6-Day Workshop on Advanced Excel and Power BI

Types: Workshop

Date: 14 October – 2024 to 19 October – 2024

Venue: Lab D

Number of Participants:55(registered :63)

Name of the Speaker: Dr. Ruchi Nanda**,** Dr. Amita Sharma, Dr. Astha Pareek,

Dr. Anubha Jain, Mr. Neelansh Yadav (Metlife,Jaipur)

Name of the Coordinator: Dr. Amita Sharam

Objective of the Workshop

The objective of the 6-day Offline Workshop on Advanced Excel and Power BI was to provide participants with practical knowledge and advanced skills in data analysis, visualization, and business intelligence using Microsoft Excel and Power BI. Key objectives included:

- **Mastering Advanced Excel Features:** Equip participants with a deep understanding of Excel's advanced functionalities, including formulas, PivotTables, PivotCharts, and financial modeling, to perform efficient data analysis and reporting.
- **Data Visualization and Dashboard Creation in Power BI:** Enable participants to create visually compelling and interactive reports and dashboards in Power BI, combining various data visualizations to present insights effectively.
- **Data Preparation and Transformation:** Teach participants how to clean, transform, and prepare raw data using Power Query for accurate analysis in Power BI, with a focus on creating calculated fields and custom columns.
- **Developing Strong Data Models:** Guide participants in building robust data models by establishing relationships between tables, applying proper data schema designs, and optimizing data connections for scalable analysis.
- **Introduction to DAX:** Introduce the basics of Data Analysis Expressions (DAX) and empower participants to create advanced calculations, including time-based analysis, using DAX functions for dynamic reporting.
- **Power BI Automation and Integration:** Equip participants with skills to automate workflows, set up data refresh cycles, and integrate Power BI with other systems for efficient data management and reporting processes.

By the end of the workshop, participants were expected to apply these skills to real-world business scenarios, enabling them to streamline data processes and generate actionable insights through Excel and Power BI.

Outcomes of the Workshop

Upon completing the 6-day Offline Workshop on Advanced Excel and Power BI, participants achieved several key outcomes, including:

1. **Proficiency in Advanced Excel:** Participants gained expertise in using advanced Excel functionalities, such as complex formulas, PivotTables, PivotCharts, and financial modeling. They learned how to apply these skills to analyze, organize, and present data effectively.
2. **Competence in Data Visualization with Power BI:** Participants developed the ability to create and customize a wide range of visualizations in Power BI. They learned how to build interactive and dynamic dashboards, enabling them to present data insights in a visually compelling and user-friendly manner.
3. **Data Preparation and Transformation Skills:** Participants acquired hands-on experience with Power Query, mastering techniques for cleaning, transforming, and shaping raw data. This included learning how to create calculated fields and custom queries to improve the quality of data analysis.
4. **Strong Data Modeling Capabilities:** Participants learned to design and implement robust data models in Power BI, establishing relationships between data tables and optimizing connections. They also understood how to structure data models for scalable and efficient reporting.
5. **Understanding and Application of DAX:** Participants gained a foundational understanding of Data Analysis Expressions (DAX), enabling them to create both basic and advanced calculations for dynamic reporting, including time intelligence functions to analyze trends over different periods.
6. **Automation and Integration Skills:** Participants learned how to automate data workflows in Power BI, set up scheduled data refreshes, and integrate Power BI with other systems like Microsoft Excel, SharePoint, and external APIs for seamless data management and collaboration.
7. **Real-World Application of BI Tools:** By the end of the workshop, participants were equipped to apply advanced Excel and Power BI techniques to solve real-world business problems, enhance decision-making processes, and provide data-driven insights in professional settings.

