

Data Transformation, Analysis and Charting



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Contents

1. Excel Fundamentals & Basic Data Handling.....	3
1.1. Getting Started with Excel.....	3
1.2. Data Entry & Editing.....	3
1.3. Basic Formatting.....	4
1.4. Managing Worksheets	4
1.5. Managing Rows, Columns & Cells	4
2. Essential Formulas & Functions	4
2.1. Understanding Formulas.....	4
2.2. Basic Math Functions	4
2.3. Relative, Absolute & Mixed References	5
2.4. Logical Functions	5
2.5. Text Functions.....	5
2.6. Date & Time Functions	6
3. Data Lookup, Validation & Advanced Analysis	6
3.1. Lookup & Reference Functions	6
3.2. Data Validation	6
3.3. Conditional Formatting.....	7
3.4. Data Sorting & Filtering.....	7
3.5. Text to Columns & Flash Fill.....	7
4. Data Aggregation & Reporting with PivotTables	7
4.1. Introduction to PivotTables.....	7
4.2. Pivot Table Layout & Fields.....	8
4.3. Grouping & Filtering in PivotTables	8
4.4. Pivot Charts.....	8
4.5. Calculated Fields & Items	8
5. Advanced Excel Features & Automation Basics.....	8
5.1. Advanced Statistical & Financial Functions (Overview)	8
5.2. Data Importing & External Connections	9
5.3. What-If Analysis Tools.....	9
5.4. Introduction to Macros (VBA Basics).....	9
5.5. Advanced Charting & Visualization.....	9

6. Power Query	10
6.1. Introduction to Power Query (Get & Transform Data):.....	10
6.2. Connecting to Data Sources:.....	10
6.3. Essential Data Transformations:.....	11
6.4. Combining Multiple Data Sources:.....	11
6.5. Loading Data & Refresh:	11
6.6. PivotTables from Clean Power Query Data:	11
6.7. Data Modelling with Power Pivot:	12
6.8. Building Interactive Dashboards with Power Query	12
7. Projects for your resume	12

1. Excel Fundamentals & Basic Data Handling

1.1. Getting Started with Excel

- Understanding the Excel Interface: Ribbon, Quick Access Toolbar, Formula Bar, Name Box, Worksheets, Workbook.
- Basic Navigation: Keyboard shortcuts, selecting cells, ranges, rows, columns.
- Saving, Opening, and Closing Workbooks.
- Understanding File Formats (.xlsx, .xls, .csv).

1.2. Data Entry & Editing

- Entering different data types (text, numbers, dates, formulas).
- Editing cell content, Undo/Redo.
- AutoFill and Custom Lists (e.g., filling series, days of the week).

1.3. Basic Formatting

- Font, Size, Color, Bold, Italic, Underline.
- Cell Borders and Fill Colors.
- Number Formatting (Currency, Percentage, Date, Time, Custom).
- Alignment and Text Wrapping.
- Merge & Center.

1.4. Managing Worksheets

- Inserting, Deleting, Renaming, Moving, Copying Worksheets.
- Grouping Worksheets for simultaneous editing.
- Hiding/Unhiding Worksheets.

1.5. Managing Rows, Columns & Cells

- Inserting and Deleting Rows/Columns/Cells.
- Adjusting Row Height and Column Width (AutoFit).
- Hiding/Unhiding Rows/Columns.
- Freezing Panes (for large datasets).

2. Essential Formulas & Functions

2.1. Understanding Formulas

- What are formulas? Operators (+, -, *, /, ^).
- Order of Operations (PEMDAS/BODMAS).
- Error Types (#DIV/0!, #VALUE!, #NAME?, etc.).

2.2. Basic Math Functions

- SUM(): Adding numbers.

- AVERAGE(): Calculating the mean.
- COUNT(), COUNTA(), COUNTBLANK(): Counting cells with numbers, non-empty cells, and empty cells.
- MAX(), MIN(): Finding the highest and lowest values.

2.3. Relative, Absolute & Mixed References

- Understanding A1 (Relative), \$A\$1 (Absolute), A\$1 (Mixed), \$A1 (Mixed).
- The importance of absolute references for copying formulas correctly.

2.4. Logical Functions

- IF(): Conditional logic (e.g., "Pass" or "Fail").
- AND(), OR(), NOT(): Combining multiple conditions.
- Nested IF statements (for multiple conditions).
- IFS() (for Excel 2016+): Multiple conditions without nesting.

2.5. Text Functions

- CONCATENATE() / CONCAT(): Joining text strings.
- LEFT(), RIGHT(), MID(): Extracting parts of text.
- LEN(): Getting the length of a text string.
- TRIM(): Removing extra spaces.
- UPPER(), LOWER(), PROPER(): Changing text case.
- FIND(), SEARCH(): Locating text within a string.
- SUBSTITUTE(), REPLACE(): Replacing text.

2.6. Date & Time Functions

- TODAY(), NOW(): Current date and date/time.
- DAY(), MONTH(), YEAR(): Extracting date components.
- WEEKDAY(), WEEKNUM(): Day of the week, week number.
- DATEDIF(): Calculating difference between dates (years, months, days).
- EOMONTH(), WORKDAY(), NETWORKDAYS(): End of month, working days.

3. Data Lookup, Validation & Advanced Analysis

3.1. Lookup & Reference Functions

- VLOOKUP(): Vertical lookup (exact and approximate match).
- HLOOKUP(): Horizontal lookup.
- **INDEX() and MATCH(): The powerful combination (more flexible than VLOOKUP).**
 - Understanding MATCH() for position.
 - Understanding INDEX() for value retrieval.
 - Combining INDEX and MATCH for two-way lookups.
- XLOOKUP() (for Excel 365/2019+): A modern, more versatile lookup function.

