

3-Days

Power BI Data Analysis for Engineers

Audience: Data analysts, BI professionals, reporting specialists, project managers, operations teams, and business users who already understand Power BI basics and want to strengthen skills in data preparation, modeling, DAX, visualization, publishing, and analytics solution delivery.

Prerequisites: Basic familiarity with Power BI Desktop, Excel-based reporting, common data concepts such as tables and relationships, and the ability to create simple charts or reports.

Course Outcome: By the end of the program, participants will be able to connect and transform business data, design an optimized semantic model, write practical DAX calculations, build interactive dashboards, publish reports to Power BI Service, configure refresh and security basics, and complete an end-to-end analytics mini project.

Day 1: Power BI Data Preparation and Intermediate Power Query

Focus: Build a strong data preparation foundation by connecting to multiple sources, applying repeatable ETL steps, improving data quality, and preparing datasets for modeling and analysis.

Module 1: Get started with Microsoft data analytics

- Introduction to Power BI business Intelligence, Review of BI concepts and the role of Power BI in modern data analysis
- Power BI ecosystem: Desktop, Service, Mobile, Gateway, workspaces, dashboards, and reports
- Power BI architecture and data flow from source to insight

Module 2: Connecting to Data Sources

- Connecting to Excel, CSV, folders, SQL Server, SharePoint, and web-based data sources
- Combining multiple data sources into one reporting model
- Import mode, DirectQuery, Live Connection, and when to use each option
- Industry use cases for manufacturing, operations, sales, finance, HR, and project reporting
- Understanding source settings, credentials, privacy levels, and refresh behavior
- Handling import errors, data type issues, duplicate headers, and inconsistent formats
- Best practices for naming queries, columns, and tables

Module 3: Power Query for Data Cleaning and Transformation

- Power Query Editor interface and applied steps
- Filtering, sorting, grouping, replacing values, and removing duplicates
- Splitting, merging, extracting, and formatting columns
- Appending and merging queries for multi-table analysis
- Creating conditional columns, custom columns, and basic M expressions
- Handling missing values, blanks, errors, and outliers
- Data profiling using column quality, column distribution, and column profile
- Creating reusable ETL workflows and query parameters

Hands-on Lab: Data Preparation

- Get data in Power BI
- Clean, transform, and load data in Power BI

Day 2: Data Modeling, DAX, and Analytical Calculations

- Focus: Design a reliable semantic model, create relationships, apply dimensional modeling principles, and develop DAX measures for business analysis and KPI tracking.

Module 4: Data Modeling and Semantic Model Design

- Understanding semantic models in Power BI
- Fact tables, dimension tables, keys, hierarchies, and granularity
- Star schema vs snowflake schema and model design trade-offs
- Relationships, cardinality, cross-filter direction, and relationship troubleshooting
- Creating date tables
- Optimizing models by removing unnecessary columns and improving table structure
- Resolve modelling challenges
- Creating Hierarchy

Hands-on Lab: Build a Semantic Model

- Configure a semantic model in Power BI
- Create relationships, hierarchies, and a dedicated date table

Module 5: Add measures to semantic models

- DAX concept and syntax

- Calculated measures, columns, and tables
- Lab: Create DAX calculations in Power BI Desktop

Module 6: Use DAX functions

- Filter context
- Understand and manipulate filter context
- Use DAX functions to extend semantic models
- Create custom date table for Time intelligence functions

Module 7 Using DAX to perform Advanced calculations

- Understanding Row Context with Iterator function
- SUMX
- AVERAGEX
- MAXX
- RANKX
- Creating and Manipulating Table in DAX with functions
- FILTER
- SUMMARIZE
- SUMMARIZECOLUMNS
- GROUP BY
- ADD COLUMN
- CALENDAR & CALENDARAUTO
- Working with Time Intelligence
- DatesYTD
- DatesQTD
- DatesMTD
- Year on Year growth calculation
- DateAdd
- Parallelperiod
- SameperiodLastYear
- Semi-additive measures

Module 8: Create Visual Calculations

- Understand visual calculations and how they differ from measures
- Create visual calculations in Power BI Desktop
- Use parameters in visual calculations

- Lab: Create visual calculations in Power BI Desktop

Hands-on Lab: Modeling and DAX

- Create DAX calculations in semantic models
- Modify DAX filter context in Power BI
- Use DAX time intelligence functions in Power BI
- Create visual calculations in Power BI Desktop

Day 3: Interactive Reports, Power BI Service, Security, and Capstone

Focus: Convert modeled data into interactive dashboards, improve report usability, publish and manage content in Power BI Service, and complete an end-to-end analytics solution.

Module 9: Report Design and Data Visualization

- Choosing the right visual for the right analytical question
- Charts, cards, matrix, tables, maps, slicers, KPI visuals, and custom visuals overview
- Dashboard layout, visual hierarchy, spacing, alignment, and theme consistency
- Drill-down, drill-through, report page tooltips, bookmarks, buttons, and navigation
- Conditional formatting for performance indicators
- Use cases, Designing Sales, Finance Report

Hands-on Lab:

- Design Power BI reports
- Enhance Power BI report designs

Module 10: Advanced Analytics and Performance Optimization

- Using analytics features such as trend lines, forecasting, anomaly detection, and clustering
- AI visuals: Key Influencers, Decomposition Tree, Smart Narrative, and Q&A visual
- What-if parameters and scenario-based reporting
- Performance Analyzer and identifying slow visuals
- Reducing model size and improving visual performance
- Best practices for report usability and storytelling with data

Hands-on Lab:

- Perform analytics in Power BI

Module 11: Publishing, Collaboration, Refresh, and Security

- Publishing reports from Power BI Desktop to Power BI Service
- Workspaces, permissions, dashboards, apps, and sharing options
- Scheduled refresh, data source credentials, and gateway overview
- Managing semantic models and refresh history
- Row-Level Security: static and dynamic security concepts
- Exporting, subscribing, and collaborating through Excel, Teams, and SharePoint
- Overview of Copilot for Power BI and Microsoft Fabric integration

Hands-on Lab:

- Secure data access in Power BI
- (Optional) Create dashboards in Power BI

Capstone Mini Project: End-to-End Power BI Analytics Solution

- Select one business scenario: Manufacturing Production Analytics, Project Progress Dashboard, Sales Performance Dashboard, Quality and Defect Analysis, Equipment Health Monitoring, Inventory Analysis, or HR Workforce Insights
- Import and transform raw data using Power Query
- Design a semantic model with relationships and calculated measures
- Create interactive report pages with slicers, drill-through, tooltips, and KPI visuals
- Publish the report to Power BI Service and configure refresh and basic security settings
- Present key insights, recommendations, and business actions from the dashboard

Suggested Day-wise Deliverables

Day	Key Deliverable	Participant Output
Day 1	Extract, transformed dataset Load datasets	Understand Data connectivity, Techniques of transformation
Day 2	Semantic model and DAX measures	Star schema model with KPIs and time intelligence calculations

Day 3	Create and Publish Reports and Dashboards	End-to-end Power BI report with insights, navigation, refresh, and security overview
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