SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: B. Tech		**Assignment Type:** Lab	**Academic Year:** 2025-26
Course Coordinator Name		Dr.Vairachilai Shenbagavel	
Instructor(s) Name		Srinivas Komakula	
Course Code	23CA201SE402	**Course Title**	Explainable AI (P)
Year/Sem	III/V	**Regulation**	R24
Date and Day of Assignment	28-08-2025	**Time(s)**	09:00AM -05:00PM
Duration	2 Hours	**Applicable to Batch**	**23CSBTB45**
Assignment Number: 04			

Q. No.	Question	Expected Time to complete
1	**Flight Delays (Regression)**	

Objectives:

- Apply Permutation Importance to rank flight features affecting delays.
- Use SHAP to provide both global and local insights.
- Use LIME to explain predictions for two flights.
- Compare methods for consistency.

Assignment Details:

- **Goal:** Explain which features (month, distance, carrier, etc.) influence flight delay predictions.
- **Data:** Flight delay dataset (CSV or public dataset).
- **Model:** GradientBoostingRegressor.
- **Steps:**
    1. Train GradientBoostingRegressor.
    2. **Permutation Importance:** Compute global importance across features.
    3. **SHAP:** Produce a beeswarm plot + local explanation for one delayed flight.
    4. **LIME:** Generate explanations for one short-haul and one long-haul flight.
    5. Compare across PI, SHAP, and LIME.
- **Deliverables:**
    - PI bar chart.
    - SHAP global + one local plot.
    - LIME explanations for 2 flights.
    - Comparative insights.

Submission Requirements:

- Short methods summary (3–5 lines).
- Clean, runnable code/notebook.
- All required plots (PI, SHAP, LIME).
- 5–10 bullet insights.