



Openminds Technologies



SQL Server Course

Database & SQL Introductions — 2 Hrs
SQL Server Introduction — 2 Hrs
SQL Sub Languages [DDL, DML, DRL, TCL, DCL] — 4 Hrs
Clauses & Operators, Set Operators — 2 Hrs
Constraints & Normalization — 4 Hrs
Data Modeling [OLTP & OLAP] — 2 Hrs
Subqueries, Joins, Functions, Views — 5 Hrs
Stored Procedures & Exception Handling — 4 Hrs
Temp Storages [Variables, Tables, CTE] — 2 Hrs
Dynamic SQL, Triggers, Cursors — 3 Hrs
Performance Tuning — 3 Hrs
Near Real-Time Project — 3 Hrs
Resume Prep & FAQs — 2 Hrs



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1**DATA, DATA STORAGES, DATABASES AND SQL NITTY-GRITTIES**

- Data Fundamentals
 - What is Data and Data Formats
 - Data Storage
 - Structured Data in Databases
 - On-Premises and Cloud Data Storage
 - Database Providers and Products
- SQL Fundamentals
 - SQL Use in Different Platforms
 - Frontend Applications
 - Business Intelligence
 - Data Engineering
 - Data Science
 - How to Interact with Different Databases Using SQL
 - Opportunities with SQL

2**SQL SERVER DATABASE NITTY-GRITTIES**

- Versions and Editions in SQL Server
 - Enterprise Edition
 - Standard Edition
 - Developer Edition
 - Workgroup Edition
 - Express Edition
- Editions of SQL Server
- Features of SQL Server
- IDEs in SQL Server
- SQL Server Tools
 - Database
 - SSIS
 - SSAS

3**SQL SERVER DATABASE INSTALLATION**

- SQL Server Database Installation
- Server Name, Instance and Authentication
- Installation Summary
- SQL Server Management Studio Installation
 - Object Explorer
 - Query Editor
- SQL Server Connections with SSMS
 - Single Instance
 - Multi-Instance



4 BASIC OPERATIONS WITH TOOL [SSMS]

- System-Defined Databases and Usage
 - masterdb
 - msdb
 - modeldb
 - tempdb
- User-Defined Database Creation and Usage
 - MDF, LDF and NDF Files
- Basic Operations on User-Defined Tables
 - Create User Tables
 - Insert Data
 - Update Data
 - Delete Data

5 COMMAND, QUERY AND SQL SERVER ARCHITECTURE

- Difference Between Query and Command
- Query and Command Execution in SQL Server
- Parser, Compiler, Optimizer, Syntaxer and CLR
- Storage Engine [SQL Engine]
- Lock, File, Transaction Manager and Buffer Manager
- Buffer and Threads

6 SQL SERVER DATA DEFINITION LANGUAGE [DDL]

- Create Table Structure
- Modify Table Structure
 - ALTER ADD
 - ALTER MODIFY
 - ALTER DROP
- Remove Data and Structure from Tables
- SELECT INTO Command
- Difference Between TRUNCATE and DROP
- SQL Server Data Types

7 SQL SERVER DATA MANIPULATION LANGUAGE [DML]

- | | |
|---|--|
| - Data Loading into Tables | - BULK INSERT |
| - Single-Row, Multi-Row & Required-Column Inserts into Tables | - MERGE Command Operations |
| - Modify Table Data | - Insert Table Data from Another Table |
| - Remove Data from Tables | |
| - Dif Between TRUNCATE, DELETE and DROP | |



8 SQL SERVER DATA RETRIVAL LANGUAGE [DRL]

- Data Loading into Tables
- Single-Row, Multi-Row and Required-Column Inserts into Tables
- Modify Table Data
- Remove Data from Tables
- Difference Between TRUNCATE, DELETE and DROP
- BULK INSERT
- MERGE Command Operations
- Insert Table Data from Another Table

9 SQL SERVER DATA CONTROL LANGUAGE [DCL]

- Providing Privileges [GRANT]
- Removing Privileges [REVOKE and DENY]
- Implicit and Explicit Grants

10 SQL SERVER TRANCATION CONTROL LANGUAGE [TCL]

- Providing Privileges [GRANT]
- Removing Privileges [REVOKE and DENY]
- Implicit and Explicit Grants

