

# SQL School <sup>TM</sup>

## Quality Training Assured

### Microsoft Fabric Training

	PLAN A	PLAN B	PLAN C
Applicable For (Resume Plan)	Microsoft Fabric	Azure Data Engineer Power BI Microsoft Fabric	SQL & T-SQL Queries Azure Data Engineer Power BI Microsoft Fabric
Fabric Licenses, Capacity	✓	✓	✓
Fabric Data Factory & ETL	✓	✓	✓
Fabric Notebooks	✓	✓	✓
Fabric Data warehouse	✓	✓	✓
Fabric Security Options	✓	✓	✓
ADF : Azure Data Factory	✓	✓	✓
ADF : Data Imports, ETL	X	✓	✓
Synapse: Configuration, Loads	X	✓	✓
Synapse: ETL with ADF, DWH	X	✓	✓
Storage: ADLS Gen 2, BLOB	X	✓	✓
Storage: Azure Tables, ACL, IAM	X	✓	✓
Azure Stream Analytics & Jobs	X	✓	✓
ADB : Azure Data Bricks, Spark	X	✓	✓
ADB : Spark Database, Data Loads	X	✓	✓
ADB : Delta Tables, PySpark ETL	X	✓	✓
DP 203 Exam Guidance	X	✓	✓
Power BI: Report Design, Visuals	X	✓	✓
Power BI: M Lang, DAX for ETL	X	✓	✓
Power BI: Cloud, Apps, Tenant	X	✓	✓
Power BI: Report Server, Project	X	✓	✓
DP 500, PL 300 Exams Guidance	X	✓	✓
TSQL: Database Basics, T-SQL	X	X	✓
TSQL : Constraints, Joins, Queries	X	X	✓
TSQL: Views, Group By, Self Joins	X	X	✓
<b>Total Duration</b>	4 Weeks	15 Weeks	18 Weeks

**Trainer:** Mr. Sai Phanindra T [18+ Yrs of Real-time Exp]. Profile @ [linkedin.com/in/saiphanindra](https://www.linkedin.com/in/saiphanindra)

Microsoft Fabric Training Modules		Duration
Module 1	Microsoft Fabric	4 Weeks
Module 2	Azure Data Engineer (DP 203) [Azure Funda, Azure Migrations, ADF, Synapse DWH, ADLS Storage, Spark SQL, Databricks, ASA, IoT, Real-time Project]	7 Weeks
	Power BI & Big Data Analytics (PL 300) [Power BI Cloud Service, Report Server, REST API, Dashboards, Power Query, DAX, Real-time Project, Resume Guide]	4 Weeks
Module 3	Database Basics, SQL, T-SQL Queries	3 Weeks
<b>Total Duration</b>		<b>18 Weeks</b>

## Module 1: Microsoft Fabric

(Applicable for Microsoft Fabric Plan A, B, C)

### Ch 1 : Fabrics Introduction

Big Data Analytics with Azure; Products and Services in Analytics; Microsoft Fabric - One Umbrella; Microsoft Fabric - Advantages; Unified Data Foundation; AI Powered Capabilities; OneLake: Storage; Synapse: Engineering, Warehouse; Synapse: Data Science, Analytics; Power BI: Business Intelligence; Action platform; Data Activator; Governance; Purview;

### Ch 2 : Fabric Licenses, Capacity

Fabric Workspace : Licensing; Fabric Components & Tenant; Organizational Licenses; Capacity, PPU and SKUs; Individual Licenses: Free, Pro; SKU Types: Azure & Office 365; Fabric Workspace : Activation; GUI: Walk Thru Options; Data Factory, Synapse Options; Power BI & Streaming Objects; Creating Fabric Capacity; Pause / Resume Capacity;

### Ch 3: Lakehouse Concepts

What is Lakehouse?; How to configure LakeHouse?; Lakehouse Explorer Tool; Interacting with Lakehouse Items; Pipelines and Notebooks; Spark Jobs and Dataflows Gen 2; Using Lakehouse Explorer; Main View and Ribbon Area; Table Section, File Section; Data Load Options to Lakehouse; SyMS and Unidentified Area; Landing Zone, Data Processing;

### Ch 4: Data Loads with Lakehouse

Large Scale Data Analytics; Onelake Metastore & Use; Workspace & LakeHouse; Lakehouse Explorer: Tables, Files; File Upload : Header, Data Types; Explorer Shortcuts in Lakehouse; File Data Load to Tables; SQL Queries in Tables; Lakehouse to SQL Endpoint; Transaction Audit: \_delta\_log; Aggregations, Visual Queries; Reports and Data Models;

### Ch 5: Fabric Data Factory - 1

Fabric Data Factory & ETL; Data Ingestions & Orchestrations; Dataflows and Pipeline Options; AI Based Transformations; Data Flows: Low Code Interface; Power Query : Advantages; Pipeline

Design: Copy Data; Compute and Optimizations; Connections & Datasets; Pipeline Activity: Options; Column Mapping & ETL; Canvas : Debug & Monitoring;

### **Ch 6: Fabric Data Factory - 2**

Fabric Studio: Copy Data Activity; Copy Assistant : Usage Options; Connections & Linked Services; serialization/deserialization; compression/decompression; Colum Mapping & Conversions; Activity Timeouts, Retries; Secure Input / Output Options; Column Mapping & Settings; Fabric Pipelines: Copy Methods; Existing Pipeline Edits, Publish; Pipeline Monitor & Logging;

### **Ch 7: Fabric Data Factory - 3**

Fabric Studio: Data Flow Activity; Spark Clusters : Automations; Spark Cluster Debugging; Spark Cluster Sizing, Capacity; Lakehouse Table: ETL Process; ADLS File Connectors; Power Query Transformations; Power Query Profiling; In-Memory Processing, M Lang; Data Flow Optimizations; Partition Options & Tuning; Broadcast Options & Tuning;

### **Ch 8: Fabrics & Spark Clusters**

Apache Spark Configurations; Data Engineering/Science; Sark Compute & Capacity; Node Family Settings; Memory Optimized; Transaction Optimized; Runtime Versions, Scaling; Notebooks, Concurrency; Python Libraries in Spark; Dataframes & Realtime Use; Spark SQL Queries & Data Loads; Data Visualizations & Spark;

