# Techno College of Engineering Agartala

**An Engineering College Approved by AICTE, MHRD, Govt. of India**

**Affiliated to Tripura University (A Central University),**

**Department of Computer Science and Engineering (Artificial Intelligence and Data Science)**

## List of Laboratory Experiments

| Data Analytics and Visualization Lab | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Hours / Week** | | | | **Maximum Marks** | | |
| | L | T | P | C | CIA | SEE | Total |
| PC CS 413 | 0 | 0 | 2 | 1 | 40 | 60 | 100 |

| Number of classes: 24 Hours | Prerequisites: Data Analytics And Visualization Theory With (Programming for Problem Solving Lab) |
|---|---|
| **Branch: CSE(AIDS)** | **Semester: IV** |

**Course overview:**

The Data Analytics and Visualization Lab provides practical experience in analyzing and interpreting data using statistical and computational tools. Students learn to clean, process, and explore datasets with software like Python, R, or specialized analytics platforms. The course emphasizes creating meaningful visualizations through libraries such as Matplotlib, Seaborn, or Tableau to communicate insights effectively. Hands-on exercises include data wrangling, exploratory data analysis, and building dashboards. This lab equips students with essential skills to transform raw data into actionable knowledge, fostering critical thinking and decision-making in various real-world domains through data-driven approaches.

**Course objectives:**

i. Develop skills to clean, preprocess, and analyze datasets using statistical and programming tools.
ii. Learn to create effective and insightful visualizations using libraries like Matplotlib, Seaborn, and Tableau.
iii. Gain hands-on experience in exploratory data analysis and data wrangling techniques.
iv. Enhance the ability to interpret data and communicate findings clearly for informed decision-making.

**Course outcomes:**

| CO Number | CO Description | K-level |
|---|---|---|
| CO-1 | Explain various techniques for automatic data collection, data cleaning and exploration using visualizations. | K2 |
| CO-2 | Apply modeling and analysis techniques for various types of datasets including e-commerce transactions, review datasets, time series datasets, text documents etc. | K3 |
| CO-3 | Implement data collection, data cleaning and exploration techniques in a programming language. | K3 |

| | | |
|---|---|---|
| CO-4 | Evaluate different models and their strengths and weakness for a given dataset and task. | K3 |
| CO-5 | Select methods and create effective visualizations to explain the artifacts in the data, distributions of attributes, relationships between the attributes, efficacy of the models and predictions. | K3 |
| CO-6 | Become proficient in data analysis tasks involving real-life datasets with noise | K3 |

| Sl. No. | EXPERIMENT NAME | CO |
|---|---|---|
| 1. | Learn how to collect data via web-scraping, APIs and data connectors from suitable sources as specified by the instructor. | CO-1 |
| 2. | Perform various types of data cleaning operations on the data collected in previous lab using data exploration, imputation etc. | CO-3 |
| 3. | Perform dimensionality reduction on a given dataset and create various visualizations like histograms, scatter-plots, etc. | CO-2 |
| 4. | Perform association analysis on a given dataset and evaluate its accuracy. | CO-2 |
| 5. | Build a recommendation system on a given dataset and evaluate its accuracy. | CO-3 |
| 6. | Build a time-series model on a given dataset and evaluate its accuracy. | CO-2 |
| 7. | Build cartographic visualization for multiple datasets involving various countries of the world; states and districts in India etc. | CO-4 |
| 8. | Perform text mining on a set of documents and visualize the most important words in a visualization such as word cloud. | CO-4 |