



## SIMATS ENGINEERING

Saveetha Institute of Medical and Technical Sciences  
Chennai- 602105



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**Course Code: DSA-0613**

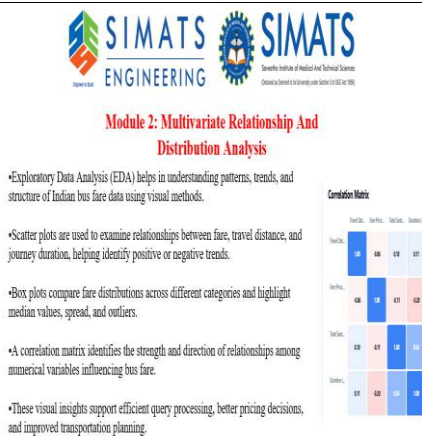
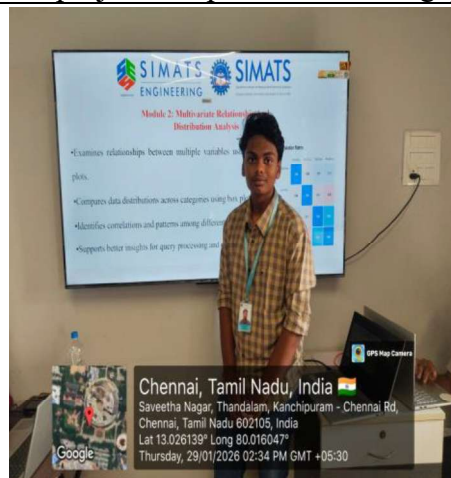
**Slot: A**

**Course Name: Data handling & visualization for data analytics**

**Course Faculty: DR. Kumaragurubaran T**

**Project Title: Exploratory Data Analysis and Visualization of Bus Fare Data Using R Techniques**

**Module Photographs:** (3 photographs –Module Photo, Individual student contribution module work in the project and presentation image)



**Correlation Matrix**



**Project Description:** (here you write what you did in this project (contribution) including Model Description)

**Module 2: Multivariate Relationship and Distribution Analysis** aims to understand how multiple factors interact to influence bus fare structures in the Indian bus transportation system. Bus fares depend on a combination of variables such as travel distance, bus category (ordinary, express, AC, deluxe), route type, passenger demand, and time of travel. This module applies advanced exploratory data analysis techniques in R to study these complex relationships in an effective visual manner. Using visualization libraries like **ggplot2**, multivariate relationships are explored through scatter plots, faceted plots, grouped box plots, violin plots, and correlation heatmaps. These plots help reveal how fares change across different service types and regions, and how distance and fare are related under varying conditions. Distribution analysis further highlights fare variability, skewness, and outliers, allowing meaningful comparison across states and bus services. By visualizing multiple dimensions simultaneously, this module uncovers hidden patterns and pricing inconsistencies that are not easily detected through numerical analysis alone. Overall, it provides valuable insights for fare regulation, transport planning, and policy formulation, contributing to a more efficient and transparent public bus fare system in India.

**Student Signature**

**Guide Signature**