### **Ch 9: Fabric Notebooks**

Spark Jobs for ETL; Spark Dataframes for ETL; Inferring & Explicit Schema; pyspark.sql.types; pyspark.sql.functions; Filter, Group Data Frames; Dataframe Storage, Partition; Spark Catalog : Objects; TempView in Spark Catalog; Spark SQL API & Visualizations; Graphic Packages: PyPlot; Big Data Analytics with Spark;

### **Ch 10: Synapse Warehouse - 1**

Fabric Datawarehouse; DWH Creation Options; Sensivity Settings; Warehouse Compute; SSMS Connections; ADS Connections; Table Creations; Warehouse Sample; Data Load Options; Warehouse Query Options; Data Aggregations; Data Analytics;

### **Ch 11: Synapse Warehouse - 2**

Fabric Security Options; Warehouse Security Model; Warehouse Access Model; Fabric Workspace Roles; Item Permissions; Object Level Security; Sharing Warehouse; SQL Permissions; Read, Connect; SQL endpoint data; ReadAll & Build; Grant, Revoke, Deny;

### **Ch 12: Synapse Warehouse - 3**

Zero Copy Clone in DWH; Table Clone in Synapse; Table Clone Inheritance; Create Table As Clone; Table Cloning Scenarios; Cloning : Limitations; Warehouse Performance; Statistics : Creation, Use; Leverage Stats in DWH; In-Memory & SSD Cache; Disk Cache, Important DMVs; Cold Cache & Management;

### **Ch 13: Synapse Realtime Analytics**

Realtime Analytics in Fabric; Streaming & Time Series Data; Capture, Transform & Route; Ingest, Load and Stream; Data Integration At Scale; Creating KQL Databases; KQL Tables, Queries; BLOB

Data Ingestions; Data Loads & Fabric Studio; Command Viewer Options; Partial Data Preview; Data Exploration;

### **Ch 14: OneLake Concepts**

Unified Data Lake in Fabric; Warehouse and Lakehouse; One Lake Workspace Management; Azure HD Insight : Security; DFS API and Connections; Fabric Workloads & Tuning; Onelake File Explorer; One Copy of Data, Data Engines; Compute and Analytics; Uni Management & Governance; Creating Lakehouse with Onelake; Data Loads with Lakehouse;

### **Ch 15: Microsoft Fabric with Power BI**

Using Power BI with Fabric; OneLake Connections with Power BI; Power BI Desktop with Fabric; Power BI Desktop with OneLake; Power BI Desktop with LakeHouse; Power BI Desktop with Synapse; Power BI Cloud with OneLake; Power BI Datasets (LIVE); Power BI Datamarts and Usage; Dashboards with Fabric Metrics; Unified Data Foundation : OneLake; End to end Implementation Plan;

## **Module 2: Azure Data Engineer**

**(Applicable for Microsoft Fabric Plan B, C)**

### **Part 1: Azure Data Factory & Synapse Analytics**

#### **Ch 1: Cloud Basics, Azure SQL**

Cloud Introduction and Azure Basics; Azure Implementation: IaaS, PaaS, SaaS; Azure Data Engineer: Job Roles; Azure Storage Components; Azure ETL & Streaming Components; Need for Azure Data Factory (ADF); Need for Azure Synapse Analytics; Azure Resources and Resource Types; Azure Account, Subscription (Free); Azure SQL Server [Logical Server]; Firewall Rules and Azure Services; Azure SQL Database Deployment; Azure SQL Pool Deployment; Compute: DTU Versus DWU; Test Connections from SSMS;

#### **Ch 2: Synapse SQL Pools (DWH)**

Dedicated SQL Pools in Azure; Data Warehouse with Synapse; Massively Parallel Processing (MPP); Control Nodes and Compute Nodes; DMS: Data Movement Service; Start/Resume/Pause & Scaling; SQL Pool Config @ TSQL Scripts; Start/Resume/Pause, Scaling Options; Table Creations @ TSQL Scripts; Table Partitions: Left & Right; Distributions: Round Robin, Hash; Distributions: Replicate and Usage; Auto Indexing & Column Store; Planning for Big Data Loads; Need for ADF: Azure Data Factory;

#### **Ch 3: Azure Data Factory, Pipelines**

Azure Data Factory (ADF) Concepts; ADF Pipelines : Architecture; Integration Runtime (IR) & Use; Linked Services and Datasets; Pipeline Activities: Copy Data Tool; DIU : Data Integration Units; DTU Vs DWUs Vs DIU; ADF Pipeline with Copy Data Tool; Azure SQL DB to Synapse Data Loads; Multi Tables Data Loads with ADF; Bulk Insert, Data Copy Methods; ETL Staging: Storage Account; Staging Container Connections; DIU Allocations & Publish; ETL Pipeline Monitoring, Runs;

#### **Ch 4: OnPremise Data Loads, Upsert**

Copy Data Tool : Incremental Loads; On-Premise Data Sources with Azure; Self Hosted Integration Runtime (IR); Access Keys, Remote Linked Service; Synapse SQL Pool (DW), OnPremise; ETL Staging with Storage Account; Copy Method: Polybase - Tuning; Polybase : Big Data Loads; ETL Pipelines for Incremental Loads; Business Keys For Table Upsert; Pipeline Schedules with ADF; ETL Logging with Storage Account; Copy Method: UPSERT; DIU, DOCP & Publish; Manual Pipeline Executions in ADF;

#### **Ch 5: File Incremental Loads in ADF**

Incremental Loads with Files (BLOB); ETL Schedules: Tumbling Window; Execution Retry and Delay Options; Binary Copy, Structural Data Loads; Incremental Loads Verification Tests; Incompatible Rows & Fault Tolerance; Pipeline Compression & Tuning; Pipeline Publish, Monitor Options; Azure Monitor Resource : Metrics; ADF Metrics and Pipeline Runs; ADF: Pipeline Monitoring and Alerts; Synapse: Storage Monitoring, Alerts; Conditions, Signal Rules and Metrics; Alerts & Action Groups: Emails; Email Notifications with Azure;

