COURSE 13 A: BUSINESS ANALYTICS USING EXCEL AND POWER BI

Theory	Credits: 3	3 hrs/week

Course Objectives
This course is designed to:

- Introduce the fundamentals of Business Analytics and data-driven decision-making.
- To train students in Excel-based analytics including data cleaning, transformation, and visualization.
- Equip learners with skills to use Power BI for real-time interactive data dashboards.
- Help students understand how to draw insights from data for business problem-solving.
- Develop analytical thinking and storytelling abilities using visual tools.

Course Outcomes
Upon successful completion, the student will be able to:

CO1: Understand the role of analytics in business problem-solving and strategic planning.

CO2: Use Excel for advanced analytics including pivot tables, statistical functions, and dashboards.

CO3: Transform, model, and visualize data using Power BI.

CO4: Interpret insights and present business intelligence reports using visual storytelling.

CO5: Apply analytics to domains such as Marketing, Finance, HR, and Operations.

SYLLABUS

Unit I: Introduction to Business Analytics
Definition and Importance of Business Analytics – Types: Descriptive, Predictive, Prescriptive – Analytics vs. Analysis – Business Analytics Life Cycle – Role of a Business Analyst – Data-Driven Decision Making – Data Sources – Case-based Applications.

Unit II: Data Analytics using Excel – Part I
Working with Raw Data – Data Cleaning & Structuring – Text Functions – Logical Functions (IF, AND, OR, IFERROR) – Lookup Functions (VLOOKUP, HLOOKUP, XLOOKUP, INDEX-MATCH) – Data Validation – Conditional Formatting – Named Ranges – Form Controls.

Unit III: Data Analytics using Excel – Part II
Pivot Tables and Charts – Slicers and Timelines – Power Query – Data Modeling with Power Pivot – What-if Analysis – Goal Seek, Solver – Statistical Tools in Excel – Excel Dashboards for KPI Tracking – Forecast Sheet – Exporting Reports.

Unit IV: Power BI – Data Loading and Modeling
Overview of Power BI Desktop and Power BI Service – Data Loading from Excel/CSV/Cloud – Data Transformation in Power Query Editor – Relationships and Data Modeling – Calculated Columns and Measures using DAX – Data Types and Hierarchies – Star Schema.

Unit V: Power BI – Visualization and Insights

Creating Interactive Visuals (Bar, Line, Pie, Cards, Maps, Gauge) – Filters and Slicers – Drill Down/Up – Tooltips and Bookmarks – Dashboard Design Principles – Publishing Reports to Power BI Service – Sharing and Collaborating – Case Study: Power BI Dashboard for Sales/Finance/HR Analytics.

Student-Centric Activities
- Mini-Project on Business Scenario Analysis: Students analyze a real or simulated business problem (e.g., sales performance, inventory control) using Excel functions (e.g., VLOOKUP, Pivot Tables, What-If Analysis) and visualize key metrics using Power BI dashboards.
- Data Cleaning Challenge in Excel: Students are given a raw dataset and asked to clean and organize the data using Power Query, Remove Duplicates, Data Validation, and other Excel tools, followed by importing into Power BI.
- Power BI Dashboard Competition: Students design an interactive dashboard in Power BI using slicers, cards, charts, and KPIs to present insights on a provided dataset (e.g., retail sales, customer feedback, or financials).
- Business Insights Presentation: Each student presents a data-driven story based on Excel/Power BI analysis, explaining trends, insights, and business implications to simulate stakeholder reporting.
- Group Activity: Excel vs Power BI Tools Debate: Student groups compare features and use-cases of Excel and Power BI for business analytics, culminating in a classroom debate with examples.

Reference Books
1. Winston, W. L. (2021). *Microsoft Excel Data Analysis and Business Modeling* (7th ed.). Microsoft Press.
2. Jablonski, D. (2022). *Data Analytics with Microsoft Excel: Building Data Models and Dashboards*. Apress.
3. Souder, M. (2023). *Beginning Power BI: A Practical Guide to Self-Service Data Analytics*. Apress.
4. Sharda, R., Delen, D., & Turban, E. (2020). *Business Intelligence, Analytics, and Data Science: A Managerial Perspective* (5th ed.). Pearson.
5. Padilla, J. (2023). *The Definitive Guide to DAX: Business Intelligence for Microsoft Power BI, SQL Server Analysis Services, and Excel* (3rd ed.). Microsoft Press.

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Practical	Credits: 1	2 hrs/week

The following lab-based practical exercises are designed to reinforce theoretical knowledge through hands-on learning:

1. Excel Analytics Lab

- **Data Cleaning & Transformation:**
  - Clean messy business data using Flash Fill, Text to Columns, Remove Duplicates, and Data Validation.

- **Analytical Functions Practice:**
  - Apply IF, AND, OR, IFERROR, and nested formulas to solve business case questions.
  - Use lookup functions like VLOOKUP, HLOOKUP, XLOOKUP, INDEX & MATCH for dataset linkage.

- **Dashboards & Reports:**
  - Build a sales performance dashboard using PivotTables, PivotCharts, Slicers, and conditional formatting.
  - Perform scenario analysis using Goal Seek and Solver for forecasting or financial planning.

2. Power BI Fundamentals Lab

- **Data Import & Cleaning:**
  - Import sales/HR/finance datasets from Excel into Power BI.
  - Clean and transform data using Power Query Editor (e.g., remove nulls, split columns, change data types).

- **Data Modeling:**
  - Create relationships using Star Schema.
  - Create calculated columns and DAX measures (e.g., Total Sales, Profit Margin).

3. Power BI Visualization Projects

- **Build Interactive Dashboards:**
  - Visualize business metrics using cards, bar/line charts, maps, pie charts, slicers, and filters.
  - Apply drill-down, bookmarks, tooltips, and hierarchy features for layered insights.

- **Insight Reporting:**
  - Use dashboard output to prepare a brief business report summarizing key patterns and suggested decisions.

4. Business Case Study Project

- Mini-project on a domain of choice (Marketing/HR/Finance/Operations):
  - Analyze data in Excel, transform in Power BI, and visualize outcomes.
  - Present insights using storytelling techniques to simulate real-world stakeholder presentations.

5. Skill-Based Student Activities

- Weekly peer reviews on dashboard aesthetics, insights, and clarity.

- Weekly speed challenge on formula writing, data import, or chart creation.

- Mock client reporting using data-driven slides built from Excel/Power BI