PG/IIS/COS/395(M2)/24
(Pr.)

M.Sc. 3rd Semester Examination, 2024

COMPUTER SCIENCE

(*Machine Learning Lab*)

(Practical)

PAPER – COS-395 (M2)

Full Marks : 25

Time : 2 hours

Answer any **one** question on a **lottery** basis

The figures in the right hand margin indicate marks

Write source code and input-output for each of the programs : 20×1

1. Implement a **Linear Regression** model in Python to predict house prices using the **Boston Housing Dataset** from sklearn.datasets. Evaluate the model's performance using Mean Squared Error (MSE) and R^2 score.

2. Train a **Logistic Regression** model on the **Breast Cancer Dataset** (sklearn.datasets) to classify tumors as malignant or benign. Perform feature scaling and evaluate the model using a confusion matrix and F1-score.

3. Build a **Decision Tree Classifier** to classify species in the **Iris Dataset**. Visualize the tree using graphviz or matplotlib. Evaluate the model's accuracy on a test dataset.

4. Train an **SVM Classifier** on the **Wine Dataset** (sklearn.datasets). Compare the performance of linear, polynomial and RBF kernels using cross-validation.

5. Perform **PCA** on the **Digits Dataset** (sklearn.datasets) to reduce the dimensionality of the data (or you may use other high dimensional feature dataset). Visualize the first two principal components and evaluate the accuracy of a classifier (e.g., SVM) on the reduced data.

(*Continued*)

6. Train a **Random Forest Classifier** on the **Heart Disease Dataset**. Compare its performance with a single Decision Tree in terms of accuracy and precision.

7. Write a program in python jupyter notebook to implement the cross-validation training in any classification algorithm, import all necessary packages and load a data in .csv form either from url or from sklearn datasets. Find the accuracy of your model.

8. Write a program in Python to implement KNN algorithm with Iris dataset.

Viva voce	— 3
Laboratory Notebook	— 2