#### **Ch 6: ADF Data Flow - 1**

Data Flow Task, Data Flow Activity; Transformations with Data Flow; Spark Cluster For Debugging; Cluster Node Configurations; Spark Cluster Types & Sizing; Transaction Optimized - Capacity; Memory Optimized - Capacity; Data Cleansing with ADF; Data Orchestration with Data Flow; SELECT Transformation & Options; Conditional Split Transformation; UNION, SELECT Transformation; Spark Cluster For Pipeline Executions; Pipeline Monitoring & Run IDs; Adding Data Flow into Pipelines;

#### **Ch 7: ADF Data Flow - 2**

ADF Pipelines For ETL Operations; Data Flow Tasks, Activities in Synapse; JOIN & EXISTS Transformations; Aggregate & Group By Transformations; Window Functions, Rank in Data Flow; Rank / DenseRank / Row Number; Derived Column Transformation; Lookup, Surrogate Key, Parse; Type Convert, Cast Transformations; Reusing Data Flow Tasks in Synapse; Pipeline Validations & Executions; Inline Datasets, Schema Drift; Data Deduplication with ADF; DFT Optimization Techniques; Data Flow Task - Staging, Logging;

#### **Ch 8: Azure Synapse Analytics**

Azure Synapse Analytics Resource; Azure Synapse Analytics Workspace; Managed Resource Group, SQL Account; Synapse Workspace & Synapse Studio; Operations with Synapse Workspace; ADLS Gen 2 Storage Account, Container; Synapse Studio: Scripts & Pipelines; Dedicated SQL Pools : Creation, Use; Synapse Tables, Data Loads with TSQL; COPY INTO Statements with T-SQL; Row Terminator and Compressions; T-SQL Queries and Aggregations; Aggregation Data Loads in Synapse; Creating Synapse Pipelines with TSQL; Stored Procedure Activity & Triggers;

#### **Ch 9: Synapse Analytics with Spark**

Synapse Pipelines: Performance Advantage; Pivot Transformation For Normalization; Generate Pivot Column, Aggregations; Pivot Transformation & Pivot Setting; Pivot Key Selection, Value and Nulls; Pivoted Columns and Column Pattern; Column Prefix, Help Graphic, Metadata;

Denormalized Data and Aggregations; Apache Spark Pool in Azure Synapse; Spark Cluster Nodes: Vcores, Memory; Notebooks : Purpose, Usage Options; Python Notebooks For Remote Access; Creating Databases in Apache Spark Pool; Data Loads from Dedicated SQL Pools; PySpark Code for Data Operations, Writes;

### **Ch 10: Synapse Security & Parameters**

Azure Active Directory (AAD) Users, Groups; IAM: Identity & Access Management; Synapse Workspace Security with RBAC; ADF Security: RBAC, Owner, Contributor; Azure Synapse SQL Pool Security: Logins; Creating SQL Logins & Users : master; SQL Users in Azure SQL DB and SQL Pool; Grant, Control, Revoke: Security Roles; Parameters - Creation and Use in Pipelines; Dynamic Connections with Credentials; User Name and Password Connectivity; Dynamic Dataset Configurations; Pipeline Expressions with Parameters; Resource Classes and Usage with SQL Pool;

### **Ch 11: Change Data Capture (CDC)**

Change Data Capture (CDC) Data Loads; Incremental Loads with CDC Types; SQL Server CDC : ETL Load Dates; Pipeline Expression, Data Window; JSON Parameters, Pipeline Scheduling; ETL Optimization Techniques; Serverless Pool in Azure Synapse; Connections, Use with Serverless Pool; Using Azure OpenDatasets in Synapse; OPENROWSET and BULK Data Loads; Working with Parquet Files in Synapse; Python Notebooks (Pyspark) in Synapse;

## **Part 2: Azure Data Lake Storage & Stream Analytics**

### **Ch 1: Azure Fundamentals - Storage**

Azure Resources: Storage Components; Storage Resources and Properties; Resource Groups & Subscriptions; Azure Storage : Files, Tables and ETL; Azure Storage Account & Use; Data Lake Storage Account (ADLS); Advanced Options: HNS Property; Resource Location, Resource Group; Azure Portal: Deployment Verifications; Azure Portal: Deployment Verification; Storage Account : Basic Properties; Overview Page: Status, HNS State; Azure Storage : Access Options; Azure Storage Explorer Tool; Explorer Tool : Configuration; Azure Subscription : Filter Options;

### **Ch 2: Azure Storage Operations**

BLOB: Binary Large Objects; Storage Browser and Service Pages; Storage Browser: Container Creation; Storage Browser: Folder, File Uploads; Service Page: Container Creation; Service Page: Folder, File Uploads; Container, Folder, File Properties; Limitations with Storage Portal; Azure Data Explorer Tool : Usage; Contrainer: Creation, Properties; File Uploads, Edits and Access URLs; Azure Storage Explorer Tool Usage; Azure Account Options in Explorer; Directory Creation, File Operations; Limitations with Explorer Tool;

### **Ch 3: Azure Storage Security, ACLs**

Azure Data Lake Storage Security Options; Shared Access Keys: Primary, Secondary; SAS Key Generation: Container, Tables; SAS Key Permissions, Validation Options; Access Keys: Account Level Permissions; Azure Active Directory: Users, Groups; Azure AD Security: RBAC, IAM, ACLs; Owner Role, Contributor, Reader Role; Azure Data Lake Storage Security; ACL : Access Control Lists & Security; Azure BLOB Storage Containers & ACLs; Folder Level and File Level Security; ACL

Permissions: Read, Write, Execute; Access Policy: Creation, Realtime Use; rwacdl; Azure Principals, CORS;

#### **Ch 4: SQL Database Migrations**

OnPremise SQL Server to Azure Migration; SSMS Tool, SQL Database Installation; Source Database Scripts & Validations; BACPAC File Generation: SSMS Tool; Table Selection & Advanced Options; Azure Data Lake Storage, SSMS Access; Azure Storage Container, BACPAC Files; IAM and Account Key Authentication; Azure SQL Server Creation From Portal; Azure SQL Database Deployment; DTU : Data Transaction Units, Pricing; Azure Firewall Configuration, Security; Azure SQL Database Imports (bacpac); Azure SQL Server with ADLS Containers; Azure SQL DB Migrations, Verification;

