

Course Type	Course Code	Name of Course	L	T	P	Credit
ESC	NGPE102	Introduction to Geophysics	3	0	0	3

Course Objective

Comprehensive understanding of Geophysics and the various geophysical techniques that are implemented in active and passive exploration.

Learning Outcomes

Students would be acquainted with the fundamental principles and applications of Geophysics, and deepen their understanding with a coherent balance of theory, concepts and applications.

Unit No.	Description of Lectures	Lecture Hrs.	Learning Outcomes
1.	Introduction to Geophysics, Developmental history of Geophysics.	2	Brief introduction to the branch of Geophysics
2.	Introduction to the Internal structure of Earth; Introduction to the elastic parameters; Variation of the elastic parameters with the Earth's internal structure.	3	Elementary information on Earth's interior
3.	Behavior of different Seismic waves, Effects of the medium on wave propagation (Dispersion, Reflection and refraction).	3	Basic understanding of the wave propagation
4.	Seismic Reflection Survey: Principle and Methodology, How to acquire data, and select field parameters.	5	Introduction of seismic methods used in geophysics
5.	Seismic Refraction methods: Principle and Methodology, Distinction between Reflection and Refraction methods, Vertical seismic profiling.	5	Introduction of seismic methods used in geophysics
6.	Introduction to Earthquake seismology, Classification of different types of earthquakes, Size of earthquakes, Earthquake precursors.	3	Understanding what are earthquakes and basics of how they occur
7.	Introduction to Geoid and Spheroid; Gravitational fields, Understanding different anomalies and their effect on the gravity data.	6	Shape of the Earth and how gravity is influenced.
8.	Introduction to Magnetic fields: Internal and External origin. Secular variation of the magnetic fields, Different types of magnetism in rocks.	6	Magnetic field and effect of earth's magnetic fields on rocks
9.	Electrical Resistivity Method: Theory and Principle; Resistivity of common rocks and minerals, Introduction to Electrical profiling and Vertical Electrical Sounding.	5	Natural resistivity of the earth.

10.	Introduction to petrophysics and petrophysical parameters, Borehole environment, Classification of different types of logs	4	Use of well logging in geophysics
Total:		42	

Textbooks

1. Anderson, D., New Theory of the Earth, Cambridge University Press, 2007
2. Lowrie, W., Fundamentals of Geophysics, Cambridge Univ. Press, 2007.
3. W.M. Telford, L.P. Geldart, and R.E. Sheriff, Applied geophysics, Cambridge, 1990

Reference Books

1. Stanislav Mares, Introduction to applied geophysics, D. Reidel Publishing Co., 1984
2. Howell, B. F., An Introduction to Geophysics, Mc-Graw Hill
3. Fowler, C.M.R., Solid Earth: An Introduction to Global Geophysics, Cambridge University Press, 2005.
4. Stacey F. and Davis P., Physics of the Earth, Cambridge University Press, 2008.

Davis

Stacey

Howell

Mares