Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NGPC525	**Gravity and Geoelectrical methods practical**	0	0	2	1

Course Objective

To facilitate the understanding and use of gravity data and its process and interpretation in solving exploration problems.
Understanding the physics of the current flow in the earth and its manifestation. Intricacies of data acquisition, interpretation and modelling for the entire gamut of geoelectrical methods. Understanding the phenomenon of Induced Polarization (IP) in identifying the electrical chargeability of subsurface materials.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of Gravity method: theory, acquisition and interpretation.
- understand the advantages of Gravity data for delineation earth's subsurface structure.
- understand the advantages of Gravity data for mineral, hydrocarbon etc. exploration.

The purpose of this course is to familiarise students with the resistivity and induced polarization methods which is extensively used in hydrogeological, environmental, geotechnical aspects of civil engineering, engineering geology and in mining engineering problems. The goal of the course is to solve geological problems by understanding the concepts of physics using electrical signature.

Unit No.	Details of Lectures	Lectures Hrs.	Outcome
1.	Compute drift correction from gravity data. Computation of field gravity data Reduction/Corrections.	2	Understanding of the gravity data & corrections.
2.	Computations of average density of surface rocks from Gravity and topography data by Nettleton's method.	2	Calculation of average density.
3.	Computations of average density of surface rocks from Gravity and topography data by Parasnis's method Preparing gravity anomaly contour map from field data.	2	Understanding of topography analysis; preparation of gravity anomaly map.
4.	Compute the Regional-Residual separation by various kinds of techniques. Computation of Upward Continuation of Gravity fields.	2	Understanding regional & residual data; Analysis on Upward continuation for gravity data
5.	Computation of Downward Continuation of Gravity fields. Preparation of residual and regional gravity anomaly map.	2	Analysis on Upward continuation for gravity data; preparation of regional & residual map
6.	Compute the gravity effect due to geometric models such as Spherical buried body and depth of same body.	2	Gravity effect for spherical body

7.	Compute the gravity effect due to geometric models such as vertical and horizontal Cylindrical buried body and depth of same body. Compute the gravity effect due to geometric models such as inclined geological sheet and depth of same sheet. Compute the gravity effect due to geometric models such as geological fault and depth of same body.	**2**	Gravity effect for cylindrical, sheet and faulted bodies
8.	Acquisition of Vertical Electrical Sounding data. Acquisition of Electrical Resistivity Tomography Data.	**2**	Data Acquisition VES & ERT data
9.	Generation of Vertical Electrical Sounding data using filter theory. Interpretation of Vertical Electrical Sounding data using partial curve matching technique	**2**	Understanding on filter theory & understanding VES data with partial matching curve
10.	Interpretation of Vertical Electrical Sounding data for resolution, sensitivity and uncertainty	2	Interpretation on VES data
11.	Interpretation of Dipole Dipole data using pseudo section Interpretation of SP data	2	Interpretation on Dipole Dipole data Understanding of SP
12.	Computation of Frechet Derivative for different arrays and its utility in field planning	2	Understanding of Array
13.	Generation of triangle of anisotropy for the given data set	2	Understanding of Anisotropy
14.	Generation of second derivative of apparent resistivity curves for tackling equivalence problem.	2	Analysis of apparent resistivity curve
	Total	28	

Textbooks

1. Dobrin, M. B., and Savit, C. H., 1988, Introduction to Geophysical Prospecting (Fourth Edition), Tata McGraw Hill.
2. Telford, W. M., Geldart, L. P., Sheriff, R. E., and Keys, D. A., 1988, Applied Geophysics.

Reference Books

1. Parasnis, D. S., 1997, Principles of Applied Geophysics (Fifth Edition), Chapman and Hall.
2. Dehlinger, P., Marine Gravity,
3. Heiskanen, and Veining Meinsez, Gravity Field of the Earth,
4. Rao, B. S. R. and Murthy, I.V.R., Gravity and Magnetic Methods of Prospecting
5. Bhattacharya, B. K., and Patra, H. P., 1968, Direct Current Electric Sounding (Methods in Geochemistry and Geophysics) Elsevier Publishing Co.