session 19 & 20 TG - Session 19 & 20</p>
19	SQL – TL19	<p>All the topics from Session 21 of <i>SQL Server Inside Out</i> book should be covered in this session.</p> <p><u>Session 21 – Improved</u></p>	<p><u>SQL Server Inside Out</u></p> <p>Session 21</p>

Session No.	Session Title	Session Details	Deliverables' Mapping
		<p><u>Performance Tools and Transact-SQL Enhancements</u></p> <ul style="list-style-type: none"> ➤ Explain how to start and use Database Engine Tuning Advisor in SQL Server 2017. ➤ Explain the set of tools for monitoring events in SQL Server 2017 and for tuning the physical database design. ➤ Outline the enhancements in Transact-SQL. 	
20	SQL – TL20	The workshop lessons of Session 19 to Session 21 of <i>SQL Server Inside Out</i> course should be covered in this session.	<p><u>SQL Server Inside Out</u></p> <p>Session 19, 20, & 21</p> <p>(OnlineVarsity)</p>

6. Library References

➤	Introducing Microsoft SQL Server 2017 by Stacia Varga, Denny Cherry, and Joseph D'Antoni
➤	Microsoft SQL Server 2012 T-SQL Fundamentals by Itzik Ben-Gan
➤	Introducing Microsoft SQL Server 2012 by Ross Mistry, Stacia Misner
➤	Microsoft SQL Server 2012 Bible by Adam Jorgensen, Jorge Segarra, Patrick Leblanc, Denny Cherry, Aaron Nelson

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