11 CLAUSES AND DATA FILTERS

- | | |
|--|---|
| <ul style="list-style-type: none">- Working with SELECT Statement- Clauses<ul style="list-style-type: none">• FROM• WHERE• GROUP BY• HAVING• ORDER BY- Single-Value Match Operators• Arithmetic Operators
+, -, *, %, /• Comparison Operators
<, >, <=, >=, =, <>, !=• Logical Operators
AND, OR, NOT | <ul style="list-style-type: none">- Multi-Value Match Operators<ul style="list-style-type: none">• IN• BETWEEN• LIKE• EXISTS• IS NULL• NOT IN• NOT BETWEEN• NOT LIKE• NOT EXISTS• IS NOT NULL- Working with TOP |
|--|---|



12**MULTI TABLE OPERATIONS [ROW-WISE SET THEORY]**

- Data Loading into Tables
- Single-Row, Multi-Row and Required-Column Inserts into Tables
- Modify Table Data
- Set Theory Generic Protocols
- INTERSECT
- UNION
- UNION ALL
- EXCEPT
- Working on Incremental Loading
- Remove Data from Tables
- Difference Between TRUNCATE, DELETE and DROP
- BULK INSERT
- MERGE Command Operations
- Insert Table Data from Another Table

13**MULTI TABLE OPERATIONS [COLUMN-WISE]**

- Simple Subquery
- Correlated Subquery
- Nested Subquery
- Difference Between Simple and Correlated Subquery

14**MULTI TABLE OPERATIONS [COLUMN-WISE JOINS]**

- Joins in Real-Time Usage
- CROSS JOIN and CROSS APPLY
- INNER JOIN [Equi, Non-Equi]
- NATURAL JOIN
- SELF JOIN
- LEFT OUTER JOIN
- RIGHT OUTER JOIN
- FULL OUTER JOIN
- ANTI LEFT OUTER JOIN
- ANTI RIGHT OUTER JOIN
- Working with ON and WHERE Clauses
- MERGE JOIN
- LOOP JOIN
- HASH JOIN

15**DATA INTEGRITY AND CONSTRAINTS**

- Domain Integrity
- NOT NULL
- DEFAULT
- CHECK

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DATA INTEGRITY AND CONSTRAINTS

- Entity Integrity
 - Primary Key and Limitations
 - UNIQUE and Limitations
- Referential Integrity
 - Foreign Key
- Keys
 - Composite Key
 - Candidate Key
 - Alternate Key
 - Super Key
 - Artificial Key
- Normal Column and Identity Column
 - Cascading
 - ON DELETE CASCADE
 - ON UPDATE CASCADE
 - ON DELETE SET NULL
 - ON UPDATE SET NULL
 - ON DELETE NO ACTION

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NORMALIZATION AND DATA MODELING

- What is Normalization
- Types of Normalization
- 1:1, 1:Many, Many-to-Many Relationships
- Business, Conceptual, Logical and Physical Data Models
- Dimension and Fact Tables
- Dimensional Model Schemas
 - Star Schema
 - Snowflake Schema
 - Galaxy Schema
- Entity-Relational Model [OLTP]
- Dimensional Model [OLAP]

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PHYSICAL DATA DISTRIBUTION [INDEXES]

- Clustered Index Design and Structure
- Non-Clustered Index Design and Structure
- Unique Index Design
- Index with Included Columns
- Columnstore Index
- Full-Text Index Population
- Filtered Index Design
- Covering Index Design
- B-Tree and Online Indexes
- Indexed View vs Materialized View
- Fill Factor, TempDB and Page Splits



- What is Schema and Real-Time Advantages with Practical Examples
- System-Defined Procedures Usage with Examples
 - sp_help
 - sp_helptext
 - sp_renamedb
 - sp_rename
 - sp_tables
 - sp_who2
 - sp_who
 - sp_spaceused
 - sp_statistics
 - sp_foreignkeys
- System-Defined Views Usage with Examples
 - sys.servers
 - sys.databases
 - sys.objects
 - sys.schemas
 - sys.views
 - sys.indexes
 - INFORMATION_SCHEMA.TABLES
 - INFORMATION_SCHEMA.COLUMNS

- Difference Between GROUP BY and DISTINCT, Performance Impact
- GROUP BY and HAVING Usage to Identify and Eliminate Duplicates
- ROLLUP and CUBE
- Creating Grand Totals and Subtotals
- Comparing ROLLUP, CUBE and GROUPING Functions

- Advantages and Limitations of Views
- Tables vs Views
- Simple Views [Modifiable Views]
- Complex Views [Read-Only Views]
- Materialized Views
- Encrypted Views
- Schema-Bound Views



- Advantages and Limitations of Functions

- System-Defined Functions

• String Functions

- ASCII
- CHAR
- CHARINDEX
- CONCAT
- CONCAT_WS
- +
- DATALENGTH
- LEFT
- LEN
- LOWER
- LTRIM
- NCHAR
- PATINDEX
- REPLACE
- RIGHT
- RTRIM
- SPACE
- STR
- STUFF
- SUBSTRING
- UPPER

