

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	12th pass with science	Studied Earth System Science and Structural Geology or Equivalent

Learning Objectives

The course on Earth Surface Processes is intended to provide students a holistic approach to study the surficial features and the processes of the Earth with emphasis on links and feedbacks between its components. They will be motivated to appreciate the dynamic and physical account of the processes at the 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 have basic skills and understanding about the sedimentary flux: origin, transport and deposition and the geomorphic and sedimentological processes related to fluvial, coastal, aeolian, and glacial regimes.

SYLLABUS OF DSE-1

Credit-4

Theory (45 hours),

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 (9 Hours)

Detailed contents

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

UNIT – V (9Hours)

Detailed contents

Earth surface processes through time: 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