

Half Day 1 — Foundations & Setup (4 Hours)

Architecture & Platform Overview

- Synapse workspace components: SQL pools, Spark, Pipelines, Studio
- Control plane vs data plane responsibilities
- Positioning: Synapse vs Azure SQL vs Databricks vs Fabric

Governance, Security & Monitoring

- Azure AD, RBAC, Synapse roles, managed private endpoints
- Built-in monitoring and integration with Log Analytics
- Governance controls using policy, tags, and management groups

Compute, Storage, Networking & DR

- DWU model, auto-scaling, pause/resume behavior
- Dedicated storage vs ADLS Gen2 over serverless SQL
- Backup snapshots, PITR, geo-restore concepts

Half Day 2 — Foundations Lab (4 Hours)

Workspace & Network Setup

- Create Synapse workspace and ADLS Gen2 integration
- Configure firewall rules and connectivity options

Security & Access Configuration

- Linked services and managed identity
- RBAC assignment and role validation

Backup & Monitoring Lab

- Restore points and PITR walkthrough
- Diagnostics, auditing, and Log Analytics dashboards

Half Day 3 — SQL Pools & Storage Internals (4 Hours)

MPP Architecture & Data Movement

- Control vs compute nodes
- Data movement service and query coordination

Distribution & Storage Internals

- Hash, round-robin, and replicated distribution
- Pages, extents, logging, and recovery model

Indexing & Statistics

- Clustered columnstore fundamentals
- Statistics auto-create and update behavior

Half Day 4 — Query Optimization Lab (4 Hours)

Data Loading & I/O Patterns

- COPY INTO and CTAS usage
- Impact of distribution choices on performance

Plan Analysis & Skew Resolution

- Query plan interpretation using DMVs
- Detecting and correcting distribution skew

Half Day 5 — Workload & Concurrency (4 Hours)

Resource Governance

- Resource classes, memory grants, concurrency slots
- Queueing and workload isolation concepts

Concurrency & Comparison

- Blocking and deadlocks
- Comparison with Azure SQL Hyperscale and MI

Half Day 6 — Workload Management Lab (4 Hours)

Workload Groups & Classifiers

- Create and test workload routing rules
- Simulate blocking and contention

Diagnostics & Analysis

- Deadlock capture
- Workload monitoring using DMVs

Half Day 7 — Advanced Tuning (4 Hours)

Query & Statistics Optimization

- Query hints and cache usage

- Stale statistics detection

Materialized Views & Monitoring

- Materialized view creation and rewrite
- Telemetry and performance monitoring

Half Day 8 — Tuning Lab & Alerts (4 Hours)

Hands-On Tuning

- Apply tuning changes and benchmark results
- Statistics maintenance scripting

Alerts & Automation

- Configure performance alerts
- Monitor cost and query behavior

Half Day 9 — Pipelines, Realtime & Cost (4 Hours)

Pipelines & Integration

- Copy, Data Flow, Notebook, Stored Procedure activities
- Error handling and retry patterns

Realtime & Cost Management

- Synapse Link and streaming overview
- DWU scaling and serverless cost controls

Half Day 10 — Capstone & Best Practices (4 Hours)

Automation & Security

- ARM/Bicep automation
- Encryption, masking, auditing

Capstone Exercise

- End-to-end Synapse solution build
- Monitoring, tuning, and final review