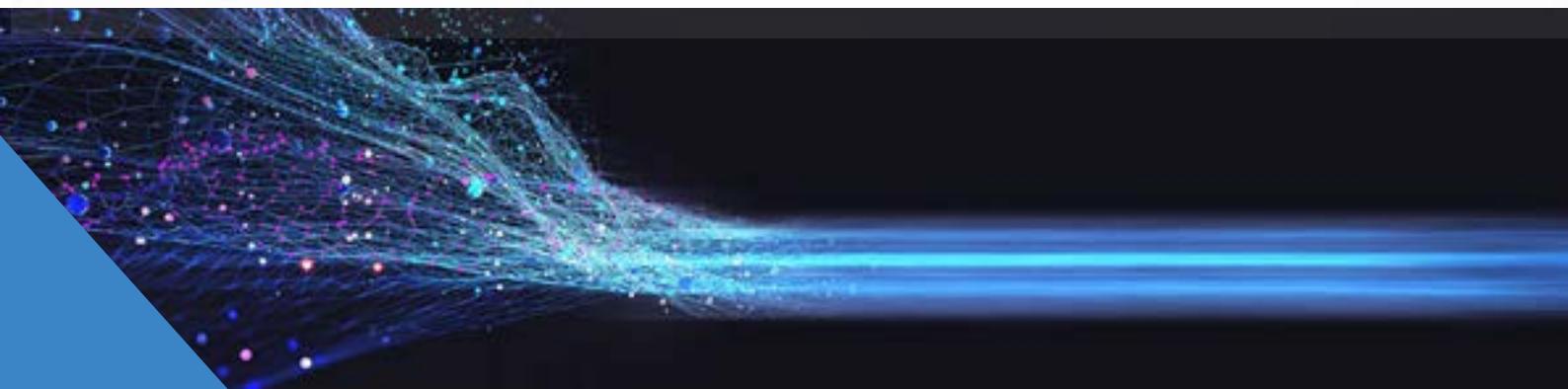




## Data Analysis

### 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.

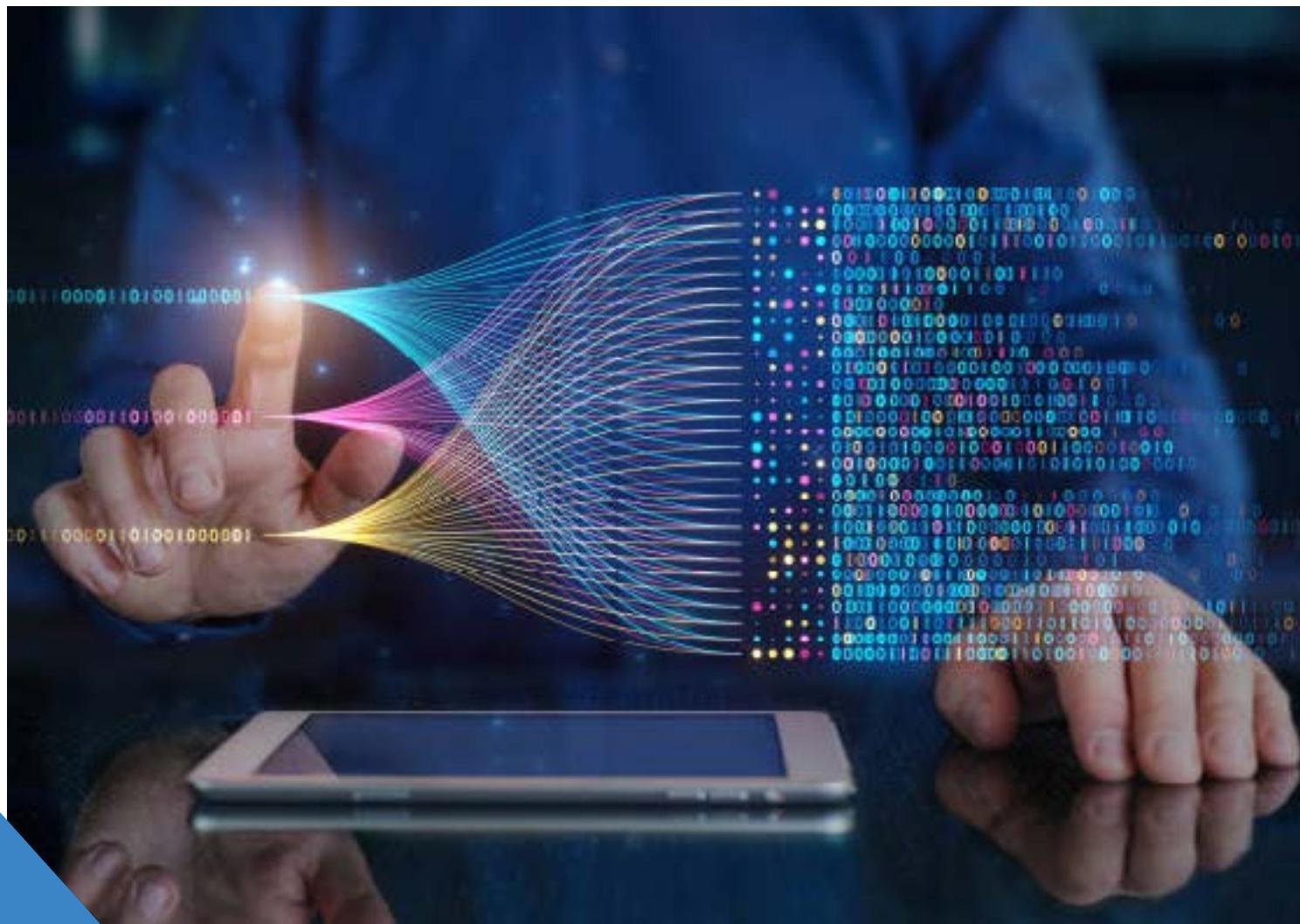
Subqueries: Using subqueries for nested queries.

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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