# PUNE INSTITUTE OF COMPUTER TECHNOLOGY

## DHANKAWADI, PUNE –43

## LIST OF LAB EXPERIMENTS

## ACADEMIC YEAR: 2024- 2025

**Department:** Computer Engineering **Date:** 29/06/2024
**Class:** B.E. **Semester:** I
**Subject:** Laboratory Practice III (410246) **Examination scheme:** TW-50, PR-50

| LAB EXP. NO | PROBLEM STATEMENT | Course Outcomes |
|---|---|---|
| GROUP A | **Based on Design and Analysis of Algorithms (410241)**<br>**(Assignment numbers from 1 to 5 are mandatory, any 1 mini project from assignment number 6)** | |
| 1. | Write a program non-recursive and recursive program to calculate Fibonacci numbers andanalyze their time and space complexity. | CO4, |
| 2. | Write a program to implement Huffman Encoding using a greedy strategy. | CO5 |
| 3. | Write a program to solve a 0-1 Knapsack problem using dynamic programming or branch andbound strategy. | CO5 |
| 4. | Design n-Queens matrix having first Queen placed. Use backtracking to place remainingQueens to generate the final n-queen | CO5 |
| 5. | Write a program for analysis of quick sort by using deterministic and randomized variant. | CO4, CO5 |
| 6 | **Mini-Project on DAA (Any 1 mini project)**<br>**1. Mini Project** - Write a program to implement matrix multiplication. Also implement multithreaded matrix multiplication with either one thread per row or one thread per cell. Analyze and compare their performance. | CO4, CO5 |

| | | |
|---|---|---|
| | 2. **Mini Project** - Implement merge sort and multithreaded merge sort. Compare time requiredby both the algorithms. Also analyze the performance of each algorithm for the best case and the worst case.<br>3. **Mini Project** - Implement the Naive string matching algorithm and Rabin-Karp algorithm forstring matching. Observe difference in working of both the algorithms for the same input.<br>4. **Mini Project** - Different exact and approximation algorithms for Travelling-Sales-PersonProblem | |
| **GROUP B** | **Based on Machine Learning (410242)**<br>**(Assignment numbers from 1 to 5 are mandatory, any 1 mini project from assignment number 6)** | |
| 1 | Predict the price of the Uber ride from a given pickup point to the agreed drop-off location.Perform following tasks:<br>1. Pre-process the dataset.<br>2. Identify outliers.<br>3. Check the correlation.<br>4. Implement linear regression and random forest regression models.<br>Evaluate the models and compare their respective scores like R2, RMSE, etc.<br>Dataset link: https://www.kaggle.com/datasets/yasserh/uber-fares-dataset | CO1, CO2 |
| 2 | Classify the email using the binary classification method. Email Spam detection has two states: a) Normal State Not Spam, b) Abnormal State Spam. Use K-Nearest Neighbors and Support Vector Machine for classification. Analyze their performance.<br>Dataset link: The emails.csv dataset on the Kaggle https://www.kaggle.com/datasets/balaka18/email-spam-classification-dataset-csv | CO3, CO4 |
| 3 | Given a bank customer, build a neural network-based classifier that can determine whetherthey will leave or not in the next 6 months.<br>Dataset Description: The case study is from an open-source dataset from Kaggle.The dataset contains 10,000 sample points with 14 distinct features such as CustomerId, CreditScore, Geography, Gender, Age, Tenure, Balance, etc.<br>Link to the Kaggle project: https:// www.kaggle.com/barelydedicated/bank-customer-churn modeling<br>Perform following steps:<br>1. Read the dataset.<br>2. Distinguish the feature and target set and divide the data set into training and test sets.<br>3. Normalize the train and test data.<br>4. Initialize and build the model. Identify the points of improvement and implement the | CO1, CO3 |

| | | |
|---|---|---|
| | same.<br>5. Print the accuracy score and confusion matrix (5 points). | |
| 4 | Implement Gradient Descent Algorithm to find the local minima of a function.<br>For example, find the local minima of the function $y=(x+3)^2$ starting from the point $x=2$ | CO4 |
| 5 | Implement K-Means clustering/ hierarchical clustering on sales_data_sample.csv dataset.Determine the number of clusters using the elbow method.<br><br>Dataset link : https://www.kaggle.com/datasets/kyanyoga/sample-sales-data | CO3 |
| 6 | **Mini-Project on Machine Learning**<br>1. **Mini Project** - - Use the following dataset to analyze ups and downs in the market and predictfuture stock price returns based on Indian Market data from 2000 to 2020. Dataset Link: https://www.kaggle.com/datasets/sagara9595/stock-data<br>2. **Mini Project** - Build a machine learning model that predicts the type of people who survivedthe Titanic shipwreck using passenger data (i.e. name, age, gender, socio-economic class, etc.).Dataset Link: https://www.kaggle.com/competitions/titanic/data | CO1, CO2, CO3, CO4 |
| **GROUP C** | **Based on Blockchain Technology (410243)**<br>**(Assignment numbers from 1 to 5 are mandatory, any 1 mini project from assignment number 6)** | |
| 1. | Installation of MetaMask and study spending Ether per transaction. | CO6 |
| 2. | Create your own wallet using Metamask for crypto transactions. | CO6 |
| 3. | Write a smart contract on a test network, for Bank account of a customer for followingoperations:<br>• Deposit money<br>• Withdraw Money<br>• Show balance | CO6 |

| | | |
|---|---|---|
| 4. | Write a program in solidity to create Student data. Use the following constructs:<br>• Structures<br>• Arrays<br>Deploy this as smart contract on Ethereum and Observe the transaction fee and Gas values. | CO6 |
| 5. | Write a survey report on types of Blockchains and its real time use cases. | CO6 |
| 6 | **Mini-Project on Blockchain Technology**<br>1. **Mini Project** - Develop a Blockchain based application dApp (de-centralized app) for e-voting system.<br>2. **Mini Project** - Develop a Blockchain based application for transparent and genuine charity<br>3. **Mini Project** - Develop a Blockchain based application for health related medical records<br>4. **Mini Project** - Develop a Blockchain based application for mental health | CO6 |

Subject Coordinator
(Mr. V. S. Gaikwad)

Head, Department of Computer Engineering
(Dr. Geetanjali. V. Kale)