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**	**23CSBTB41**
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: Global summary plot + force plot for one building.
- 4. LIME: Explain predictions for two buildings with different energy demands.
- 5. Compare results across methods.

Deliverables:

- PI bar chart.
- SHAP summary plot + local explanation.
- LIME explanations for 2 buildings.
- Comparative discussion.

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 highlighting consistencies and differences.