**Azure Data Engineering**

**1️ Basics of Azure and Cloud Concepts**

* What is Azure?
* Azure Subscription, Portal, and Resource Groups
* Azure Storage Types (Blob, File, Table, Queue)

**2️ Azure Data Storage Services**

* Azure Data Lake Storage (ADLS)
* Azure SQL Database
* Azure Cosmos DB

**3️ Data Integration with Azure**

* Azure Data Factory (ADF) – Basics and Pipelines
* Data Flows in ADF
* Connecting ADF with various data sources

**4️ Azure Compute Services for Data Engineering**

* Azure Synapse Analytics
* Azure Databricks
* Serverless SQL Pools and Dedicated SQL Pools

**5️ Azure Security and Monitoring**

* Azure Active Directory (AAD)
* Role-Based Access Control (RBAC)
* Monitoring and Logging with Azure Monitor

**6️ Real-World Projects**

* Building an End-to-End ETL Pipeline
* Data Ingestion, Transformation, and Storage
* Integrating Azure Services for a Data Solution

**Azure Data Engineering Learning Path - Table of Contents (TOC)**

**🔵 Part 1: Azure Fundamentals (Foundation)**

Before diving into data engineering, you need to understand **Azure’s core concepts** and how cloud services work.

**Topics to Cover:**

1. **What is Cloud Computing?**
2. **Introduction to Microsoft Azure**
3. **Azure Subscription, Portal, and Resource Groups**
4. **Understanding Azure Regions and Availability Zones**
5. **Azure Pricing and Cost Management**

**🗄️ Part 2: Azure Storage Services (Data Storage)**

Data storage is **the backbone of any data engineering solution**. We’ll explore various storage options and their use cases.

**Topics to Cover:**

1. **Azure Blob Storage**
   * What is Blob Storage?
   * Types of Blob Storage (Block, Append, Page Blobs)
   * Hands-on: Creating a Blob Storage Account
2. **Azure Data Lake Storage (ADLS)**
   * What is Data Lake?
   * Differences Between ADLS Gen1 and Gen2
   * Hands-on: Creating a Data Lake and Accessing Files
3. **Azure Files and Azure Disks**
4. **Azure SQL Database**
   * Basics of SQL Database
   * Creating and Managing Databases
5. **Azure Cosmos DB**
   * NoSQL Database Concepts
   * Use Cases and Hands-on Demo

**🔄 Part 3: Data Integration with Azure (ETL/ELT Pipelines)**

Data engineers need to **move, transform, and process data** from various sources.

**Topics to Cover:**

1. **Azure Data Factory (ADF)**
   * What is Azure Data Factory?
   * Creating Pipelines and Data Flows
   * Connecting ADF with Different Data Sources
   * Triggering Pipelines (Manual and Automated)
2. **Azure Synapse Analytics (formerly SQL DW)**
   * Data Warehousing Concepts
   * Serverless and Dedicated SQL Pools
   * Hands-on: Building a Data Warehouse Solution
3. **Azure Databricks**
   * Introduction to Apache Spark
   * Setting Up Azure Databricks Workspace
   * Data Processing with Spark in Databricks

**📊 Part 4: Data Analytics and Business Intelligence**

Once data is stored and processed, you need to **analyze it and generate insights**.

**Topics to Cover:**

1. **Azure Synapse Analytics (Analytics Layer)**
2. **Power BI Integration with Azure**
   * Connecting Power BI to Azure Data Sources
   * Building Dashboards and Reports

**🔐 Part 5: Security, Monitoring, and Governance**

Azure provides several tools to **secure data and monitor data pipelines**.

**Topics to Cover:**

1. **Azure Active Directory (AAD)**
   * Identity and Access Management
   * Role-Based Access Control (RBAC)
2. **Azure Key Vault**
   * Managing Secrets and Keys
3. **Azure Monitor and Log Analytics**
   * Monitoring Data Pipelines
   * Setting Up Alerts and Notifications
4. **Data Governance with Azure Purview**
   * Data Catalog and Data Lineage
   * Setting Up Data Governance Policies

**🧱 Part 6: Building Real-World Data Engineering Projects**

You’ll apply everything you’ve learned by building **end-to-end data engineering projects** on Azure.

**Project Ideas:**

1. **Building an ETL Pipeline using Azure Data Factory and Blob Storage**
2. **Data Lakehouse with Azure Synapse and Azure Databricks**
3. **Real-Time Data Processing with Azure Event Hub and Stream Analytics**
4. **Data Governance Project with Azure Purview**

**🛠️ Part 7: Azure DevOps for Data Engineers**

Learn how to **automate deployments and manage code** using **Azure DevOps**.

**Topics to Cover:**

1. **Azure Repos** (Source Control)
2. **Azure Pipelines** (CI/CD for Data Pipelines)
3. **Azure Boards** (Agile Project Management)

**🚀 Part 8: Advanced Topics in Azure Data Engineering**

Once you’ve mastered the basics, explore **advanced concepts** to become an expert.

**Topics to Cover:**

1. **Azure Event Hubs** (Real-Time Data Streaming)
2. **Azure Stream Analytics**
3. **Azure Machine Learning** (for Data Engineers)
4. **Managing Big Data with HDInsight**

**📂 Part 9: Preparing for Azure Certifications**

If you want to **validate your knowledge**, you can pursue Azure certifications:

**Relevant Certifications for Data Engineers:**

1. **Microsoft Certified: Azure Data Engineer Associate (DP-203)**
2. **Microsoft Certified: Azure Fundamentals (AZ-900)**