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**	**23CSBTB44**
Assignment Number: 04			

Q. No.	Question	Expected Time to complete
1	**Energy Efficiency (Regression)**	

Objectives:

- Use Permutation Importance to identify building features that influence heating/cooling loads.
- Apply SHAP for global and local interpretations.
- Use LIME to generate explanations for two buildings.
- Compare and contrast across PI, SHAP, and LIME.

Assignment Details:

- **Goal:** Understand which architectural and material features drive building energy efficiency.
- **Data:** UCI Energy Efficiency dataset.
- **Model:** RandomForestRegressor.
- **Steps:**
    1. Train RandomForestRegressor.
    2. **Permutation Importance:** Rank features such as surface area, wall area, roof area.
    3. **SHAP:** Generate global summary plot + force plot for one building.
    4. **LIME:** Produce explanations for two buildings with different energy demands.
    5. Compare results across methods.
- **Deliverables:**
    - PI bar chart.
    - SHAP summary plot + one local explanation.
    - LIME explanations for 2 buildings.
    - Comparative discussion across all methods.

Submission Requirements:

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