These outcomes ensured that participants could efficiently manage data, automate reporting processes, and generate actionable insights to drive business intelligence in their organizations.
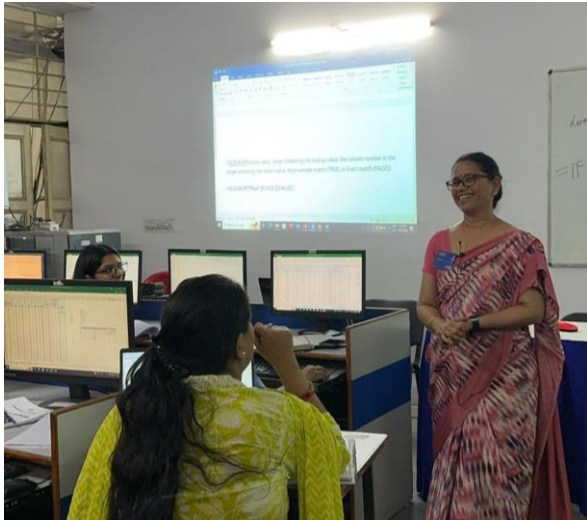
Day 1 (14 October 2024) - Monday

Morning Session:

- **Session 1: Advanced Excel**

  Resource Person: Dr. Ruchi Nanda, Head & Associate Professor, CSIT
  Description: With the introductory session of the 6 day workshop, Dr. Ruchi Nanda focused on mastering advanced Excel functionalities that are essential for data management and analysis. The session included the following key topics:

  Conditional Formatting: The session introduced participants to conditional formatting, a powerful tool for visualizing data patterns:

  - **Highlighting Key Data**: Participants learned how to use conditional formatting to automatically highlight important data points, such as values above or below a certain threshold.
  - **Color Scales and Data Bars**: The session demonstrated how to use **color scales** to show data distribution or data bars to represent values within a cell, providing an at-a-glance view of trends.
  - **Custom Rules**: Participants explored creating custom formatting rules based on specific conditions, allowing for tailored data visualizations (e.g., highlighting cells that meet multiple criteria or using icons to indicate performance levels).

  Filtering and Sorting Data: Participants were introduced to advanced techniques for filtering and sorting large datasets. This included:

  - **Custom Filters**: Using multiple criteria to refine data views.
  - **Sorting by Multiple Columns**: Arranging data by various parameters for more detailed analysis.
  - **Handling Large Datasets**: Efficiently navigating and manipulating extensive data within Excel.

  Excel Functions: The session emphasized important Excel functions commonly used in data analysis:

  - **Nested IF**: A step-by-step explanation of how to use the **IF function** within other IF statements to handle more complex decision-making scenarios, including practical examples of applying the function to real-world data.
  - **COUNT and COUNTIF**: Participants learned how to use these functions to count cells that meet specific conditions. Practical use cases were demonstrated, such as counting occurrences of specific entries or counting values based on certain criteria.
  - **Other Key Functions**: An overview of additional useful functions for efficient data analysis, such as **AVERAGE**, **SUMIF**, etc. .

Creating Charts: Dr. Nanda also covered how to effectively visualize data using Excel's charting tools. Participants learned:

- **Choosing the Right Chart Type**: Guidance on selecting the most appropriate chart for different types of data, including bar charts, pie charts, and line charts.
- **Customizing Charts**: Instructions on customizing chart elements such as labels, colors, and axis formatting to improve clarity and impact.
- **Dynamic Charts**: How to create charts that update automatically when the underlying data changes, making them valuable for real-time analysis and reporting.

Afternoon Session

- **Session 2: Data Preprocessing and Pivot Tables**
  Resource Person: Dr. Amita Sharma, Assistant Professor(Selection Grade), CSIT

  Description:
  In this session, Dr. Amita Sharma guided participants through essential data preprocessing techniques in Excel. The session was focused on preparing and cleaning datasets for analysis, followed by creating pivot tables for data summarization. Key topics covered included:

  Deleting Empty Rows and Columns:
  Dr. Sharma demonstrated how to efficiently clean up datasets by removing empty rows and columns that could skew analysis or visualizations.

  Removing Duplicates:
  Participants learned how to eliminate duplicate entries from their datasets to ensure data accuracy and reliability. Key steps included:

  - **Identifying Duplicate Records**: Techniques for locating duplicate rows based on one or more columns.
  - **Deleting Duplicates**: Methods for safely removing duplicates while retaining the first occurrence or selecting which duplicates to keep based on specific criteria.

  Creating Pivot Tables:
  Dr. Sharma provided an in-depth introduction to creating and using pivot tables, one of Excel's most powerful features for summarizing and analyzing data. Key steps included:

  - **Building a Pivot Table**: Instructions on selecting relevant data, arranging fields, and choosing how to summarize information (e.g., sum, average, count).

