

Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NGPC102	Geo-Electromagnetism Practical	0	0	2	1

**Course Objective**

The primary objective of the course is to describe the physical and mathematical principles of electromagnetism as observed and prevalent in the domain of geophysics, specifically in the context of global electrical, and magnetic fields.

**Learning Outcomes**

Upon successful completion of this course, students will have:

- In-depth knowledge of the physical and mathematical principles of electromagnetism as observed and prevalent in the domain of geophysics.
- In-depth information about the usage of electromagnetic fields in all areas of geophysics, including a study of the Earth's atmospheric, near surface and deep layers.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	Magnetic declination calculation based on the International Geomagnetic Reference Field .	2	Understanding magnetic field modelling
2.	Magnetic field value calculation based on the International Geomagnetic Reference Field.	2	Understanding magnetic field modelling
3.	Magnetic field value grid calculation based on the International Geomagnetic Reference Field.	2	Understanding magnetic field grid modelling
4.	Historical (1750-2010) magnetic declination calculation based on the IGRF.	2	Understanding the Magnetic Measurements
5.	Magnetic declination calculation based on the International Geomagnetic Reference Field Model extended with the gUFM research model	2	Understanding the Data Analysis in Geomagnetism
6.	Magnetic declination calculation based on the World Magnetic Model.	2	Understanding magnetic field modelling
7.	Estimation of geographical coordinates using the Geocentric Axial Dipole model.	2	Understanding GAD hypotheses
8.	Magnetic field value calculation based on .the World Magnetic Model.	2	Understanding magnetic field modelling
9.	Magnetic field value grid calculation based on .the World Magnetic Model.	2	Understanding magnetic field grid modelling
10.	Historical (1750-2010) magnetic declination calculation based on the USD polynomial models	2	Understanding magnetic field modelling
11.	Reading and interpretation of Magnetograms and its use in magnetic observatories	2	Understanding magnetograms
12.	Estimating Inclination of the geomagnetic field using IGRF and WMM models	2	Understanding magnetic field modelling
13.	Reading maps based on Archeomagnetism and Palaeomagnetism	2	Understanding magnetic field in palaeo era
14.	Understanding solar activity and its influence on geomagnetic field	2	Understanding solar magnetism
	<b>Total</b>	<b>28</b>	

**Text books**

1. Nathani Basavaiah, Geomagnetism: Solid Earth and Upper Atmosphere Perspectives. Springer, 2011.
2. W. H. Campbell Introduction to Geomagnetic Fields , Second Edition, Cambridge university press, 2003.



**Reference books**

1. Zhdanov, M.S., 2009. Geophysical electromagnetic theory and methods. Elsevier.
2. Lowrie, William, and Andreas Fichtner. Fundamentals of geophysics. Cambridge university press, 2020.
3. Fowler, Christine Mary Rutherford, Clarence Mary R. Fowler, and Mary Fowler. The solid earth: an introduction to global geophysics. Cambridge University Press, 1990.
4. Kono, Masaru, ed. Treatise on Geophysics, Volume 5: Geomagnetism. Elsevier, 2010.
5. Manda, Mioara, and Monika Korte (eds.) Geomagnetic observations and models. Vol. 5. Springer Science & Business Media, 2010.