Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NGPC519	Geophysical Methods Practical	0	0	2	1

Course Objective
The main objective of the course is to provide students with basic practical skills in applying geophysical methods to interpret subsurface structures and geological features.
Learning Outcomes
Students will gain a basic understanding of planning, conducting, and interpreting simple geophysical data acquisition, processing, and interpretation. They will also learn about integration techniques for subsurface characterization.

Unit No.	Topic to be covered	Lecture hours	Learning outcomes
1.	Computation of free air anomaly using the measured gravity value and the normal gravity value for that location.	2	Ability to calculate the free air anomaly, a fundamental concept in gravity data processing.
2.	Computation of Bouguer anomaly from the given raw data.	2	Proficiency in applying the Bouguer correction formula to raw gravity data.
3.	Regional-residual separation in gravity data to differentiate long-wavelength variations (regional component) from shorter- wavelength anomalies (residual component) that could signify subsurface geological structures.	2	Understanding of the regional-residual separation technique in gravity data processing.
4.	Estimation of the depth to the source bodies by plotting the Bouguer anomaly versus profile distance.	2	Expertise in estimating the depth of source bodies based on the Bouguer gravity anomaly.
5.	Computation of total field magnetic anomaly from the given raw data.	2	Ability in applying corrections (e.g., diurnal variation, International Geomagnetic Reference Field) to raw magnetic data to compute the total field anomaly.
6.	Calculating the depth to the source bodies by plotting the magnetic anomaly versus profile distance.	2	Ability to interpret the magnetic anomaly curve to estimate source depths.
7.	Seismic reflection data processing: A hands- on approach.	2	Skill in basic processing of seismic reflection data through practical application
8.	Quantifying dipping layer parameters with seismic refraction data.	2	Ability to quantify dipping layer parameters using seismic refraction data.
9.	Interpreting seismic reflection sections: Key concepts and techniques	2	Aptitude in interpreting seismic reflection sections using key concepts and techniques.

10.	Analyzing self-potential data and plotting after applying corrections	**2**	Ability to analyze self-potential data by applying corrections and plotting the results.
11.	Create a resistivity versus distance plot using the provided data, analyze the curve types, and draw conclusions.	**2**	Knowledge in creating resistivity versus distance plots, analyzing curve types, and drawing geological conclusions from the data.
12.	Compile a table of radioactive elements and their half-lives, and derive an equation for calculating the age of a rock using its decay constant and the half-life of the radioactive element.	**2**	Ability to compile and analyze radioactive elements and their half-lives, and derive an equation for rock age calculation using decay constants.
13.	Calculate the cementation and formation factors using Archie's equation based on the provided well log data.	**2**	Skill to calculate cementation and formation factors using Archie's equation with well log data.
14.	Integrate and plot the free-air gravity and magnetic anomalies along with the seismic section. Characterize the main subsurface features and draw conclusions based on the integrated data.	**2**	Basic knowledge to integrate and interpret free-air gravity and magnetic anomalies with seismic data to characterize subsurface features.
	Total:	**28**	

Textbooks

1. Lowrie, W., Fundamentals of Geophysics. Cambridge Univ. Press, 2007.
2. Philip, K., Brooks, P., Hill, I. An introduction to Geophysical Exploration. Black well Science, 2002.
3. Telford, W.M., Geldart, L.P., Sheriff, R.E. Applied geophysics. Cambridge University Press, 1990.

Reference Books

1. Jones, E.J.W. Marine Geophysics. John Wiley & Sons, 1999.
2. Howell, B. F. Introduction to Geophysics. Mc-Graw Hill, 2012.
3. Stanislav M., Tvrdy, S. Introduction to applied geophysics. Springer Dordrecht, 1984.