

LABORATORY COMPONENT

1	Basic Programming and Syntax: A. Simple calculator B. Temperature converter (Celsius to Fahrenheit and vice versa) C. Program to find the largest of three numbers
2	Functions and Recursion: A. Factorial of a number using recursion B. Word count program
3	Data Structures: A. Program to perform various operations on lists (insert, delete, find, etc.) B. Program to merge two dictionaries
4	File Handling: A. Program to read a CSV file and perform basic analysis B. Getting awareness about local and Google drive folder and file access, renaming, copy, move files
5	Setup and Environment: A. Installation and configuration of Anaconda (install file in USB pendrive), Python 3.12 and Jupyter Notebook 7.1.2 in the local environment B. Getting comfortable with Google Colab environment
6	NumPy Basics: A. Creating and manipulating NumPy arrays B. Program to perform matrix operations using NumPy
7	Pandas Basics: A. Creating a DataFrame from scratch and from a CSV file B. Program to clean data (handling missing values, duplicates)
8	Descriptive Statistics: A. Use mean(), median(), mode(), min(), max(), var(), std() from Pandas to measure central tendencies and dispersion of data
9	Data Distribution: A. Use describe(), quantile(), skew(), kurt(), value_counts() from Pandas for shape and distribution data
10	Data Handling: A. Handle missing data in the provided unclean dataset B. Handle duplicates
11	Categorical Encoding: A. Perform categorical encoding - OneHotEncoder, LabelEncoder from Python
12	Data Scaling: A. Scale the data using Python - StandardScaler(), Normalizer(), MinMaxScaler() from sklearn.preprocessing
13	Outlier Detection:

	A. Identify outliers in datasets using Pandas DataFrame and Interquartile Range (IQR) B. Visualize outliers using box plot from Matplotlib and Seaborn
14	Advanced Pandas Operations: A. Advanced Pandas operations, GroupBy, merging, joining, concatenating DataFrames B. Time series analysis of stock prices
15	Comprehensive Data Analysis: A. Program to analyze a large dataset (import, clean, analyze, visualize)
16	Basic Plotting with Matplotlib: A. Program to plot various types of charts using Matplotlib B. Customizing and saving plots
17	Advanced Visualization with Seaborn: A. Using Seaborn to visualize data distributions B. Creating a pair plot for a DataFrame
18	Outliers and Correlation: a. Visualize outliers using box plot from Matplotlib and Seaborn b. Visualize correlation matrix using heatmap from Seaborn to enhance readability c. Identify the relationship between different columns by interpreting correlation matrix
19	Identifying Trends and Relationships: A. Identify the trend of any variable using line chart from Matplotlib and Seaborn B. Visualize the relationship between two correlated columns using scatter plot
20	Category and Numeric Relationships: A. Visualize the relationship between categorical and a numerical column using bar plot
21	Project Setup and Data Exploration: A. Exploring different datasets B. Import or load CSV file into Jupyter Notebook
22	Data Cleaning and Preprocessing: A. Handle missing data in the provided unclean dataset B. Handle duplicates
23	Statistical Analysis and Visualization: A. Statistical analysis of a dataset using SciPy B. Visualize the relationship between categorical and a numerical column using bar plot
24	Advanced Analysis and Visualization: A. Time series analysis of stock prices B. Comprehensive data analysis project: students choose their dataset and perform end-to-end analysis
25	Data Storytelling and Presentation: A. Interpret maps created by India in Pixels (iip) B. Demonstrate different maps from iip and student presentation