#### **Ch 5: Azure Tables & Replication**

Azure Tables - SchemaLess Design; Azure Tables: Creation, Data Inserts; Tables, Entities, Properties Concepts; Structured, Relational Data Storage; Azure Tables: GUI, Data Types; Azure Tables: Big Data Imports; Data Edits, Queries, Delete Operations; Odata Options (REST API), End Points; Azure Storage: Replications, DR Options; LRS: Locally Redundant Storage; GRS: Globally Redundant Storage; ZRS: Zone Redundant Storage; Replication Options and Advantages; Replication Verification, Modifications; Storage Endpoints, Failover Partner;

#### **Ch 6: Azure Stream Analytics, IoT**

Azure Stream Analytics Real-time Use; Real-time Data Processing, Events; Ingest, Deliver & Analysis Operations; Azure Stream Analytics Jobs Concept; Understanding Input, Output Options; SAQL Queries: Stream Analytics Jobs; IoT: Internet Of Things, Real-time Data; Need for IoT Hubs and Event Hubs; Conditional Split Transformation; Creating IoT Device for Data Inputs; Creating Azure Stream Analytics Job; Stream Analytics for Historical Data; Azure SQL Database for ASA Jobs; SAQL: Query Formatting, Validation; Historical Data Upload, ASA Jobs; Stream Analytics Job Monitoring;

#### **Ch 7: Azure Event Hubs**

Azure Stream Analytics For API Data; IoT Hubs, IoT Devices, Connection Strings; Raspberry APP Connections with IoT Hub; Azure Storage Account and Container; Creating Azure Stream Analytics Job; Configuring Input Aliases with IoT Hub; Output Aliases with ADLS Gen 2; SAQL Query, Job Executions; Monitoring; Azure Event Hubs and Event Instances; Event Hub Namespaces, Partition Counts; Access Policies, Permissions & Defaults; RootManageSharedAccessKey & Options; Connection Strings & Event Service Bus; Telco App : Executions & LIVE Data; On-Premise App Integration, ASA Jobs;

#### **Ch 8: Storage Architecture, Queues**

Azure Storage Account : Architecture; Etag: Replication & Encryption Use; BLOB Types: Block, Append & Page; Access Tiers: Hot, Cool, Cold Types; Archive Access Tier & Retention; Legal Hold & Time Bound Access; Pricing : HNS, Security, Encryption; EndPoint URL & Read-Only Use; Azure File Share Service (Files); Mounting Files From On-Premise; SMB File Share : Hot, Optimized; Azure

Queue Service & Messages; Message Queues : Operations; Storage Explorer Tool with Shares; Azure Storage Services: ETL Needs;

### **Ch 9: Monitoring & Key Vaults**

Azure Monitor, Metrics & Activity Logs; Monitoring Azure Storage Namespaces; Add KQL Metrics; Account, Blob and File; Total Ingress and Egress Metrics: Charts; Average Latency, Transaction Count; Request Breakdowns, Signal Logic; Azure Alerts & Conditions, Notifications; Signal Logic Conditions and Emails; Key Vaults Types: Standard & Premium; Secret Page, Key Backups, Key Restores; Azure Key Vaults - Name and Vault URI; Inbuilt Managed Key and Azure Key Vault; Key Vaults Types: Standard & Premium; Secret Page, Key Backups, Key Restores; Managed Identity with ETL Process;

## **Part 3: Azure Databricks & Spark, Python**

### **Ch 1: Azure Intro, Azure Databricks**

Azure Cloud : SaaS, PaaS, PaaS & IaaS; Azure Cloud : Storage, ETL Resources; Azure Databricks : Compute Resources; Need for Azure Databricks (ADB); Azure Databricks : Purpose & Config; Azure Databricks Service Creation; Azure Databricks Components; Azure Databricks Workspace, Usage; Spark Cluster Configurations, Capacity; Driver Nodes, Worker Nodes in Spark; Cluster Types : Personal, Unrestricted; CPU, Memory & IO Resources; Virtual Machines (VM) for Clusters; Databricks : Runtime & DBFS Storage; DBFS : Files, Tables with Spark DB;

### **Ch 2: SparkDatabase, SQL Notebooks**

DBFS : File Uploads from ON-Premise; Creating Spark Tables; Spark DB; Data Explorer: HIVE Metastore; Data Explorer: Spark Database, Tables; Notebooks: SQL, Python and Scala; Creating SQL Notebooks in Databricks; Creating User Defined Spark Databases; Connecting / Using Spark Databases; Spark SQL : Big Data Loads; Spark SQL : Database & Table List; Spark SQL : Data Aggregations, Jobs; Spark SQL : Data Analytics, Reports; Analytics: X, Y Axis, Group By; Notebooks : Export, Import, Clone; Notebooks : Storage & Versions;

### **Ch 3: Python Intro, Data Loads**

Python : Introduction, Real-time Use; Python For ETL and DWH; Python For Azure: Data Engineer; Python Data Frames & Purpose; Python Dataframes - Pandas; Python with Spark Integrations; PySpark for DDL and ETL; PySpark Versus SQL Notebooks; Reading DBFS Data into Spark; Creating Dataframes for ETL; Temporary Views & Dataframes; Spark Temp Views: Aggregations; Spark Table Loads, HIVE Data; dataframe.write.format(); Parquet Tables with Spark DB;

### **Ch 4: PySpark with ADLS**

Azure Storage Account : Creation; Azure Data Lake Storage : HNS; Creating Containers in ADLS; BLOB File Uploads / Generation; Account Key : Access Key / SAS Key; BLOB Access URL for Databricks; WASBS URL for PySpark Notebook; Generating PySpark Script; PySpark Connection Variables; Databricks : Data Import Scripts; Config Options with ADLS, Spark; spark.config (), Session Context; DataFrames with Temp Tables; Escape Sequence with SparkSQL; Data Explorer: HIVE & Spark DB;



