

## Core IX

# Geomorphology

### Unit-I

#### Learning Outcome:

Apply theoretical knowledge of geomorphology to real-world scenarios: demonstrate the ability to analyze and interpret various landforms and geological features in the field, applying geomorphic principles to understand their formation processes and evolutionary history.

Applied Geomorphology: Nature, Scope and significance; **Principles of Geomorphology**; Modern techniques in geomorphology and their application- Profile, Hypsometry, Altimetry and Clinographic Drainage Basin: Network Characteristics, Morphology, Phases of drainage network development; Major Landforms (Fluvial, Aeolian, Glacial, Karst and Coastal)

### Unit-II

#### Learning Outcome:

Assess and mitigate geomorphic hazards and to identify potential geomorphic hazards, such as landslides, erosion, and riverbank failures, and develop effective strategies to mitigate risks and protect communities and infrastructure in vulnerable areas.

Environmental Geomorphology: Meaning and Application; Natural hazards and environmental management; Geomorphic hazards: Volcanic, Earthquakes, Landslide and Floods; Anthropogenic activities and their effects on erosion and sedimentation. Urban geomorphology: Study of previous terrain of the cities; Application in urban planning. Concept of economic geomorphology.

### Unit-III

#### Learning Outcome:

Evaluate human impacts on geomorphic processes and landforms and will examine the influence of human activities on the Earth's surface, including construction, mining, and deforestation, and assess their effects on geomorphic processes and long-term landform evolution.

Case Studies in Applied Geomorphology: Geomorphic application in soil studies; Geomorphology and Disaster Management; Geomorphology in engineering construction: Construction of large dams, roads, tunnels, and their impact; Coastal Geomorphology and Management; Land Degradation and Restoration; sustainable Geomorphological Practices;

## Unit IV: Practical

### Learning Outcome:

Design sustainable land use and development plans: Through integrating geomorphological data and analysis, learner will be equipped to propose and implement sustainable land use and development plans that consider geomorphic factors, ensuring long-term environmental stability and minimizing adverse impacts on landscapes and ecosystems.

1. Practical methods for geomorphic field surveys and data collection. Conducting field survey for collection data at different geomorphic settings
2. Hands-on experience with topographic maps, aerial photographs, and GPS for landform identification.
3. Utilizing remote sensing data and geographic information systems (GIS) for landform mapping and analysis
4. Digital terrain modeling and visualization of geomorphic features.
5. Drainage Morphometry: delineation of watershed, stream ordering; Morphometric analysis: mean stream length, drainage density and drainage frequency.
6. Integrating geomorphic data and analysis into land use planning for sustainable development.
7. Report and Viva- Voce

### Text Books:

- ✓ Hussain, M. (2014). *Physical Geography*. Anmol Publication. New Delhi.
- ✓ Strahler, A. N., & Stahler, A. M. (2016). *Modern Physical Geography*. Wiley India, New Delhi.
- ✓ Thornbury, W. D. (1969). *Principles of Geomorphology*. Wiley Eastern.

### Reference Books:

- ✓ Alcántara, I., & Goudie, A. S. (Eds.). (2010). *Geomorphological hazards and disaster prevention*. Cambridge University Press.
- ✓ Bird, E. C. (2008). *Coastal geomorphology: an introduction*. John Wiley & Sons.
- ✓ Bryant, R. H. (2016). *Physical Geography*. Rupa Publication. New Delhi.
- ✓ Chorley, R. J. (1972). *Spatial Analysis in Geomorphology*. Methuen, London.
- ✓ Garner, H. F. (1974). *The Origin of Landscape – A Synthesis of Geomorphology*. Oxford University Press, London.
- ✓ Hooke, J. M. (2020). *Changing landscapes: Five decades of applied geomorphology*. *Geomorphology*, 366, 106793. [https://livrepository.liverpool.ac.uk/3055638/1/Applied%20Geomorph%20%20Hooke%20\\_final.pdf](https://livrepository.liverpool.ac.uk/3055638/1/Applied%20Geomorph%20%20Hooke%20_final.pdf)
- ✓ Mitchell, C. W. (1973). *Terrain Evaluation*. Longman, London.
- ✓ Pandit, R., et.al (2020). *A framework to evaluate land degradation and restoration responses for improved planning and decision-making*. *Ecosystems and People*, 16(1), 1-18. <https://www.tandfonline.com/doi/pdf/10.1080/26395916.2019.1697756>

- ✓ *Robinson, P. J., & Henderson, S. (1999). Contemporary Climatology. Henlow.*
- ✓ *Singh, S. (1998). Geomorphology. Prayag Publications, Allahabad.*
- ✓ *Singh, S. (2016). Physical Geography. Pravalika Publications, Allahabad.*
- ✓ *Stoddart, D. R. (Ed.). (1996). Process and Form in Geomorphology. Routledge, New York.*
- ✓ *Summerfield, M. (2013). Global Geomorphology. Routledge, New York.*
- ✓ *Wooldridge, S. W., & Morgan, R. S. (1959). The Physical Basis of Geography - An Outline of Geomorphology. Longman, London.*