Lab Exercise 1: <u>Introduction to Data Analysis using Python</u>

Objective:
Gain hands-on experience with data analysis using **NumPy**, **Pandas**, and **Matplotlib**. Learn essential data manipulation, analysis, and visualization techniques.

Dataset:
Use any publicly available dataset or the sample datasets provided

Section 1: NumPy – Numerical Computing with Python

1. Creating and manipulating NumPy arrays

2. Random number generation and sampling

3. Indexing, slicing, and selection techniques

4. Basic array operations and mathematical functions

Section 2: Pandas – Data Manipulation and Analysis

1. Creating and working with Series and DataFrames

2. Handling missing or null data

3. Using `groupby`, merging, joining, and concatenation

4. Reading/writing files and performing data operations

Section 3: Matplotlib – Data Visualization

Practice Files:

- *Pandas Built-in Data Visualization*

- *Matplotlib Concepts Lecture*

- *Advanced Matplotlib Concepts*

1. Line, bar, histogram, scatter, box, and pie charts

2. Customizing plots – titles, labels, legends, colors, styles

3. Subplots and layout management