Title: Introduction to Data Visualization with Matplotlib

Part 1: Introduction to Matplotlib

- **Brief Overview of Data Visualization**
    - **Improves Understanding**
    - **Facilitates Quick Decision-Making**
    - **Enables Communication**
    - **Identifies**
    - **Reveals Insights**
- **Role of Matplotlib in Data Visualization**
    - **Versatility**
    - **Integration with Pandas**
    - **Customizability**
    - **Wide Adoption**
    - **Publication-Quality Figures**
- **Setting up the Environment**
    - Installing Matplotlib.
    - Importing necessary libraries (**matplotlib.pyplot**, **numpy**).
- **Basic Concepts**
    - Figure and Axes explained.
    - Creating a simple plot.
    - Plotting with lists and Numpy arrays.

Part 2: Basic Plots

- **Line Plots**
    - Creating a simple line plot.
    - Customizing line styles and colors.
- **Bar Charts and Histograms**
    - Creating bar charts for categorical data.
    - Plotting histograms for frequency distribution.
        - Introduction to numpy.random module.
        - key functions and features:
            - Random Sampling from Distributions: **rand**, **uniform**, **normal**, and **binomial**
            - Permutations: **shuffle** and **permutation**
            - Setting the Seed: **seed**
            - Random Integers: **randint**
            - Random State: RandomState
- **Scatter Plots**
    - Creating scatter plots for bivariate data.
    - Customizing markers and colors:
        - Color

- Alpha
- cmap: Spectral, BrBG, etc
- size

Part 3: Advanced Plotting

- **Subplots**
  - Creating multiple plots in one figure.
  - Customizing subplot layout: **subplots_adjust**
- **Customizations**
  - Adding titles, labels, and legends.
  - Adjusting axes and gridlines.

Part 4: Interactive Visualizations

- **Interactive Features**
  - Zooming and panning in plots.
  - Adding interactive widgets (sliders, buttons).

Part 5: Practical Exercise

- **Hands-On Activity**
  - Students create a multi-plot figure with line plot, histogram, and scatter plot using a provided dataset.
  - Encourage customization and interaction features.

Conclusion and Q&A

- Recap of key concepts.
- Open the floor for questions and discussion.