Course Type	Course Code	Name of Course	L	T	P	Credit
E/SO	**GPE 202**	**Geophysical Prospecting**	3	0	0	9

Course Objective
Comprehensive understanding of various geophysical techniques used in the exploration.
Learning Outcomes
This course module introduces data acquisition, processing and interpretation of different geophysical methods.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	**Different geophysical exploration methods**: its principles and limitations; Basis for Gravity Exploration, Concept of Geoid and International Gravity Formula; Densities of common rocks and minerals. Gravimeters: Spring-mass system as basic gravimeters, Principle of working of unstable Gravimeters, Zero length spring, La-Coste-Romberg and Worden Gravimeters; Gravity data reduction; Gravity effect due to the buried sphere, horizontal cylinder, semi-infinite horizontal sheet	8	Introduction to the different Geophysical methods. Basic understating of Earth Gravity filed. Understanding the principles of different Gravimeters. Basic Gravity survey practices, data processing techniques and interpretation procedures.
2.	**Magnetic Susceptibility of Rocks and their ranges, elements of Earth Magnetic Field**; Magnetometers: Fluxgate and Proton Precession Magnetometers. Diurnal Correction and overview of other corrections; Magnetic effect due to isolated pole, vertical dipole, horizontal dipole and dipping dipole	6	Fundamental knowledge of the Earth Magnetic field. Principles of magnetic instruments, Survey procedures, data processing techniques and interpretation procedures.
3.	**Origin of Self Potential (SP)**; Field procedure to conduct SP survey, removal of bias from SP anomalies, common Minerals showing SP anomalies; Interpretation of SP anomalies, SP for groundwater, detection of Coal mine front.	6	Learning about the origin of Self Potential field in Earth, SP survey, data processing techniques and Interpretation.

4.	**Resistivity of common rocks and minerals;** True and apparent resistivity; Electrode configuration: Schlumberger and Wenner; Vertical Electrical sounding and interpretation of two layered YES curves	8	Different filed configurations of Resistivity survey. Data processing techniques and interpretation procedures.
5.	**Generation and propagation of Seismic waves;** Geometry of refraction and reflection; Seismic energy sources; Geophone and Hydrophone; Interpretation of Travel time curves for two layered earth-horizontal and dipping interface; Various field procedure-profile basic concept and broad side shooting, fan shooting, end on and split spread arrangements	10	Basic knowledge of wave propagation, Principles of various seismic Instruments. Different seismic field configurations, data processing techniques and interpretation procedures.
6.	**Objective of well logging, Borehole environment, surface logging setup;** Sources of SP in well bore, Archie's law and Darcy's law.	4	Helps to understand the Borehole environment and basic logging tools.
	Total:	**42**	

Text books

I. Lowrie, W., Fundamentals of Geophysics, Cambridge Univ. Press, 2007.
2. Kearey, P., Brooks, M., Hill, I., An introduction to geophysical exploration, Wiley-Blackwell, 2002.

Reference books

3. Telford, **W.M.,** Geldart, L.P., Sheriff, R.E. and Keys, D.A., Applied Geophysics Cambridge University Press, 1990.
4. Dobrin, **M.B.** and Savit, C., Introduction of Geophysical Prospecting, McGraw-Hill, 1988.
5. Parasnis, D. S., Principles of Applied Geophysics, Chapman and Hall, 1979.