

**Discipline Specific Elective: DSE-1: Earth Surface Processes (L3, P1) or DSE-2: Surveying Techniques (L3, P1)**

**Or**

**One GE from GE pool (GE-3): Fossils and Applications (L3, P1)**

**Credit distribution, Eligibility and Pre-requisites of the Course**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE-1 Earth Surface Processes (L3, P1)	4	3	0	1	Class 12 <sup>th</sup> with Science	Studied Earth System Science and Structural Geology or Equivalent

**Learning Objectives**

The course “Earth Surface Processes” is intended to provide a holistic approach to study the surficial features and the processes with emphasis on links and feedbacks between its components. The subject will serve as a dynamic and physical based account of the processes at planets surface with an integrated approach involving the principles of geomorphology and sedimentology.

**Learning outcomes**

After going through this course students will have sound idea about the Earth’s Energy Balance, Hydrological cycle, Topography and bathymetry. This will enable them to learn about the sedimentary flux: origin, transport and deposition and the geomorphic and sedimentological processes related to fluvial, coastal, aeolian, and glacial regimes. Students will also appreciate about the environmental changes and its impact on surface processes and landforms.

**SYLLABUS OF DSE-1**

**UNIT – I (9 Hours)**

Detailed contents

Introduction to Earth Surface System. Earth’s energy balance, hydrological cycle, carbon cycles, heat transfer, topography and bathymetry.

## **UNIT – II (9 Hours)**

### Detailed contents

Earth's critical zone, weathering and formation of soils, sediment routing systems, sediment and solute in drainage basins, importance and impact of climate change and tectonics on sediment yield and transport.

## **UNIT – III (9 Hours)**

### Detailed contents

Fluid and sediment dynamics and transport: Natural substances, settling of grains, types of flows and boundary separation layers, sediment continuity, modes of sediment transport, bedforms and stratification.

## **UNIT – IV (12 Hours)**

### Detailed contents

Sediment transport and deposition associated with fluvial, aeolian, glacial, coastal and marine regimes.

## **UNIT – V (6 Hours)**

### Detailed contents

Impact of environmental changes on Earth Surface processes.

## **Practical Component- (30 Hours)**

Exercises on flexural isostasy.

Exercises related to settling of sediments.

Sediment flux exercises.

Preparation of river profiles (Hack Profile, calculation of SL index, Ksn).

Exercises related to fluvial geomorphology.

Exercises on rate of uplift and incision.

## **Essential/recommended readings**

P. A. Allen, 2009, Earth Surface Processes. Wiley

John Bridge and Robert Demicco: Earth Surface Processes and Landforms and Sediment Deposits

## **Suggestive readings**

P. A. Allen, 2009, Earth Surface Processes. Wiley

John Bridge and Robert Demicco: Earth Surface Processes and Landforms and Sediment Deposits

Bloom, A.L., 1998. Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Pearson Education

Summerfield, M.A., 1991. Global Geomorphology, Prentice Hall.

Jon D.Pelletier.2008. Quantitative Modelling of Earth Surface Processes. Cambridge University Press

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.