

Advanced Excel for Data Science

Menu-Wise Detailed Study Material with Reference Links

(Data Analytics Using Tools – MSCDS)

1. FILE MENU

Purpose: Data Import, Storage, and Export

Menu Path

File → Open / Save / Save As / Options

Description

The File menu is used to **import datasets**, **save analysis**, and **export data** for further processing in data science tools.

Key Operations

- Open CSV and TXT datasets
- Save datasets in .xlsx or .csv format
- Export cleaned data for Python/R
- Set calculation options

Data Science Use

- Import raw datasets
- Export preprocessed data
- Maintain dataset versions



Reference:

<https://support.microsoft.com/excel-open-save-files>

2. HOME MENU

Purpose: Basic Data Cleaning and Formatting

Menu Path

Home → Clipboard / Font / Alignment / Number / Styles / Cells / Editing

Important Tools

a) Clipboard

- Copy, Cut, Paste
- Paste Special (Values, Formats)



Use: Removing formulas before export

b) Number Group

- Text, Number, Date formats





Use: Correct data type assignment

c) Editing

- Find & Replace

- Sort & Filter
- Clear
- Remove Duplicates

 Use: Initial data cleaning

 Reference:

<https://support.microsoft.com/excel-home-tab>

3. INSERT MENU

Purpose: Visualization and Reporting


Menu Path

Insert → Tables / Charts / PivotTables

Important Tools


a) Tables

- Convert range into Table

 Use: Structured data handling

b) Charts

- Column, Bar, Line, Pie
- Histogram

 Use: Data visualization

c) PivotTable

- Create Pivot Tables
- Summarize large datasets

 Use: Exploratory Data Analysis (EDA)

 Reference:

<https://support.microsoft.com/excel-insert-tab>

4. PAGE LAYOUT MENU

Purpose: Presentation and Reporting

Menu Path

Page Layout → Themes / Page Setup / Scale to Fit

Use in Data Science

- Preparing reports
- Printing dashboards
- Academic submission formatting

 Reference:

<https://support.microsoft.com/excel-page-layout-tab>

5. FORMULAS MENU

Purpose: Core Analytics Logic

Menu Path

Formulas → Function Library / Defined Names / Formula Auditing

Important Functions (VERY IMPORTANT)

Logical Functions

- IF
- IFS
- AND
- OR



Use: Rule-based analytics

Conditional Functions

- COUNTIF / COUNTIFS
- SUMIF / SUMIFS
- AVERAGEIF



Use: Feature-wise aggregation

Lookup Functions

- VLOOKUP
- HLOOKUP
- XLOOKUP
- INDEX & MATCH



Use: Data merging & feature mapping

Error Handling

- IFERROR



Use: Clean output for modeling



Reference:

<https://support.microsoft.com/excel-functions>

6. DATA MENU

Purpose: Data Science Backbone (MOST IMPORTANT MENU)

Menu Path

Data → Get & Transform / Sort & Filter / Data Tools / Forecast

a) Get & Transform (Power Query – Intro Level)

- Get Data from CSV/Text
- Transform data



Use: Data ingestion




Reference:

<https://support.microsoft.com/power-query>

b) Sort & Filter


- Sort by multiple columns

- Advanced Filter

 Use: Data segmentation


c) Data Tools

- Text to Columns
- Remove Duplicates
- Data Validation

 Use: Data preprocessing

d) Forecast & Analysis

- What-If Analysis
- Goal Seek
- Scenario Manager

 Use: Predictive analysis basics

 Reference:

<https://support.microsoft.com/excel-data-tab>

7. REVIEW MENU

Purpose: Accuracy and Validation

Menu Path

Review → Proofing / Comments / Protect

Use in Data Science

- Error checking
- Documentation
- Dataset protection

 Reference:

<https://support.microsoft.com/excel-review-tab>

8. VIEW MENU


Purpose: Analysis Convenience

Menu Path

View → Workbook Views / Show / Zoom

Tools

- Freeze Panes
- Split
- Page Break Preview

 Use: Handling large datasets

 Reference:

<https://support.microsoft.com/excel-view-tab>

9. ANALYSIS TOOLPAK

Purpose: Statistical Analysis

Menu Path

Data → Data Analysis

Tools

- Descriptive Statistics
- Histogram
- Correlation
- Regression



Use: Statistical foundation for ML



Reference:

<https://support.microsoft.com/analysis-toolpak>

10. COMPLETE DATA SCIENCE PATHWAY USING EXCEL

**Raw Data → Cleaning → Functions → Pivot Analysis → Statistics → Visualization → CSV Export
→ Python/R**

11. Recommended Learning & Video References

Microsoft Official

- <https://learn.microsoft.com/excel>

Excel for Data Analytics

- <https://www.excel-easy.com>
- <https://www.contextures.com>

YouTube (Academic Friendly)

- Microsoft Excel Official
- ExcellsFun
- Leila Gharani

12. Academic Outcome

After this material, students will be able to:

- Navigate Excel menus confidently
- Clean and preprocess datasets
- Perform EDA and statistical analysis
- Visualize data effectively
- Prepare datasets for Data Science tools

ADVANCED EXCEL – STEP-WISE

PRACTICAL TASKS

(Data Science & Data Analytics Using Tools – MSCDS)

TASK 1: Import Dataset into Excel

Objective

To import a dataset into Excel for data analytics.

