

Lab 5: Excel Practical Data Visualization Using Excel

Module: Transport Research and Analysis

Duration: 0.5 Hours

Due Date: One week from the date of assignment release

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Objective

This lab exercise introduces basic data visualization techniques using Microsoft Excel. Students will learn to build and analyze histograms, line charts, and scatter plots using public transport ridership data. By the end, students should be able to describe patterns, detect outliers, and assess correlations relevant to urban transport decision-making.

Dataset Overview

We will use the dataset file `advanced_transport_ridership_practical.xlsx`, where each record represents one day's ridership values. Columns:

- **Date** — The calendar day
- **DayType** — Weekday, Weekend, or Holiday
- **Station** — One of five stations (Central, North, South, East, West)
- **Bus_Ridership** — Number of bus passengers
- **Train_Ridership** — Number of train passengers
- **Metro_Ridership** — Number of metro passengers

Part 1: Histogram

Goal

Visualize the distribution of ridership values.

Steps

- Open Excel and load the dataset.
- Select the column `Bus_Ridership`.
- Go to **Insert > Chart > Histogram**.
- Repeat for `Train_Ridership` and `Metro_Ridership`.
- Label axes and chart title.

Hint

Look for skewness or multimodal shapes. High values may indicate event days or anomalies.

Questions

- Which transport mode shows the highest variability?
- Are any values extreme (outliers)?

Part 2: Line Chart

Goal

Explore how ridership changes over time.

Steps

- Use **Date** as X-axis.
- Add all three ridership columns as series in a line chart.
- Distinguish series using color and legend.
- Optionally filter for one **Station** only.

Hint

Spikes or dips during holidays can indicate behavioral shifts in travel demand.

Questions

- Do weekends affect ridership?
- Which transport mode has the most stable trend?

Part 3: Scatter Plot

Goal

Understand relationships between transport modes.

Steps

- Insert a scatter plot for **Bus vs Train**.
- Add a trendline and enable R^2 .
- Repeat for **Train vs Metro**.

Hint

A strong linear trend (R^2 close to 1) means good correlation between the modes.

Questions

- Are these modes complementary or independent?
- Are there consistent travel behaviors across them?

Bonus Exploration (Optional)

- Create a Pivot Table by **DayType** to summarize average ridership.
- Try a Combo Chart mixing bar and line series.
- Use Conditional Formatting to highlight days exceeding 15,000 riders.

Grading Criteria

Component	Weight
Part 1: Histogram	30%
Part 2: Line Chart	30%
Part 3: Scatter Plot	30%
Final Discussion	10%

Final Discussion

Conclude your report by reflecting on the visualizations:

- What did you discover about transport demand?
- How can this analysis inform infrastructure decisions?
- What were the key insights or unexpected findings?