Channels and Landscapes: Bedrock channels, Bedrock incision process; River response to climate, tectonics and human disturbance; Bedrock channel processes and evolution of fluvial landscapes. Fluvial hazards: Integrated approach to stream management. Introduction to river ecology.

Practical Component- (30 Hours)
Exercises based on River visit during weekend, Stream power calculation, Longitudinal profile analysis, Hydrograph analysis, and Flood Analysis

Essential/Recmmended readings
Fryirs and Brierly (2013) Geomorphology and river management. Wiley-Blackwell Pub.
Julien, P.Y. (2002) River Mechanics. Cambridge University Press.

Recommended readings
Bridge, J.S., (2003) Rivers and Floodplain: Forms, Processes and Sedimentary Record. Blackwell Science.
Gibling, M.R., (2021) River Planet. Dunedin Press.
Wohl, E., (2010) Mountain Rivers Revisited. American Geophysical Union.

OR

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE-3 **Introduction to Geophysics** (L3, T1)	**4**	**3**	**1**	**0**	**12th pass with science**	**Studied Earth System Science and Structural Geology or Equivalent**

DSE-3:
Introduction to Geophysics (L3, T1)
Credit: 4
Theory (45 hours), Tutorial (30 hours)

Learning Objectives
This course on introduction to geophysics is intended to provide basic scientific knowledge to students to understand the interrelationship of geology and geophysics, which is essential to know the geodynamic behavior of the Earth and its interior. Students will be taught about the basic concepts in geophysics, different types of geophysical exploration methods, and geophysical anomalies to appreciate the geodynamics of the Earth and its resources.

Learning outcomes
After going through this course, students will be able to have an elementary knowledge and comprehension about the geophysical methods and their application to understand and explore Earth and its interior. They will also develop basic skills about the geophysical anomalies and their relation to geological process that are essential for any detailed exploration activity.

Theory (45 hours),

UNIT – I (9 Hours)
Detailed content
Basic concepts of geophysics: Interrelationship between geology and geophysics, Role of geology and geophysics in explaining geodynamical features of the earth.

UNIT – II (9 Hours)
Detailed content
Exploration geophysics: General and Exploration geophysics: Different types of geophysical methods - gravity, magnetic, electrical and seismic; their principles and applications; Concepts and Usage of corrections in geophysical data

UNIT – III (9 Hours)
Detailed content
Geophysical surveys: Geophysical field operations: Different types of surveys, grid and route surveys, profiling and sounding techniques; Scales of survey,

UNIT – IV (9 Hours)
Detailed content
Geophysical Methods: Application of Geophysical methods. Regional geophysics, oil and gas geophysics, ore geophysics, groundwater geophysics, engineering geophysics, internal structure of the Earth based on major discontinuities in seismic velocities.

UNIT – V (9 Hours)
Detailed content
Geophysical anomalies: Correction to measured quantities, regional and residual (local) anomalies, factors controlling anomaly, and depth of exploration. Integrated geophysical methods: Ambiguities in geophysical interpretation, planning and execution of geophysical surveys

Tutorials (30 Hours)
Students in small batches or groups will be assigned to resolve different types geophysical problems concerning calculating the free air and Bouguer anomalies, determining the gravity anomaly arising due to density contrast in the subsurface, calculating paleolatitude and paleopole, numerical problems on resistivity survey, Problems on seismic survey.

Essential/Recommended readings
Kearey, P., Brooks, M. and Hill, I., 2002. *An Introduction to Geophysical Exploration* . Third Edition. Blackwell Publishing.
Lowrie, W. (2007). Fundamentals of geophysics. Cambridge University Press.
Mussett, A.E. and Khan, M.A., 2000. *Looking into the Earth: An Introduction to Geological Geophysics*. Cambridge University Press.
Bhimasankaram, V.L.S. (1990). Exploration Geophysics - An Outline by, Association of Exploration Geophysicists, Osmania University, Hyderabad.
Dobrin, M.B. (1984) An introduction to Geophysical Prospecting, McGraw-Hill, New Delhi.

Recommended readings
Bhimasankaram, V.L.S. (1990). Exploration Geophysics - An Outline by, Association of Exploration Geophysicists, Osmania University, Hyderabad.
Dobrin, M.B. (1984) An introduction to Geophysical Prospecting, McGraw-Hill, New Delhi.
Telford, W. M., Geldart, L. P., & Sheriff, R. E. (1990). Applied geophysics (Vol. 1), Cambridge University press.