### **Chapter 5: PySpark Widgets & Spark**

Widgets : Notebook Parameters; dbutils.widget module : Text, Combo; Dropdown, Multi Select Parameters; dbutils help(), get() & remove(); Dataframes, Spark SQL @ Variables; Python Data Frames, Spark SQL; Reading Parameters Values; Parameters Versus Variables; Using Parameters For Temp Tables; Using Parameters for Spark Tables; Data Storage and HIVE Metastore; Reading Parameterized Data; Format Strings with PySpark; Dynamic Queries with Spark SQL; Aggregations and f Strings;

### **Ch 6: Architecture, Workflows**

Driver Nodes, Worker Nodes, DBUs; RDD : Resilient Data Distribution; DAG : Directed Acyclic Graph; Hadoop HDES and Spot Instance; Cluster Manager, Master Node; RDDS, Worker, Executor & Slave; Hadoop HDES & Databricks Runtime; Databricks Optimization Techniques; Spot Instance, Photon Acceleration; All Purpose Cluster, Job Cluster; Databricks Jobs: Creation & Tasks; Jobs with Parameters, Executions; Task Dependency & Notifications; Continuous & Manual Schedules; Active Jobs, Recent Run Jobs, Monitor;

### **Ch 7: Databricks Security, Scala**

Azure Databricks Security Operations; Azure Active Directory (Azure AD); AD Users and RBAC with IAM; Owner, Contributor & Reader Roles; Workspace Admin Permissions; Notebook Permissions & Share; Workflow Security, HTTP Path; User Tokens & ServerName; Scala : Differences with PySpark; Scala : Variables Declaration, Usage; SparkSQL with Scala Notebooks; Temp Views with Scala Notebooks; Aggregations with Scala Notebooks; Visual Data Analytics with Scala; PySpark to Scala Conversions;

### **Ch 8: Scala with ADLS, Azure SQL**

Data Imports with Azure SQL DB; Using Scala for Big Data Loads; Spark SQL Queries @ Temp Views; Variables, display(), spark.read(); Scala Transformations, display(); JSON, AVRO and DBFS Mounts; fs.azure.sas.container @ ADLS; dataframe.write.jdbc() & JVM; JDBC Connection, DataframeWriter; Data Extraction, SQLContext; Spark Context and Spark Session; SQLServerDriver with Scala; ADLS with Scala Notebooks; Parameters (Widgets) with Scala; Compare Python with Scala;

### **Ch 9: DeltaLake Incr Loads, DWH**

Azure DeltaLake Implementation; ACID Properties, Upsert Advantages; Delta Engine Optimizations & Uses; Pipeline Creation: JSON Files in DBFS; Delta Tables Creation, Data Loads; Spark Cluster Settings: Auto Optimize; Auto Compact, Delta Table Optimize; JSON Files, Delta Streaming Location; Joins and Merge with Delta Tables; Incremental Loads, Delta Tables; Create & Use DWH with Databricks; Upsert (Merge) with Spark Tables; Big Data & Jupyter Notebooks; Databricks with Data Factory (ADF); Pipelines with Databricks Notebooks; End to End Implementations;

## **Real-time Project (End to End)**

Online Retail Database Data Source; Azure Migrations and ETL Concepts; Azure SQL Pool (Synapse DWH) Tables; Apache Spark Pool : Databases, Tables; Azure Data Lake Storage (ADLS Gen 2); Handling Unstructured Data in ADF; End to End Workflows, Automations; Azure Logic Apps: Automated Workflows; Visual Designer & Prebuild Templates; Server Less Integrations in Azure; Workflow, Triggers and Actions; Managed Connectors, Integrations; ARM Template : Deployments; ARM Templates : ADF, ADLS;

ADLS with Spark Databases; Aggregations with Big Data Loads; Parameterized ETL Sources; Parameterization & Workflows; Python Notebooks to Scala; Azure SQL DB Connections; ARM Templates & JSON; Project Requirement; Project Solution, FAQs; Concept wise FAQs; Resume Guidance; Mock Interviews (1 to 1); DP 203 Certification Guidance; DP 203 Sample Papers (Latest);

## Azure Data Engineering with Power BI (For Power BI Registrations)

Power BI with Synapse SQL Pool; Power BI with Synapse Analytics; Get Data: Storage Modes; Direct Query, Performance Inspector; Aggregated Data Analytics; Data Gateways : Auto Refresh; Power BI with ADLS : Record Query; Power BI with ADLS : BLOB Data; Power BI with Spark DB : JDBC; Power BI with Spark DB : User Tken; Power BI with Spark DB : LIVE Data; Power BI with Spark DB : Refresh;

Azure Purview : Data Governance; Unified SaaS for Multi Cloud; Data Mapping and Resilience; Automated Data Discovery; Sensitive Data Labels : SQL Server; Interactive Data Lineage; Trusted Data Discovery in Azure; Confidential Data & Trust; DataCatalog, Data Estate Insights; Azure Key Vaults, ADLS Security; Azure Passwords, Keys, Certificates; Azure Key Vaults - Name, Vault URI; Managed Key & ETL Connections;

# Power BI

## Part 1: Power BI Report Design

### Ch 1: POWER BI INTRODUCTION

Power BI : Introduction to Analytics; Power BI Tools Suite, Advantages; Power BI : Career Options, Plan; Power BI Developer Job Role; Microsoft Data Analyst Job Role; Big Data Analyst Job Role; Power BI Data Analyst (PL 300); Data Engineer\*, Power BI (DP 500 \*); Artificial Intelligence (AI) Visuals; AI Enabled Power BI Features; Course - Lab Plan with Design Tools; Need for Power Query & DAX; Power BI Licensing Types; Power BI Cloud - Advantages; Power BI Report Server Advantages;

### Ch 2: Basic Report Design

Power BI Eco System: Architecture; Data Sources & Types in Real-world; Report Types: Interactive, Paginated; Analytical Reports & Mobile Reports; Data Sources : File, Database, Web; Visualizations : Report Shapes; Power BI Design Tools, Requirements; Power BI Desktop Tool : Installation; Desktop Interface: Overview, Canvas; Get Data, Data View, Report View; In-Memory Xvelocity Database; Basic Visuals: Table, Tree Map; Data Labels, Legend, Category; Local Store: PBIX & PBIT Files; Data Points and Tooltips;