Step-by-Step Procedure

1. Open **Microsoft Excel**
2. Click on **File** menu
3. Select **Open → Browse**
4. Choose a **CSV dataset file**
5. Click **Open**
6. Dataset appears in worksheet
7. Identify:
 - Total rows
 - Total columns
 - Column headers
 - Data types

Result

Dataset successfully imported.

TASK 2: Understanding Dataset Structure

Objective

To understand dataset format and variables.

Step-by-Step Procedure

1. Scroll through the dataset
2. Identify each column name
3. Note type of data in each column
4. Identify categorical and numerical columns

Result

Dataset structure understood.

TASK 3: Remove Duplicate Records

Objective

To eliminate duplicate data entries.

Step-by-Step Procedure

1. Select entire dataset
2. Go to **Data** → **Remove Duplicates**
3. Select all columns
4. Click **OK**
5. Observe duplicates removed message

Result

Duplicate records removed.

TASK 4: Handle Missing Values

Objective

To clean missing or blank values.

Step-by-Step Procedure

1. Select dataset
2. Go to **Home** → **Find & Select** → **Go To Special**

3. Select **Blanks** → **OK**
4. Replace with suitable values or remove rows
5. Use **IFERROR()** where required

Result

Missing values handled.

TASK 5: Text Cleaning using TRIM & CLEAN

Objective

To remove unwanted spaces and characters.

Step-by-Step Procedure

1. Insert a new column

Apply formula:

=TRIM(A2)

- 2.

Apply formula:

=CLEAN(A2)

- 3.
4. Drag formulas down

Result

Text data cleaned.

TASK 6: Split Data using Text to Columns

Objective

To separate combined data into columns.

Step-by-Step Procedure

1. Select target column
2. Go to **Data** → **Text to Columns**
3. Choose **Delimited**

4. Select delimiter (Comma / Space)

5. Click **Finish**

Result

Data split successfully.

TASK 7: Apply Data Validation

Objective

To restrict incorrect data entry.

Step-by-Step Procedure

1. Select target column
2. Go to **Data** → **Data Validation**
3. Select validation criteria
4. Click **OK**

Result

Data entry controlled.

TASK 8: Apply IF Logical Function

Objective

To categorize data based on conditions.

Step-by-Step Procedure

1. Insert new column

Enter formula:

=IF(C2>=60,"Pass","Fail")

- 2.
3. Press **Enter**
4. Drag formula

Result

Data categorized logically.

TASK 9: Apply Conditional Functions

Objective

To perform condition-based analysis.

Step-by-Step Procedure

Apply COUNTIF:

```
=COUNTIF(D:D,"Pass")
```

1.

Apply SUMIF:

```
=SUMIF(A:A,"Category1",B:B)
```

2.

Result

Conditional results calculated.

TASK 10: Lookup Function (VLOOKUP / XLOOKUP)

Objective

To retrieve related data from another table.

Step-by-Step Procedure

1. Prepare two tables
2. Select target cell

Apply formula:

```
=VLOOKUP(A2,Sheet2!A:C,3,FALSE)
```

3.

4. Drag formula

Result

Data mapped correctly.

TASK 11: Sorting & Filtering Data

Objective

To organize and filter data.

Step-by-Step Procedure

1. Select dataset
2. Go to **Data** → **Sort**
3. Apply filters using **Filter option**

Result

Data organized.

TASK 12: Create Pivot Table (EDA)

Objective

To summarize large data.

Step-by-Step Procedure

1. Select dataset
2. Go to **Insert** → **PivotTable**
3. Choose worksheet
4. Drag fields to Rows, Columns, Values

Result

Pivot summary created.

TASK 13: Create Pivot Chart

Objective

To visualize summarized data.

Step-by-Step Procedure

1. Select Pivot Table
2. Go to **Insert** → **Pivot Chart**
3. Select chart type

Result

Pivot chart generated.

TASK 14: Statistical Analysis (ToolPak)

Objective

To perform statistical analysis.

Step-by-Step Procedure

1. Go to **Data** → **Data Analysis**
2. Select **Descriptive Statistics**
3. Choose input range
4. Click **OK**

Result

Statistical results displayed.

TASK 15: Correlation Analysis

Objective

To find relationship between variables.

Step-by-Step Procedure

1. Open **Data Analysis**
2. Select **Correlation**
3. Select input range
4. Click **OK**

Result

Correlation matrix generated.

TASK 16: Create Charts

Objective

To visualize insights.

Step-by-Step Procedure

1. Select data

2. Go to **Insert** → **Charts**

3. Choose chart type

Result

Charts created.

TASK 17: What-If Analysis

Objective

To analyze scenarios.

Step-by-Step Procedure

1. Go to **Data** → **What-If Analysis**
2. Select **Goal Seek / Scenario Manager**
3. Set values

Result

Scenario analysis performed.

TASK 18: Export Data for Data Science Tools

Objective

To export cleaned data.

Step-by-Step Procedure

1. Copy data
2. Paste as **Values**
3. Go to **File** → **Save As**
4. Select **CSV format**

Result

Dataset exported successfully.

FINAL PRACTICAL OUTCOME

Students will be able to:

- Clean and preprocess data
- Apply advanced Excel functions
- Perform EDA and statistical analysis
- Visualize insights
- Prepare data for Data Science tools