3.2. Data Validation

- Setting up data validation rules (e.g., whole numbers, dates, list from a range).
- Input messages and error alerts.
- Creating dependent dropdown lists.

3.3. Conditional Formatting

- Highlighting Cells Rules (e.g., greater than, text contains).
- Top/Bottom Rules.
- Data Bars, Color Scales, Icon Sets.
- Using formulas to apply conditional formatting (advanced rules).

3.4. Data Sorting & Filtering

- Basic Sort (single column).
- Custom Sort (multiple columns, by color).
- Basic AutoFilter.
- Advanced Filter (using criteria ranges).
- Removing Duplicates.

3.5. Text to Columns & Flash Fill

- Splitting data by delimiter or fixed width.
- Using Flash Fill for intelligent data extraction/transformation.

4. Data Aggregation & Reporting with PivotTables

4.1. Introduction to PivotTables

- What is a PivotTable? Why use it?
- Preparing data for PivotTables (clean, tabular data).
- Creating a basic PivotTable.

4.2. Pivot Table Layout & Fields

- Rows, Columns, Values, Filters (Report Filter).
- Changing aggregation functions (Sum, Count, Average, Min, Max, etc.).
- Value Field Settings (Show Values As: % of Total, Difference From, etc.).

4.3. Grouping & Filtering in PivotTables

- Grouping by Date (Years, Quarters, Months).
- Grouping Numbers.
- Label Filters, Value Filters, Report Filters.
- Using Slicers for interactive filtering.
- Creating Timelines (for date fields).

4.4. Pivot Charts

- Creating charts directly from PivotTables.
- Understanding dynamic charts.

4.5. Calculated Fields & Items

- Adding custom calculations within a PivotTable.

5. Advanced Excel Features & Automation Basics

5.1. Advanced Statistical & Financial Functions (Overview)

- SUMIFS(), COUNTIFS(), AVERAGEIFS(): Conditional aggregations.
- IFERROR(): Handling errors gracefully.

- RANK(), LARGE(), SMALL(): Ranking and extracting specific values.
- GETPIVOTDATA(): Extracting data from PivotTables (and why to avoid it for general use).

5.2. Data Importing & External Connections

- Importing data from CSV, Text files.
- Connecting to external data sources (e.g., Access, SQL Server - basic concept).
- Refreshing data connections.

5.3. What-If Analysis Tools

- Goal Seek: Finding the input value needed to achieve a desired output.
- Scenario Manager: Storing and comparing different input scenarios.
- Data Tables: Analyzing how changing one or two inputs affects formula results.

5.4. Introduction to Macros (VBA Basics)

- Understanding the Developer Tab.
- Recording a simple Macro to automate repetitive tasks.
- Running a Macro.
- Basic understanding of VBA editor (optional, but good for awareness).

5.5. Advanced Charting & Visualization

- Band Chart
- Thermometer Chart

- Gantt Chart
- Waterfall Chart
- Sparklines
- Pivot Charts
- PivotChart from PivotTable
- PivotChart without a PivotTable
- Multiple Worksheets with same Structure
- Creating a Formula across Multiple Worksheets
- Summarizing Data in Multiple Worksheets

6. Power Query

6.1. Introduction to Power Query (Get & Transform Data):

- What is Power Query? The ETL (Extract, Transform, Load) concept.
- Automation, consistency, handling messy data, scalability.
- Ribbon, Queries Pane, Applied Steps Pane, Formula Bar.

6.2. Connecting to Data Sources:

- Importing existing Excel data.
- Importing flat files.
- Combining multiple files automatically (e.g., monthly reports).
- Extracting data from web pages.
- *(Briefly mention: Databases, other online services as advanced options).*

6.3. Essential Data Transformations:

- Data Type Conversion: Ensuring correct data types.
- Column: Removing/Choosing/Renaming/Reordering columns.
- Row Management: Filtering, Sorting, Removing Duplicates/Errors/Blanks.
- Splitting & Merging Columns: Parsing text data.
- Replacing Values, Fill Down/Up: Cleaning inconsistencies and blanks.
- Add Custom Column: Simple calculations (Gross Sales, Net Sales).

6.4. Combining Multiple Data Sources:

- Append Queries: Stacking tables (union equivalent) – e.g., combining sales data from different years.
- Merge Queries: Joining tables (lookup/relationship equivalent) – e.g., linking product details to sales transactions.
- Understanding different Join Kinds (Inner, Left Outer, etc.).

6.5. Loading Data & Refresh:

- Loading transformed data to an Excel Table.
- Loading to the Data Model (for Power Pivot & advanced relationships).
- Automating Updates: How to refresh your queries to automatically update all connected data and dashboards.

6.6. PivotTables from Clean Power Query Data:

- Creating PivotTables directly from your Power Query-loaded tables/Data Model.
- Leveraging Power Query's robust transformations for cleaner PivotTable inputs.
- Using PivotTable features (SUM, COUNT, AVG, Show Values As).

6.7. Data Modelling with Power Pivot:

- Understanding the Data Model when loading from Power Query.
- Creating relationships between multiple Power Query-loaded tables (e.g., Sales, Products, Customers).
- Introduction to DAX (Data Analysis Expressions) for more complex measures.

6.8. Building Interactive Dashboards with Power Query

- Connecting Charts to PivotTables: (As in your existing curriculum).
- Slicers: Filtering your dashboard dynamically using data from Power Query.
- Timelines: Interactive date filtering on Power Query-driven PivotTables.
- The Power of Automation: Demonstrating how clicking "Refresh All" updates the entire dashboard from new raw data source.

7. Projects for your resume

- Accounting and Finance
- Supply Chain
- Product Analytics