

Microsoft Azure Data Engineering & AI (3 Months)

Duration: 3 Months (~120 Hours)

Mode: Live Online / Classroom

Tools & Technologies: Azure Data Lake, Data Factory, Synapse Analytics, Azure Databricks, Stream Analytics, Event Hub, Cosmos DB, Power BI, Azure ML

Certifications Prepared: DP-203: Data Engineering on Microsoft Azure, AI-102: Designing Azure AI Solutions, PL-300: Power BI Data Analyst

Syllabus

Week 1: Data Storage & Lakehouse Architecture

- Azure Data Lake Storage Gen2 features
- Blob Storage for analytics workloads
- Hierarchical namespace & partitioning best practices
- Hands-on: Create & configure Data Lake Gen2
- Assignment

Week 2: Data Integration with ADF

- Linked Services, Datasets, Pipelines
- Copy Activity, Mapping Data Flows, Data Transformations
- Triggers & scheduling in ADF
- Hands-on: Build ETL pipeline (CSV → SQL DB)
- Assignment

Week 3: Azure Synapse Analytics

- Dedicated vs Serverless SQL Pools
- External tables & PolyBase
- Synapse Studio features (queries, notebooks)
- Hands-on: Query data from Data Lake using Synapse
- Assignment

Week 4: Azure Databricks & Delta Lake

- Databricks workspace & clusters setup
- Notebooks (Python, PySpark)
- Delta Lake for incremental ETL
- Hands-on: PySpark transformations on raw → curated data
- Assignment

- Mock Interview 1

Week 5: Real-Time Data Streaming

- Event Hubs vs IoT Hubs – concepts & use cases
- Stream Analytics Jobs (SQL queries)
- Integration with Synapse & Power BI
- Hands-on: Stream real-time IoT data into dashboard
- Assignment

Week 6: NoSQL with Cosmos DB

- API options: SQL, Mongo, Cassandra
- Partitioning & scaling throughput
- Consistency models (strong, eventual, bounded staleness)
- Hands-on: Ingest JSON data into Cosmos DB & query
- Assignment

Week 7: Visualization & BI

- Power BI integration with Synapse & Data Lake
- Dataset refresh, row-level security
- Building interactive dashboards
- Hands-on: Build executive sales dashboard
- Assignment

Week 8: Azure ML & Capstone Project

- Azure ML Workspace setup
- Model training with Designer & AutoML
- Model deployment to endpoints
- Monitoring ML lifecycle
- Project: End-to-End ETL + ML model + Power BI dashboard
- Assignment
- Mock Interview 2

Learning Outcomes

- Design and manage Azure Data Lake & Blob Storage
- Integrate and transform data with Azure Data Factory
- Build and query large-scale data warehouses with Synapse Analytics
- Implement real-time pipelines with Event Hub & Stream Analytics

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- Develop scalable ETL jobs with Azure Databricks & Delta Lake
 - Create dashboards with Power BI and ML solutions with Azure ML
 - Prepare for DP-203, AI-102 and PL-300 certification exams