Lecture 7

Learning outcomes:

- *Advanced Excel knowledge*

What are advanced Excel skills?

- Advanced Excel skills refer to a specialised and sophisticated level of proficiency that surpasses the basic knowledge of Excel formulas and features.

- Individuals with advanced Excel skills possess a breadth of knowledge and expertise that enables them to perform complex data analysis, create dynamic reports, automate tasks, and handle large datasets efficiently.

- These skills are vital in sectors that rely heavily on data-driven decision-making, such as financial services, data analysis, and market research.

- Advanced users are expected to be knowledgeable with a deep understanding of most of the functions in Excel. An advanced user should be comfortable enough to teach Excel to new or intermediate users.

- Advanced-level Excel users can process data and produce results using spreadsheets, data tables, graphs, charts, automation, and calculations in massive quantities.

The benefits of learning Advanced Excel Skills

- The more skills you have, the more you will benefit from learning Advanced Excel Skills. Whether you are a Data Analyst, IT Professional, Accountant or Banker, if you want good pay, it is always better to enhance your skills and learn more about using MS Excel.

- It will help improve your proficiency and, most importantly, add to your knowledge; this will help you demonstrate your determination and willingness to improve at your workplace.

- Also, Excel is always in demand, so it will benefit and improve your job profile no matter where you are placed.

Here are a few examples of Advanced Excel Skills:

1) Build Excel dashboards, templates, and spreadsheets

2) Knowledge of Pivot table with the ability to build one

3) Create compound and complex formulas

4) Knowledge of add-ins and installation

5) Constructing and applying advanced formulas

6) Knowledge of Auto filter options

7) Recording, editing, and modifying Macro to use it for automation purposes

Here is a list of Top Advanced Excel Skills

❖ Conditional formatting

- A technique to build a spreadsheet is conditional formatting, which allows a user a simple way to add a visual analytical layer to a data collection.

- Depending on the criteria you specify, it modifies the contents and colour of a cell. You may, for instance, emphasise any negative numbers.

- Examples: ***SUMIFS, COUNTIFS, AVERAGEIFS***.

SUMIFS

- The SUMIFS function in Excel is used to sum values based on multiple criteria. It's an extension of the SUMIF function, which allows you to apply just one condition, while SUMIFS allows multiple conditions.

- ***Syntax of SUMIFS***

SUMIFS(sum_range, criteria_range1, criteria1, [criteria_range2, criteria2], ...)

- ✓sum_range: The range of cells to be summed.
- ✓criteria_range1: The range that is evaluated against criteria1.
- ✓criteria1: The condition that defines which cells in criteria_range1 should be considered.
- ✓criteria_range2 (optional): The second range to evaluate against criteria2.
- ✓criteria2 (optional): The condition for the second range.

❑ Example

- Imagine you have a table that looks like this:

Product	Region	Sales	Date
Apples	East	100	01-Jan-2024
Bananas	West	150	02-Jan-2024
Apples	East	200	03-Jan-2024
Bananas	East	250	03-Jan-2024
Oranges	West	300	04-Jan-2024

- You want to sum the sales of "Apples" in the "East" region.
- The formula would be: =SUMIFS(C2:C6, A2:A6, "Apples", B2:B6, "East")

✓C2:C6 is the range of values you want to sum (Sales).
✓A2:A6 is the range where you're checking for "Apples" (Product).
✓B2:B6 is the range where you're checking for "East" (Region).

- This formula will return a value of 300.

❑ **Example with Date Criteria**

- Suppose you want to sum sales for all regions for "Apples" sold after 02-Jan-2024.
- The formula would be: =SUMIFS(C2:C6, A2:A6, "Apples", D2:D6, ">02-Jan-2024")

✓C2:C6 is the range to sum (Sales).
✓A2:A6 is the range where you're checking for "Apples".
✓D2:D6 is the range of dates, and ">02-Jan-2024" is the condition to check for dates after 02-Jan-2024.

- This formula will return a value of 200.

COUNTIFS

- The COUNTIFS function in Excel is used to count the number of cells that meet multiple criteria across different ranges. It's an extension of COUNTIF, which only allows for one condition.

- ***Syntax of COUNTIFS***

COUNTIFS(criteria_range1, criteria1, [criteria_range2, criteria2], ...)

- ✓criteria_range1: The range of cells to evaluate against criteria1.
- ✓criteria1: The condition that defines which cells in criteria_range1 should be counted.
- ✓criteria_range2 (optional): The second range to evaluate against criteria2.
- ✓criteria2 (optional): The condition for the second range.

