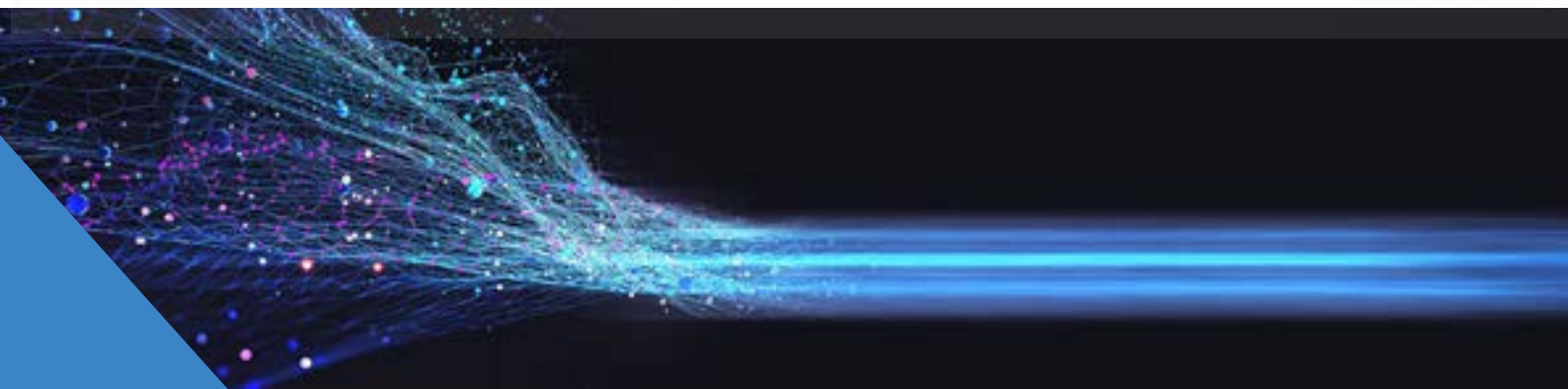




Data Analysis

Pre - requisites

Basic Understanding of Excel is enough to learn this course



About

Data Analysis

Data analysis is the process of inspecting, cleaning, transforming, and modeling data to discover useful information, draw conclusions, and support decision-making. It involves a systematic approach to understanding data and finding patterns, trends, or relationships that can inform strategies or improve outcomes. Here's a breakdown of the key aspects of data analysis:

- Data Collection
- Data Cleaning
- Exploratory Data Analysis (EDA)
- Data Transformation
- Statistical Analysis
- Reporting and Visualization





Data Analysis with Python

- Learn to collect and clean data.
- Understand key data analysis techniques.
- Use Python libraries like Pandas, NumPy, Matplotlib, and Seaborn for data manipulation and visualization.
- Conduct exploratory data analysis (EDA).
- Perform statistical analysis and hypothesis testing.
- Build data analysis reports and communicate results effectively.

Introduction to Data Analysis

- Overview of data analysis
- Types of data: Structured vs. unstructured data
- Tools used in data analysis (Python, Jupyter Notebooks)
- Introduction to Python libraries: Pandas, NumPy, Matplotlib, Seaborn
- Data Collection and Preprocessing
- Importing data (CSV, Excel, SQL, JSON)
- Handling missing data
- Data cleaning techniques: Removing duplicates, dealing with outliers
- Data types in Pandas and conversion methods
- Introduction to dataframes and series

Data Manipulation and Transformation

- Data wrangling with Pandas
- Filtering and selecting data
- Grouping data and aggregating
- Merging and joining datasets
- Pivot tables and cross-tabulations



Exploratory Data Analysis (EDA)

- Descriptive statistics: Mean, median, mode, variance, standard deviation
- Visualizing data distributions (histograms, box plots, KDE)
- Correlation and covariance analysis
- Identifying trends and patterns
- Handling categorical and numerical data

Data Visualization

- Introduction to Matplotlib and Seaborn
- Creating basic visualizations: line plots, bar charts, scatter plots
- Advanced visualizations: heatmaps, pair plots, violin plots
- Customizing plots (labels, titles, themes)
- Visualizing distributions and relationships in data

Data Analysis and Visualization with Power BI

Power BI is a powerful business analytics tool developed by Microsoft that allows users to visualize and analyze data in a comprehensive and interactive way. It helps individuals and organizations turn raw data into meaningful insights through intuitive reports, dashboards, and data visualizations





Introduction to Power BI

- Overview of Business Intelligence and Data Visualization
- Introduction to Power BI and its components (Power BI Desktop, Power BI Service, Power BI Mobile)
- Power BI Interface and Navigation
- Understanding Data Sources: Excel, SQL Server, Web, APIs, etc.
- Installing Power BI Desktop

Getting Data and Data Transformation

- Connecting Power BI to various data sources (Excel, databases, cloud services, web data)
- Introduction to Power Query Editor for data transformation
- Cleaning and shaping data: Remove duplicates, null values, filtering rows
- Merging and appending queries
- Creating relationships between tables (One-to-One, One-to-Many)

Data Modeling and Relationships

- Introduction to Data Modeling in Power BI
- Creating and managing relationships between tables
- Understanding Cardinality and Relationship Types
- Building and managing calculated columns and tables
- Understanding Data Types and Key Metrics

Introduction to DAX (Data Analysis Expressions)

- Overview of DAX and its role in Power BI
- Basic DAX functions: SUM, AVERAGE, COUNT, MIN, MAX
- Creating calculated columns and measures
- Using DAX for time-based analysis (Date, Year, Quarter, Month)
- Introduction to CALCULATE, FILTER, and other important DAX functions





Visualizations and Report Building

- Introduction to Power BI Visualization Types: Bar, Line, Pie, Area, etc.
- Creating charts, tables, and maps in Power BI
- Formatting visualizations for clarity and impact
- Adding slicers and filters for interactivity
- Best practices for designing intuitive and effective reports

Advanced Visualizations and Customization

- Using advanced visualizations: Scatter plots, Waterfall charts, Funnel charts
- Introduction to Power BI Custom Visuals
- Creating dynamic reports with drill-through, drill-down, and tooltips
- Conditional formatting and KPI visualizations
- Building interactive dashboards: combining multiple visuals on a single report page

Advanced DAX and Time Intelligence

- Advanced DAX techniques: Time Intelligence functions (YTD, MTD, QTD, etc.)
- Working with CALCULATE and FILTER for advanced filtering
- Handling context in DAX (Row Context vs. Filter Context)



Introduction to MySQL and Databases

Introduction to SQL: Basics of SQL language, syntax, and commands.

Basic SQL Queries

Advanced SQL Techniques

JOIN Operations: Inner Join, Left Join, Right Join, and Full Join.

Subqueries: Using subqueries for nested queries.

Union and Intersection: UNION, UNION ALL, INTERSECT.

Data Transformation: Using CASE WHEN for conditional logic.

String Functions: Concatenation, trimming, and replacing.

Date Functions: Manipulating dates and times in queries (DATE_FORMAT, DATEDIFF, etc.)





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