- **Customizing the Layout**: Guidance on customizing pivot table fields to highlight key insights, such as grouping data by categories or applying filters.
- **Using Pivot Table Features**: Dr. Sharma also covered advanced features like sorting within pivot tables, creating subtotals, and adding calculated fields for deeper data insights.

Day 2 (15 October 2024) - Tuesday

Morning Session:

- **Session 3: Advanced Excel-Formulas, Functions**
  Resource Person: Dr. Astha Pareek, Assistant Professor(Selection Grade), CSIT

  Description:
  This session focused on enhancing participants' proficiency in using advanced Excel formulas and functions, which are crucial for complex data analysis and decision-making. The key topics covered were:

  Formulas:
  Participants were introduced to the structure and usage of complex formulas in Excel to perform calculations and data manipulations. The session covered:

  - **Creating Complex Formulas**: How to combine multiple operations in a single formula to automate calculations across datasets.
  - **Referencing Cells and Ranges**: Techniques for efficiently referencing specific cells or ranges in formulas, including absolute and relative referencing.

  Functions:
  The session highlighted a variety of advanced Excel functions that streamline data processing and analysis. Key functions included:

  - **Logical Functions**: The session explored IF, AND, and OR functions to execute conditional logic in spreadsheets, allowing for decisions based on specified criteria.
  - **Text Functions**: Techniques for manipulating text data, including CONCATENATE, LEFT/RIGHT, and TEXTJOIN to merge, extract, or format text strings.

Afternoon Session
- **Session 4: Financial Modeling in Excel**

Resource Person: Dr. Anubha Jain, Associate Professor and Director, CSIT

Description:
This session provided participants with an introduction to financial modeling in Excel, focusing on key techniques and functions used in the financial industry. The session also covered advanced LOOKUP functions, a critical component in building robust financial models. The key topics covered are:

Financial   Modeling:
The session started with an overview of financial modeling, which involves constructing a mathematical representation of a company's financial performance. Participants learned:

- **Building Financial Models**: Step-by-step guidance on setting up financial models, including organizing financial data, setting assumptions, and linking various financial statements (e.g., income statement, balance sheet, and cash flow statement).
- **Scenario Analysis**: Techniques for incorporating different scenarios (e.g., best case, worst case) into the financial models, allowing users to analyze potential outcomes based on varying assumptions.
- **Forecasting**: Participants were introduced to forecasting methods using historical data and assumptions to predict future performance. Formulas and functions were used to calculate revenue growth, expenses, and profitability.

LOOKUP   Functions:
The session covered the use of LOOKUP functions in Excel to search for and retrieve data from large datasets, a vital tool in financial modeling. Key functions included:

- VLOOKUP and HLOOKUP: Participants learned how to use VLOOKUP (vertical lookup) and HLOOKUP (horizontal lookup) to search for specific values in tables and return corresponding data.

Day 3 (16 October 2024) - Wednesday

Morning Session:

- **Session   5:   Loading   Data   and   Creating   Graphs**
  Resource Person: Mr. Neelansh Yadav, Associate Consultant, Medlife, Jaipur
  Description: In this session, participants were introduced to the process of loading data from various sources into Power BI. Key steps included:

Connecting Data Sources: The session covered how to connect Power BI to different data sources like Excel files, databases, and cloud services (e.g., SQL, SharePoint, Azure).

Data Import and Refresh: Participants learned the importance of setting up data refresh cycles to ensure the latest data is available for analysis.

Basic Graph Creation: The focus then shifted to creating simple but effective visuals such as:

- Bar and column charts for categorical comparisons
- Line charts for showing trends over time
- Pie charts for displaying proportions

Choosing the Right Visuals: The session emphasized selecting appropriate visuals based on the data type and analysis goals. Practical examples were used to illustrate how well-chosen graphs can communicate insights effectively.

Afternoon Session:

- **Session 6: Creating a Dashboard**
  Resource Person: Mr. Neelansh Yadav, Associate Consultant, Medlife, Jaipur
  Description: This session was dedicated to building a fully functional and interactive dashboard. Participants learned how to:

  Combine Multiple Visualizations: They combined visuals such as charts, graphs, and tables into a cohesive dashboard, ensuring a logical flow for end-users.

  Adding Slicers and Filters: Interactive elements like slicers and filters were introduced to enable dynamic report navigation. For example, users could filter data by date range, categories, or regions.