❑ Example

- Suppose you have a table like this:

Product	Region	Sales	Date
Apples	East	100	01-Jan-2024
Bananas	West	150	02-Jan-2024
Apples	East	200	03-Jan-2024
Bananas	East	250	03-Jan-2024
Oranges	West	300	04-Jan-2024

- You want to count how many times "Apples" were sold in the "East" region.
- You can use the following formula: =COUNTIFS(A2:A6, "Apples", B2:B6, "East")

✓A2:A6 is the range where you’re checking for "Apples" (Product).

✓B2:B6 is the range where you’re checking for "East" (Region).

- This will return the count of rows where both "Apples" and "East" are present in their respective columns (which are 2).

❑ Example with Multiple Criteria

- You can apply more than two conditions. Suppose you want to count how many "Bananas" were sold in the "East" region, but only on or after 03-Jan-2024.
- You can use this formula: =COUNTIFS(A2:A6, "Bananas", B2:B6, "East", D2:D6, ">=03-Jan-2024")

✓A2:A6 is the range where you're checking for "Bananas".

✓B2:B6 is the range where you're checking for "East".

✓D2:D6 is the date range, and the criteria ">=03-Jan-2024" checks for dates on or after January 3, 2024.

- This formula will return a value of 1.

AVERAGEIFS

- The AVERAGEIFS function in Excel is used to calculate the average of a range of cells that meet multiple criteria. It is an extension of AVERAGEIF, which allows for only one condition, while AVERAGEIFS supports multiple conditions.

- ***Syntax of AVERAGEIFS***

AVERAGEIFS(average_range, criteria_range1, criteria1, [criteria_range2, criteria2], ...)

- ✓average_range: The range of cells to average.
- ✓criteria_range1: The range of cells to evaluate against criteria1.
- ✓criteria1: The condition to determine which cells in criteria_range1 should be included in the average.
- ✓criteria_range2, criteria2, ... (optional): Additional ranges and conditions.

❑ Example

- Suppose you have a dataset like this:

Product	Region	Sales	Date
Apples	East	100	01-Jan-2024
Bananas	West	150	02-Jan-2024
Apples	East	200	03-Jan-2024
Bananas	East	250	03-Jan-2024
Oranges	West	300	04-Jan-2024

- You want to calculate the average sales for "Apples" in the "East" region.
- The formula would be: =AVERAGEIFS(C2:C6, A2:A6, "Apples", B2:B6, "East")

✓C2:C6 is the average_range where sales are averaged.

✓A2:A6 is the first criteria_range, checking for "Apples".

✓B2:B6 is the second criteria_range, checking for "East".

- This will return the average of sales where both "Apples" and "East" are present (which is 150).

❑ Example with Multiple Criteria

- You can use more than two conditions. For example, if you want to calculate the average sales for "Bananas" in the "East" region, but only for dates on or after 03-Jan-2024.
- The formula would be: =AVERAGEIFS(C2:C6, A2:A6, "Bananas", B2:B6, "East", D2:D6, ">=03-Jan-2024")

✓C2:C6 is the range where you want to calculate the average (Sales).

✓A2:A6 is the range where you're checking for "Bananas".

✓B2:B6 is the range for "East".

✓D2:D6 is the range for the date, and ">=03-Jan-2024" specifies dates after January 3, 2024

- This formula will return a value of 250.

❖ Offset

- Microsoft Excel comes with a built-in feature called Offset. Its function is to return a range from a reference cell or with a defined number of rows and columns. In Excel, selecting a cell or entering a column and row is often required.

- **Syntax of OFFSET**

OFFSET(reference, rows, cols, [height], [width])

- ✓reference: The starting cell or range from which the offset is applied.
- ✓rows: The number of rows to move from the starting reference (positive moves down, negative moves up).
- ✓cols: The number of columns to move from the starting reference (positive moves right, negative moves left).
- ✓height (optional): The height of the range (number of rows) you want to return. Default is 1.
- ✓width (optional): The width of the range (number of columns) you want to return. Default is 1.

❑ Example: Simple Offset

- Suppose you have a table like this:

A	B
Item	**Price**
Apples	100
Bananas	150
Oranges	200

- You want to refer to the cell containing the price of "Bananas" (B3) by using the OFFSET function, starting from cell B2.
- The formula would be: =OFFSET(B2, 1, 0)

✓B2 is the starting reference.

✓1 means you are moving down one row from the starting cell.

✓0 means you're staying in the same column.

- This formula will return the value in cell B3, which is 150.

❖ Macros

- Macros in Excel are sequences of instructions written in Visual Basic for Applications (VBA) that automate repetitive tasks, allowing users to enhance their productivity by minimizing manual effort.