### **Ch 3: Visual Interaction, Visual Sync**

Visual Interaction with Data Points; Disabling / Enabling Interactions; Edit Interactions: Format Options; Spotlight and Focus Mode; Report Export to CSV, PDF; Tooltip Options and Usage; Working with Pages in PBI; Rename, Duplicate, Hide Pages; Slicer Visual : Real-time Usage; Orientation, Selection Properties; Slicer Settings : Tiles & Slider; Single & Multi Select, Header; Number, Text, Show Summary; Date Slicer and Value Selections; Slicer List, Dropdowns & Clear; Visual Sync Limitations with Slicer;

### **Ch 4: Grouping & Hierarchies**

Grouping : Visuals with Pdf Sources; List Grouping and Binning Options; Grouping Static / Fixed Data Values; Grouping Dynamic / Changing Data; Bin Size and Bin Limits (Max, Min); Bin Count and Grouping Options; Group with Bins & Clustering; Group, Layer with Selection Pane; Creating Hierarchies in Power BI; Independent, Dependant Drill-Down; Drill-Down with Interactive Reports; Conditional Drilldowns, Data Points; Drill Up Buttons and Operations; Expand & Show Next Level; Dynamic Data Drills Limitations;

### **Ch 5: Filters & Bookmarks**

Filters : Types and Usage in Real-time; Visual Filter, Page Filter, Report Filter; Basic, Advanced and TOP N Filters; Category and Summary Level Filters; Data / Drill Options, DrillThru Filters; Keep All Filters" Options in DrillThru; CrossReport Filters, Include, Exclude; Drill-thru Filters, Page Navigations; Bookmarks : Report Navigations; Buttons, Images with Actions; Selection Pane, Actions, Text URLs; Show Data and See Records; Custom Tooltips, Table Visual; Table Vs Matrix : Drill-downs; Styles, Cell Properties, Databars; Conditional Formatting, Divergent;

### **Ch 6: Big Data Access, Visuals**

OLTP Databases, Big Data Sources; Azure Database Access, Reports; Import, Direct Query & Dual Mode; Data Modeling: Do Not Summarize; Data Modeling: Currency, Relations; Power BI Archtecture, Eco System; Power BI Interface for Reports; Stacked Chart, Clustered Chart; Line Chart, Area Chart, Bar Chart; 100% Stacked Bar & Column Chart; Map Visuals: Tree, Filled, Bubble; Small Multiples, Legends, Axis; Cards, Funnel, Table, Matrix; Scatter Chart : Play Axis, Labels; Waterfall Chart, Multi Row Cards;

## **Part 2: Power Query, Cloud (Service)**

### **Ch 7: POWER QUERY LEVEL 1**

Power Query M Language Purpose; Power Query Architecture and ETL; Data Types, Literals and Values; Power Query Transformation Types; Table & Column Transformations; Text & Number Transformations; Date, Time and Structured Data; let, source, in statements @ M Lang; Get Data, Table Creations and Edit; ETL Operations with Power Query; Merge Transformations in Power BI; Join Kinds: Inner, Outer & Apply; Union All Transformation & Appends; Power Query Editor, Step Edits; Close & Apply Options. Report Design;

### **Ch 8: POWER QUERY LEVEL 2**

Query Duplicate, Query Reference; Group By and Advanced Options; Aggregations with Power Query; Transpose, Header Promotion; Reverse Rows and Row Count; Data Type Changes &

Detection; Replace Columns: Text, NonText; Advanced Query Edit Options; Replace Nulls: Fill Up, Fill Down; Pivot, Unpivot Transformations; Move Column and Split Column; Extract, Format and Numbers; Date & Time Transformations; Derive Year, Quarter, Month, Day; Add Column : Query Expressions; Query Step Inserts and Step Edits;

### **Ch 9: POWER QUERY LEVEL 3**

Big Data Loads : Parameter Queries; Creating Parameters in Power Query; Parameter Data Types, Default Lists; Static & Dynamic Lists: List Queries; Convert Tables to Lists, Use Cases; Linking Parameters to Queries; Testing Parameters with Canvas; Multi-Valued Parameter Lists; Creating Lists in Power Query; Converting Lists to Table Data; Invoke Function, Type Conversions; Function Query & Parameter List; Columns From Examples, Indexes; Conditional Columns, Expressions; Disable / Enable Data Loads;

### **Ch 10: POWER BI CLOUD - 1**

Power BI Cloud Components; App Workspaces, Report Publish; Reports & Related Datasets Cloud; Creating New Reports in Cloud; Report Publish, Report Uploads; Report Edits and New Reports; Report Actions: Downloads; Dataset Usage Options in Cloud; Dashboards Creation and Usage; Pining Visuals and Report Pages; Visual Pin Actions in Dashboards; Dashboard & LIVE Interactions; Media Tiles: Images, Custom Links; Q & A Option with Dashboards; Pin with Q & A; Standard Visuals;

### **Ch 11: POWER BI CLOUD - 2**

Report Actions : Share, Subscribe; Report Actions : Lineage, Embed; Report Actions : Export Options; Report Actions : Public User Access; Dashboard Actions : Share, Subscribe; Dashboard Actions : Themes, Lineage; Dashboard Actions : Share, Subscribe; Favorite, Insights, Embed Code; Gateways Configuration, PBI Service; Gateway Types, Cloud Connections; Gateway Cluster, Add Data Sources; Data Refresh : Manual, Scheduled; Power Query Parameters, Gateways; DataFlows, Power Query in Cloud; Lineage, Share, Subscribe, Insights; Performance Inspector& Gateways;

### **Ch 12: POWER BI CLOUD - 3**

Workbooks : Excel Online & Pins; Power BI Apps: Creation & Usage; Power BI Segments, Content; Navigation Screens, Audience; App Publish, Verification & Edits; Export, Share & Subscribe; List View & Lineage View Options; Power BI Scorecards: Realtime Use; Paginated Reports - Design & Usage; Power BI Report Builder Tool; Microsoft Report Builder Tool; Report Builder : Datasets, Charts; Report Builder : Bar Charts, Fields; Report Builder : Creating RDL Files; Paginated Reports : Deployments;