  Implementing Drill-Throughs: Drill-through functionality was covered, allowing users to explore more detailed reports by clicking on specific data points.

  Dashboard Design Best Practices: The session concluded with best practices for designing user-friendly dashboards, including color schemes, layout planning, and balancing data density to ensure clarity.

Day 4 (17 October 2024) - Thursday

Morning Session:

- **Session   7:   Power   Query**
  Description: The morning session delved deep into Power Query, the data preparation tool in Power BI. Topics covered included:

    Data Cleaning: Participants learned to handle messy or incomplete data, using tools to filter, sort, and replace values.

    Data Shaping and Transformation: The session demonstrated how to:

    - Merge and append data from different sources.
    - Pivot and unpivot columns for better analysis.
    - Remove duplicates and null values.

    Custom Queries: Participants were also introduced to creating custom queries, allowing them to automate repetitive tasks and create a standardized process for future data imports.

Afternoon Session:

- **Session   8:   Creating   Calculated   Fields**
  Description: The afternoon session continued the exploration of Power Query, with a focus on calculated fields. Participants learned:

    Creating Custom Columns: They were taught how to create custom columns using conditional logic (e.g., adding a custom "Revenue Category" field based on sales data).

    Using M Language: Basic M Language, the formula language of Power Query, was introduced to enhance the capabilities of custom columns.

    Practical Applications: Various business use cases were provided to showcase how calculated fields could be used to segment data, create performance metrics, and streamline data models.

    Calculated Measures: In addition to calculated columns, the concept of calculated measures was introduced to allow for dynamic calculations that update based on user inputs or slicers.

Day 5 (18 October 2024) - Friday

Morning and Afternoon Sessions:

- **Session 9 & 10: Data Modeling and Connections**
  Description: Day 5 was dedicated to data modeling, a crucial part of the Power BI workflow. Both sessions were structured around understanding and implementing robust data models. Topics included:

  Understanding Relationships: Participants learned about one-to-many and many-to-many relationships between tables. The session also explained primary and foreign keys and how they are used to connect tables in a data model.

  Star and Snowflake Schema: The session introduced star and snowflake schema design, common data modeling structures that help optimize performance and query speed in Power BI.

  Setting Up Connections: Participants practiced setting up connections between different data tables, ensuring that reports are built on a solid foundation. They also learned how to troubleshoot common issues like ambiguous relationships.

  Managing Hierarchies: Hierarchies (e.g., date hierarchies for year, quarter, month) were covered, allowing users to drill down into data layers within visuals.

  Optimizing Data Models: The session ended with techniques to optimize data models for performance, including removing unnecessary columns and reducing the size of datasets for quicker load times.

Day 6 (19 October 2024) - Saturday

Morning Session:

- **Session 11: Introduction to DAX**
  Description: The session introduced participants to DAX (Data Analysis Expressions), the formula language used to create calculations in Power BI. Key points included:

  Basic DAX Functions: Participants learned common DAX functions such as:

  - SUM, AVERAGE, MIN, MAX for simple aggregation
  - IF and SWITCH for logical operations
  - CONCATENATE for text-based calculations

Calculated Columns vs. Measures: The difference between calculated columns (which are static) and measures (which are dynamic and recalculated based on the visual context) was emphasized.

Basic Date Functions: Introduction to date and time functions, essential for any time-based analysis in business intelligence reports. By the end of the session, participants had hands-on experience writing basic DAX expressions and using them in reports.

Afternoon Session:

- **Session 12: Advanced DAX**
Description: The final session of the workshop went deeper into advanced DAX functions, particularly those used in complex business analysis. Key topics included:

  Time Intelligence: Participants learned how to create advanced time-based calculations using functions such as:

  - SAMEPERIODLASTYEAR, TOTALYTD for year-over-year analysis.
  - DATESBETWEEN and PARALLELPERIOD for dynamic date range comparisons.

  Advanced Calculations: More sophisticated DAX functions were introduced, including:

  - CALCULATE to modify the filter context.
  - ALL to ignore specific filters in a visual.
  - RANKX for ranking data dynamically.

  Performance Optimization: The session also touched on optimizing DAX formulas for performance, particularly for large datasets, ensuring that calculations run efficiently in real-time reports. By the end of the day, participants were equipped to handle complex business scenarios using DAX, allowing for powerful data insights.