- With Macros, you can record data and associate it with events to automate almost any task.

❖ PivotTables

- Excel's PivotTable functionality is to generate reports from massive datasets.

- It is an effective tool because it enables users to examine the same data from many angles.

- A pivot table can be used to analyse, compute, condense, compare, and spot patterns and trends in your data.

- Pivot tables can be utilising to sort, count, total, or average data contained in a single spreadsheet and present it in a new table.

❑A pivot table is a dynamic tool for:

1) Presenting and analysing voluminous data in a variety of approachable ways.

2) Compiling and arranging information into categories and subcategories.

3) Creating unique formulae and computations to be used with the dataset.

4) Sorting, organising, and filtering the data to concentrate on the information you need to know.

❖ Filters

- Filters are used to temporarily hide some of the data in a table to help the user view the data they want to concentrate on. Use Excel's sort & filter feature on the data tab to filter data depending on the criteria selected. To filter by numerical values and cell colour, you may also use autofilter or built-in comparison operators like "greater than" and "top 10".

- Once you've located what you're searching for, you can either remove a filter to redisplay all the data or reapply it to receive the most recent results. When you need to filter more than one column combination, the filtering option will be much more useful.

❖ Charts

- Charts improve data presentation by offering clear visual help, particularly when working with numbers. Users can compare individual data points to the other data in a data collection using this feature. Creating or building charts is one of the most effective techniques for displaying data analysis.

- In Excel, there are over 20 different types of charts. The most widely used charts are bar, column, line, pie, and scatter diagrams. A set of numbers is required to make a chart for each of the following: bar, column, pie, and line. A scatter chart may be created by comparing two sets of related data, such as height and weight.

❖ Power Pivot

- An effective Excel add-in for building complex data models is called Power Pivot. The ability of Power Pivot to handle enormous data sets from several sources, all within a single Excel file, is by far its most incredible feature. Power Pivot is a tool used by Excel specialists to link PivotTables to other databases.

- Power Pivot is to establish connections between several tables. After that, you may combine them and use Pivot Tables and Charts to show your analysis. Overall, this add-in makes information analysis rapid and sharing the results simple.

❖ Using powerful Excel functions

➢In addition to basic arithmetic operations, Excel tools include a wide range of advanced functions to help you manipulate, analyze, and visualize your data. Some of the most useful functions for data analysis include:

- INDEX and MATCH for looking up values based on multiple criteria.
- IFERROR for handling errors and preventing formulas from breaking.
- TEXTJOIN for combining text from multiple cells into a single string.

❖ IndexMatch

- Excel's INDEX and MATCH Function capabilities are combined in INDEX MATCH.

- The formula is a more sophisticated and dynamic variant of the VLOOKUP or HLOOKUP formulae.

- While MATCH delivers the location of a cell in a row or column, INDEX returns the value of a table cell based on the column and row numbers.

❖ Data validation

➢Data validation tools can help advanced users identify and correct mistakes in data. Data validation functions include:

✓Email address verification

✓Drop-down menu integration

✓Duplicate entry notification

✓Spelling validation through autocorrect

❖ Data manipulation

➢Data manipulation is an advanced skill you can use to synthesize data and create uniformity. Users can incorporate many complex formulas to alter data sets. Examples of data manipulation include:

✓Combining columns or extracting data into multiple columns

✓Consolidating two lists into one

✓Eliminating duplicate data

❖ Keyboard shortcuts for efficiency

- Navigating Excel using just a mouse can be slow and cumbersome, especially when working with large datasets or doing repetitive tasks. Memorizing a few keyboard shortcuts can dramatically speed up your workflow and get more done in less time.

- ***Some of the most useful shortcuts include:***
- CTRL+C and CTRL+V for copying and pasting
- CTRL+Z and CTRL+Y for undoing and redoing actions
- CTRL+F for finding specific values or text
- CTRL+SHIFT+ARROW KEYS for selecting entire rows or columns
- F4 for repeating the last action or applying absolute cell references

Excel integration with other applications

➢While Excel is a powerful tool on its own, it becomes even more useful when integrated with other applications and data sources. For example, you can use Excel to:

- Import data from databases, CSV files, or web pages
- Export data to other formats like PDF or XML
- Connect to cloud-based services like OneDrive or Google Sheets
- Analyze data using Power Query, Power Pivot, or Power BI
- Automate workflows using VBA or third-party tools

✓***By learning how to integrate Excel with other applications and services, you can streamline your workflow, save time, and gain more insights from your data.***