• Aggregate Functions

- AVG
- BINARY_CHECKSUM
- CHECKSUM
- CHECKSUM_AGG
- COUNT
- COUNT_BIG
- GROUPING
- GROUPING_ID
- MAX
- MIN
- STDEV
- STDEVP
- SUM
- VAR
- VARP

Cursor Functions

- CURSOR_STATUS
- CURSOR_ROWS
- FETCH_STATUS

• Configuration Functions

- DATEFIRST
- DBTS
- LANGID
- LANGUAGE
- MAX_PRECISION
- REMSERVER
- SPID
- LOCK_TIMEOUT
- NESTLEVEL
- SERVERNAME
- TEXTSIZE
- MAX_CONNECTIONS
- OPTIONS
- SERVICE_NAME
- VERSION

• Date and Time Functions

- CURRENT_TIMESTAMP
- DATEADD
- DATEDIFF
- DATENAME
- DATEPART
- GETDATE
- GETUTCDATE
- ISDATE
- MONTH
- SWITCHOFFSET
- SYSDATETIME
- SYSDATETIMEOFFSET
- SYSUTCDATETIME
- TODATETIMEOFFSET
- YEAR

- Mathematical Functions

- ABS
- ACOS
- ASIN
- ATAN
- ATN2
- CEILING
- COS
- COT
- DEGREES
- EXP
- FLOOR
- LOG
- LOG10
- PI
- POWER
- RADIANS
- RAND
- ROUND
- SIGN
- SIN
- SQRT
- SQUARE
- TAN



21 FUNCTIONS [USER DEFINED & SYSTEM DEFINED]

- Other Functions
 - APP_NAME
 - CAST
 - CONVERT
 - CURRENT_USER
 - GETANSINULL
 - HOST_ID
 - HOST_NAME
 - IDENT_CURRENT
 - IDENT_INCR
 - IDENT_SEED
 - IDENTITY
 - ISNULL
 - ISNUMERIC
 - NEWID
 - NULLIF
 - PARSENAME
 - PERMISSIONS
 - ROWCOUNT
 - ROWCOUNT_BIG
 - SCOPE_IDENTITY
 - SESSION_USER
 - STATE_USER
 - TRANCOUNT
 - USER_NAME
- System-Defined Window Functions
 - Introduction to Window Functions
 - Basic Windowing Syntax
 - The Usual Suspects: SUM, COUNT and AVG
 - ROW_NUMBER()
 - RANK() and DENSE_RANK()
 - NTILE()
 - LAG() and LEAD()
 - Defining a Window Alias
- User-Defined Functions
 - Scalar-Valued Functions
 - Table-Valued Functions
- Difference Between Functions and Procedures

22 PROGRAMMING FUNDAMENTALS

- Other Functions
 - APP_NAME
 - CAST
 - CONVERT
 - CURRENT_USER
 - GETANSINULL
 - HOST_ID
- HOST_NAME
- IDENT_CURRENT
- IDENT_INCR
- IDENT_SEED
- IDENTITY
- ISNULL

23 STORED PROCEDURES

- Use in Real-Time and Types
- System-Defined and User-Defined Procedures
- Dynamic SQL Queries in Procedures
- IN, OUT and INOUT Parameters
- Dynamic Data Insertion with Procedures
- Using TEMP Tables in Procedures
- Stored Procedure Inside Stored Procedure



24**TEMP STORAGES**

- Local Variables vs Global Variables with Examples
- Table-Valued Variables
- Temporary Table Usage in Real Time
- Inline Views vs Normal Views
- Common Table Expressions (CTEs)
- CTE Usage in Real Time
- Multiple Examples Using CTEs
- Finding and Removing Duplicates
- Non-Recursive and Recursive CTEs

25**TRIGGERS**

- Use in Real Time
- Triggers vs Procedures
- Types of Triggers
- DML Triggers
- DDL Triggers
- FOR Triggers
- INSTEAD OF Triggers

26**CURSORS**

- What is a Cursor
- Cursor Life Cycle
- Working Process of Cursor

27**DYNAMIC SQL IMPLEMENTATION**

- Creating Dynamic SELECT statements
- Passing DynamicTable Names
- Creating a Procedure with Dynamic Table names & Variables
- Normal SQL vs Dynamic SQL

28**OTHERS**

- Project Explanation
- Day to Day Activities
- Real Time Database Environment
- Challenges
- Performance Tuning

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