2025

M.Sc. 3rd Semester Examination

COMPUTER SCIENCE

Paper : COS - 307A & B

[Practical]

Full Marks : 50 Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

COS - 307A

(Advanced Networking Lab)

(Marks : 25)

Answer any ***one*** question on a lottery basis : $20 \times 1 = 20$

1. Write a program to implement Cyclic Redundancy Check (CRC) error detection algorithm.

2. Write a program to implement a Client-Server model using socket programming.

3. Write a program to implement the Selective Repeat Sliding Window Protocol.

4. Write a program to simulate the Distance Vector Routing Algorithm.

5. Write a program to implement a TCP Client-Server model.

6. Write a program to implement Stop and Wait Protocol.

7. Write a program to simulate ARP Protocol for finding MAC address of a given IP.

8. Write a program to implement a UDP Client-Server model.

9. Write a program to implement Dijkstra's Algorithm for shortest path routing.

10. Write a program to create a Socket for HTTP web page upload and download.

[PNB & Viva-voce - 5 Marks]

COS - 307B

(Machine Learning Lab)

(Marks : 25)

Answer any ***one*** question on a lottery basis : $20 \times 1 = 20$

Write source code and input-output for each of the programs.

1. 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.

2. 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.

3. 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.

4. Implement a **k-NN Classifier** on a custom dataset of your choice. Experiment with different values of `k` (e.g., 1, 3, 5) and compare the accuracy.

5. 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.

6. Write a python program to import and export data using Pandas library functions.

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

8. 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.

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

10. Write a Python program to demonstrate various Data Visualization Techniques.

[Viva-voce - 3; Laboratory Notebook - 2]