**Lab 1: Clustering Algorithms**

To implement and compare clustering techniques (K-Means, K-Median, K-Mode, K-Medoids) using Python.

Dataset Suggestions:

* Iris Dataset (for numerical data)
* Mall Customer Segmentation Dataset (Income vs Spending Score)
* Mushroom Dataset (for categorical data with K-Mode)

If you find any other appropriate dataset you can use that.

Steps:

1. Load and Preprocess the Data
   * Use pandas to load a dataset.
   * Normalize numerical data using StandardScaler or MinMaxScaler.
2. Apply K-Means Clustering
   * Use KMeans from sklearn.cluster.
   * Set different values for k and observe cluster assignments.
3. Apply K-Median Clustering
   * Use kmedoids from sklearn\_extra.cluster.
   * Compare results with K-Means.
4. Apply K-Mode Clustering (For Categorical Data)
   * Use kmodes.KModes from kmodes library.
   * Cluster categorical data and analyze differences.
5. Find how to measure the clustering performance?

**Lab 2: Radial Basis Function (RBF) Network**

To implement an RBF network for classification using Python.

Dataset Suggestion:

* Iris Dataset (Multiclass classification)
* Synthetic Gaussian Dataset (For better understanding)

If you find any other appropriate dataset you can use that.

Steps:

1. Load and Preprocess Data
   * Use sklearn.datasets.load\_iris or generate synthetic data.
2. Define RBF Kernel (Gaussian)
   * Implement the Gaussian basis function.
3. Train an RBF Network
   * Use scikit-learn’s RBFKernel **or** manually implement RBF.
4. Compare with other known classifiers