

**Program Level Learning Outcome Assessment
Environmental Studies**

PLO1: Students will acquire broad knowledge of the Earth environment, using a systems approach to identify and describe its history, components, their functions and interactions at multiple spatial and temporal scales.

Learning Outcome Criteria	Does Not Meet Expectations	Approaches	Meets Expectations	Masters
Use a systems approach	Unable to describe the systems approach to Earth Science	Interprets systems diagrams correctly.	Can create, explain and interpret systems diagrams.	Can create, explain and interpret complex systems diagrams.
Describe Earth's history	Unable to grasp Earth history and different time scales.	Describe the geologic timescale.	Describe the geologic timescale and the key events that are associated with geologic eons and eras.	Demonstrates detailed knowledge of the Earth's history and evolution.
Describe components of the Earth system	Unable identify the 5 key spheres of the Earth System.	Describe the 5 major components of the Earth System.	Describe the roles of the 5 major components of the Earth System in regulating the Earth's climate.	Analyze the role of the 5 major components of the Earth system in regulating climate on different timescales.
Describe relationships between components using equations and systems diagrams	Unable to use equations to describe fluxes of energy/matter between components of the Earth system.	Can understand equations used to describe Earth System interactions.	Apply equations to quantify residence times and energy fluxes in the Earth System.	Apply equations to quantify residence times, energy fluxes, and population dynamics in the Earth System.
Describe interactions at multiple timescales.	Unable to differentiate processes that occur on different timescales.	Can recognize that different interactions occur at different timescales.	Describe the Earth's climate at different points in Earth history and the underlying reasons for long-term climate variability.	Describe the Earth's climate at different points in Earth history and the underlying reasons for long-term climate variability, medium-term and short-term climate variability.