Introduction to the Course

Excel, Power BI, Tableau, and SQL are fundamental tools for modern data analytics, each offering unique strengths. Excel is ideal for quick data analysis, calculations, and visualizations, making it versatile for various data tasks. Power BI specializes in creating dynamic, interactive dashboards and supports collaborative reporting. Tableau stands out for its advanced visual analytics capabilities, enabling users to build insightful and engaging data stories. SQL is the backbone for data extraction, transformation, and database management, ensuring efficient handling of large datasets. Together, these tools provide a comprehensive skill set for tackling diverse data challenges.

Course Content

1. Introduction to Data Analytics

- Overview of Data Analytics: Definition, importance, and real-world applications.

- Importance of Integrated Tools:

    o Role of Excel, Power BI, Tableau, and SQL in data analysis.

    o Key differences and when to use each tool.

- Setting Up the Environment:

    o Installation and configuration of Excel add-ins, Power BI Desktop, Tableau Desktop, and SQL clients.

2. Data Preparation and Cleaning

- Excel:

    o Importing and exporting data from various sources (CSV, databases, web data).

    o Cleaning data using functions like CLEAN, TRIM, SUBSTITUTE, and VALUE.

    o Removing duplicates and handling missing values.

- Power BI:

    o Using Power Query Editor for data shaping (split columns, pivot/unpivot data).

    o Data transformations and managing relationships between tables.

- Tableau:

    o Connecting to data sources (Excel, SQL databases, cloud data).

    o Data blending, unions, and joins.

- SQL:

    o Importing data and understanding database schemas.

    o Using SQL queries to filter and format data for further analysis.

3. Data Manipulation and Analysis

- Excel:

    o Advanced functions: VLOOKUP, INDEX-MATCH, SUMIFS, and nested IF statements.

    o Utilizing PivotTables and PivotCharts for data summarization.

    o Conditional formatting and data visualization basics.

- Power BI:

    o Creating calculated columns and measures using DAX.

    o Building relationships and hierarchies.

    o Implementing data filters and slicers for interactive analysis.

- Tableau:

    o Building basic and advanced visualizations (bar charts, line charts, heat maps).

    o Customizing tooltips and labels for better insights.

    o Using calculated fields and parameters for dynamic analysis.

- SQL:

    o Writing and optimizing queries for data extraction.

    o Using aggregation functions (SUM, COUNT, AVG, MIN, MAX) and GROUP BY.

    o Applying joins (INNER, LEFT, RIGHT, FULL) to combine data from multiple tables.

4. Data Visualization Principles

- Core Visualization Concepts:

  - Importance of visual storytelling.

  - Best practices for designing clear and effective visualizations.

- Excel:

  - Creating dynamic charts (line, bar, scatter plots) and interactive dashboards.

- Power BI:

  - Building interactive visuals and customizing with themes and formatting.

  - Using bookmarks, buttons, and drill-throughs to enhance user experience.

- Tableau:

  - Designing interactive dashboards with filters, parameters, and actions.

  - Incorporating advanced visualization techniques like dual-axis charts.

5. Advanced Analytical Techniques

- Excel:

  - Time series analysis and forecasting.

  - Advanced functions like SUMPRODUCT and array formulas.

- Power BI:

  - DAX functions for complex calculations (e.g., CALCULATE, FILTER).

  - Time intelligence functions (e.g., DATESYTD, DATEADD).

- Tableau:

  - Implementing LOD (Level of Detail) expressions for granular analysis.

  - Predictive analytics (trend lines, clustering).

- SQL:

  - Using subqueries and nested queries for advanced data extraction.

  - Performance optimization using indexes and EXPLAIN for query analysis.

6. Dashboard Design and Reporting

- Principles of Effective Dashboard Design:

  o Layout and visual hierarchy.

  o Designing with user experience in mind.

- Excel:

  o Combining PivotTables, charts, and slicers into interactive reports.

- Power BI:

  o Creating comprehensive dashboards with interactive elements (tiles, images, text boxes).

  o Drill-down reports for detailed analysis.

- Tableau:

  o Integrating multiple data sources in dashboards.

  o Using actions (filter, highlight) for enhanced interactivity.

7. Collaboration and Data Sharing

- Power BI:

  o Publishing reports to Power BI Service.

  o Sharing and collaborating using Power BI apps and workspaces.

- Excel and Tableau:

  o Sharing workbooks and dashboards.

  o Exporting reports to PDF and web-friendly formats.

8. Real-World Applications and Case Studies

- Case Studies:

  o Analysis of industry-specific datasets (e.g., sales, finance, marketing).

  o Solving business problems using data-driven insights.

- Project Examples:

- o Comprehensive analysis of a sales dataset using Excel, Power BI, Tableau, and SQL.

- o Practical exercises involving customer segmentation and forecasting.

9. Capstone Project

- Hands-On Project:

  - o Students complete projects incorporating data preparation, analysis, and visualization.

  - o Presenting findings through an integrated dashboard using all four tools.

- Peer Review and Feedback:

  - o Group sessions for project feedback and discussions.