## **Part 3: DAX & Report Server**

### **Ch 13: DAX Functions - Level 1;**

DAX : Importance in Real-time; DAX Data Types, Syntax Rules; DAX Measures and Columns; ROW Context and Filter Context; Operators, Special Characters; DAX Functions, Vertipaq Engine; DAX Cheat Sheet : Expressions; Data Analytics with DAX; DAX Measures : Expressions; ISBLANK, IF, IN,

SUM; SUMX, AVG, AVERAGEX; Data Models: Fact, Dimensions; Detecting Relations for DAX; Star & Snowflake Schemas; Data Modeling Options in DAX;

### **Ch 14: DAX Functions - Level 2**

Quick Measures in Power BI; Average and Filtered Average; Running Totals, EARLIER( ); RELATED, COUNTROWS; CALCULATE Function Conditions; ALL Members Scope & IN; Account and Time Calculations; Star Rating, DAX Expressions; Data Modeling Options in DAX1:1, 1:M and M:1 Relations; Working with Facts & Measures; Modeling : Missing Relations; Relationships & Importance; Modeling : Relation Management; Modeling with Multiple Keys;

### **Ch 15: DAX Functions - Level 3**

DAX : Variables and Expressions; Dynamic Expressions, RETURN; Current Value, Previous Value; SELECTED VALUE, Joins; FORMAT Function with DAX; RELATED, Joins in DAX; DAX Expressions with SQL DB; Time Intelligence Functions; Date Dimension : Generation; CALENDAR(), DATESYTD(); TOTALYTD, TOTALQTD; TODAY, DATE, DAY with DAX; SELECTEDVALUE, FORMAT; Date, Time and Text Functions;

### **Ch 16: DAX Functions - Level 4**

RLS: Row Level Security; Data Models in Power BI Desktop; DAX Roles Creation and Testing; DAX Expressions & Operators; PBIX Uploads: Power BI Cloud; Dataset Security with DAX Roles; Entity Sets and Slicing in DAX; Dataflows with Power BI; Analytical Reports - DAX Usage; Creating Data Models with DAX; Datasets in Excel and Dashboards; Using Excel Analyzer in Power BI; Power BI Data Source in Excel; Connection Strings and Refresh; Analytical Reports - Limitations;

### **Ch 17: Power BI Report Server**

Power BI Report Server Config; SQL Server Instance Verifications; Report Server DB, Temp Database; WebService & WebPortal URL; Uploading Interactive Reports; End User Report Share (pdf); Power BI Desktop RS Tool; Interactive Reports: Report Server; Mobile Reports : Design Options; Mobile Reports : Grids, Elements; Mobile Reports : Uploads, Edits; Paginated Reports : Deployments; Paginated Vs Interactive Reports; Paginated Vs Analytical Reports; Paginated Vs Mobile Reports; Power BI Report Server Vs Cloud;

### **Ch 18: Power BI Admin & AI**

Power BI Cloud Management; Power BI Admin : Alerts; Workspace Management, Users; Security: Report, Dataset Levels; Security: Dataset, App Levels; Security: Workspace Options; PBI Performance Inspector; Power BI & Artificial Intelligence; Power BI & CoPilot Add-Ins; AI Visuals & Big Data Analytics; Smart Narrative and Q & A; Infographics, Icons and Labels; Key Influencer Visual in Power BI; Metrics Visual, Performance; Paginated Reports Visual;

## **Power BI: Real-time Project**

### **Phase 1 : Basic Report Design**

Project Requirement Analysis; Requirement Gathering, FSA; Report Design with Excel; Basic Data Modelling ; Infographics, Histograms; Analytics and Formatting;

### **Phase 2 : SME Level**

Report Design with SQL DB; SQL Database : Joins, Views; Dual Storage Mode, SQL Queries; Data Modeling, Power Query; Dynamic Connections, Azure DB; Parameters and M Lang Scripts;

### **Phase 3: Deployments (Cloud, Server)**

DAX Requirements, Analysis; Cloud and Report Server; Custom Visualizations; 3party Visuals & REST API; Project FAQs and Solutions; One - One Resume, Mock Interview;

## **Module 3: Database Basics, SQL, T-SQL Queries**

**(Applicable for Microsoft Fabric Plan C)**

### **Ch 1: DATABASE INTRODUCTION**

Databases Introduction & Purpose; Database Types : OLTP, DWH, OLAP; Microsoft SQL Server Advantages, Use; SQL Server Components and Usage; Microsoft SQL Server - Career Options; Developer, DBA, Data Engineer; Data Analyst, Data Scientist Careers; SQL : Purpose, Real-time Usage Options; SQL Versus Microsoft T-SQL [MSSQL]; Course Plan, Real-time Project, Resume; 24 x 7 Online Lab for Remote DB Access; Versions and Editions of SQL Server; SQL Server Pre-requisites : S/W, H/W; System Configuration Checker Tool;

### **Ch 2: SQL SERVER INSTALLATION**

SQL Server & SSMS Installation Plan; SQL Server Pre-requisites : S/W, H/W; SQL Server 2022 & 2019 Installation; Database Engine Feature, OLTP; Instances : Types and Properties; Default Instance, Named Instances; Service and Service Account Use; Authentication Modes and Logins; Windows Logins and SQL Logins; SQL Server Management Studio; Server Connections with SSMS Tool; Local and Remote Connections; System Databases: Master and Model; MSDB, TempDB, Resource Databases;

### **Ch 3: SSMS Tool, SQL BASICS - 1**

Creating Databases: Files [MDF, LDF]; Creating Tables in User Interface; Data Insertion & Report in User Interface; SQL : Purpose and Real-time Usage; SQL Versus T-SQL : Basic Differences; DDL, DML, SELECT, DCL and TCL; Creating SSMS Sessions : SPID; Create, Connect Databases using SQL; Creating Tables with INT, CHAR; Data Storage, Inserts - Basic Level; Table Data Verifications with Select; SELECT Statement for Table Retrieval; Identify Databases and Tables; Identify Sessions and Session ID;

