Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NGPD504	**Airborne Geophysics**	3	0	0	3

Course Objective

- The airborne geophysics can produce information from the surface down to a depth of several kilometers.
- Airborne geophysics produces additional data supplementing other available information (geological maps, drilling and seismic data, etc.) to support better descriptions and a better understanding of the subsurface, with applications in the fields of planning, water and materials resources, geothermal energy, underground storage and geological knowledge in general.
- Airborne geophysical surveys to acquire high-resolution data require flights at very low altitudes, from about 80 to 120 m above the ground.

Learning Outcomes

- Many different methods are used in airborne geophysics, each designed to produce information on one or more surface or subsurface parameters, at different resolutions and penetrating to different depths.
- Students will learn the geophysical feasibility modelling study based on the geological setting and all other geophysical and geological data available.

Unit No.	Details of Lectures	Lecture Hrs.	Outcome
1.	Introduction of Airborne Geophysical survey and its instrument; The purpose of airborne geophysical surveys, advantages and disadvantages of airborne geophysical surveys. Planning of Airborne surveys, sensors types, flight path recovery methods. Airborne geophysical techniques: Airborne magnetics survey, Airborne Electromagnetic surveys, Airborne Gravimetric surveys, Airborne Gamma-ray surveys, Helicopter-Borne Bathymetric surveys (Georadar).	8	Introduction to Airborne Geophysics
2.	Brief introduction of Airborne Electromagnetic methods (EM), uses and importance, Continuous wave systems, Different systems in operation, Airborne transient system description, Rigid Boom Helicopter system, Passive Airborne EM systems – AFMAG and VLF, Different noises in Airborne EM systems, methods of suppression, interpretation of AEM data and applications.	9	Understanding on Airborne of Airborne Electromagnetic method
3.	Introduction of Airborne Gravity meters; Principles of airborne Gravity meters; Aircraft installations and Gravity compensation; Navigation and position-fixing systems; Altimeters and digital elevation models; Recording systems, Adaptation of airborne geophysical instruments, survey procedures and planning of survey lines, airborne gravimeters,	8	Understanding on Airborne Gravity method

	correction of airborne gravity data, calculation of gravity anomalies and absolute gravity value, vertical and horizontal gradients, amplitude ofthe analytic signal, upward or downward continuation.		
4.	Principle of airborne magnetic prospecting and Instruments, magnetic and gradiometer measurements; airborne magnetic surveys in regional geological mapping and different exploration programs, Airborne magnetometry: orientation mechanisms, survey techniques, Magnetic data reduction/correction, Advantages and disadvantages, vertical and horizontal gradients, amplitude of the analytic signal, reduction to the pole, reduction to the equator, upward or downward continuation.	9	Understanding on Airborne Magnetic method
5.	Hydrocarbon exploration, mineral exploration, engineering projects, Geothermal resource mapping, Geophysical survey mapping, mapping exposed bedrock, Mapping of geological structure and lithology, sub-surface conductors, paleochannels, mineral deposits and salinity, identification of structural features, altered zones, Base metals exploration.	8	Applications of Airborne geophysical survey
	Total	42	

Textbooks:

1. Dobrin, M. B. and Savit, C., 1988, McGraw-Hill Education, Introduction to Geophysical Prospecting.
2. Dehlinger, P., 1978, AGU, Marine Gravity.

Reference books:

1. Heiskanen, and Veining Meinsez, 1958, Mcgraw-hill Book Company,inc., Gravity Field of the Earth.
2. Hinze, W. J., 1985, Society of Exploration Geophysicists, The Utility of Regional Gravity and Magnetic Anomaly maps.