### **Ch 4: SQL BASICS - 2**

Creating Tables: VARCHAR, FLOAT; Single Row Inserts, Multi Row Inserts; Rules for Data Insertion Statements; SELECT with WHERE Conditions; AND and OR Operators Usage; IN Operator and NOT IN Operator; Between, Not Between Operators; LIKE and NOT LIKE Operators; ORDER BY, TOP & OFFSET; Basic Sub Queries with SELECT; UPDATE Statement & Conditions; DELETE & TRUNCATE Statements; ALTER, ADD COLUMN Statements; DROP Statements: Table, Database;

### **Ch 5: SQL Basics - 3, TSQL INTRO**

Database Objects : Tables and Schemas; Schemas : Group Tables in Database; Schemas : Security Management Object; Creating Schemas & Batch Concept; Using Schemas for Table Creation; Data Storage in Tables with Schemas; Data Retrieval & Usage with Schemas; Table Migrations across Schemas; Import and Export Wizard in SSMS; Data Imports with Excel File Data; Performing Bulk

Operations in SSMS; Temporary Tables : Real-time Use; Local and Global Temporary Tables; # and ## Prefix, Scope of Usage;

### **Ch 6: Constraints, Index Basics**

Constraints and Keys - Data Integrity; NULL, NOT NULL Property on Tables; UNIQUE KEY Constraints: Importance; PRIMARY KEY Constraint: Importance; FOREIGN KEY Constraint: Importance; REFERENCES, CHECK & DEFAULT; Candidate Keys and Identity Property; Database Diagrams and ER Models; Relationships Verification and Links; Indexes : Basic Types and Creation; Index Sorting and Search Advantages; Clustered and NonClustered Indexes; Primary Key and Unique Key Indexes; Need for Indexes - working with Keys;

### **Case Study 1: Database Design with Tables, Constraints, Keys & Relations**

### **Ch 7: Joins Basics, TSQL Queries**

JOINS - Table Comparisons Queries; INNER JOINS For Matching Data; OUTER JOINS For (non) Match Data; Left Outer Joins - Example Queries; Right Outer Joins - Example Queries; FULL Outer Joins: Realtime Scenarios; CROSS JOIN and CROSS APPLY; One way, Two way Comparisons; GROUP BY Queries, Aggregations; Group By Queries & Having Clause; Using WHERE & HAVING in TSQL; Joining Unrelated Tables in TSQL; Using Table Aliases, Column Aliases; Optimizing Join Queries with Indexes;

### **Ch 8: Group By, Views & Excel**

Group By with Joins in TSQL; Query Execution Order & Aliases; Joins with Sub Queries, Formatting; Joins with Sub Queries, Conditions; Joining 2 and 3 Tables, Aliases; Joining more than 3 Tables; Query Execution Order in TSQL; Database Objects: Overview & Usage; Views: Types, Usage in Real-time; Creating, Executing & Verifying Views; Storing Queries in Database Views; MS Excel with SQL Server (ODC); Excel Analytics - Joins & Views; Excel Office Data Connection Reports;

### **Ch 9: Functions, Procedures Basics**

Functions with SQL Server, TSQL; Scalar, Inline, Table Functions; Variables: Declare, Real-time Use; Creating, Executing Functions; Functions for Computations; Functions for Parameterized Joins; Procedures: Usage in Real-time; Using Parameters in SQL Server; Parameterized Joins in TSQL; Compilation with Stored Procedures; sp\_help, sp\_helptext, sp\_helpindex; sp\_helpdb, sp\_rename, sp\_recompile; System Views For Metadata Audits; DBID, DBName, ObjectID, ObjectName;

### **Ch 10: TRIGGERS & TRANSACTIONS**

Triggers - Purpose, Real-world Usage; FOR/AFTER Triggers - Real time Use; INSTEAD OF Triggers - Real time Use; INSERTED, DELETED Memory Tables; Using Triggers for Data Replication; Enable Triggers and Disable Triggers; Database Level, Server Level Triggers; Transactions : Types, ACID Properties; Transaction Types and AutoCommit; EXPLICIT & IMPLICIT Transactions; COMMIT and ROLLBACK Statements; Batch Concept and Go Statement; Open Transactions in Real-time; Using Conditional Commits, Rollbacks;

### **Ch 11: Normal Forms, Remote Joins**

First Normal Form and Atomicity; Third Normal Form & MVD Property; Boyce-Codd Normal Form : BNCF; Fourth Normal Form : Advantages; 1:1, 1:M, M:1, M:M Relationship Types; Self Reference Keys and 4 NF Usage; TSQL Self Joins, Correlated Queries; Linked Servers Configurations, RPC; Linked Servers, Remote Joins in TSQL; 2 Part, 3 Part, 4 Part Naming Styles; Remote Joins Queries and Aliases; UNION and UNION ALL Operator; Data Types: Numerical, Text Types; Date & Time Functions, DateAdd;

**Ch 12: TSQL Queries, Cursors**

IIF() Function with SELECT Query; CASE. WHEN..THEN..ELSE; WHEN MATCHED, NOT MATCHED; Incremental Loads, Upsert Statement; Stored Procedures: Merge Statement; Window Functions: Rank, Dense Rank; Row\_Number, PartitionBy in TSQL; Duplicate Row Identification, Deletion; Grouping, Cube, Rollup, Lag, Lead; String Functions, Concat, SubString; Cursors - Basics, Data Operations; Cursors - Life Cycle & Declaration; Cursors Types, FETCH Operations; Cursors - Deallocate, Real-world Use;

**Case Study 2: Joins with Group By, Sub Queries, Views, Excel Analytics**

<b>Email :</b> contact@sqlschool.com <b>Skype:</b> SQL School Training Institute <b>Website:</b> www.sqlschool.com	<b>Call Us (India) : 24 x 7</b> +91 9666 44 0801
<b>Trainer Contact:</b> saiphanindrait@gmail.com +91 9030040801	<b>Call Us (USA / Canada) : 24 x 7</b> +1 956.825.0401

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