

**Course Code** : ENCM 21513  
**Title** : Principles of Geo-informatics  
**Pre-requisite** : ENCM 11522  
**Co-requisite** : None  
**Status** : Compulsory, Theory cum Practical

**Learning outcomes:**

After completion of the course unit, student will be able to;

- describe definitions, components of and map projections in GIS,
- identify spatial data sources and explain spatial data acquisition methods in GIS,
- describe data storing methods in GIS,
- describe remote sensing, GPS and web GIS and their applications, and
- analyze spatial problems using a GIS software.

**Course content:**

Introduction to GIS, Components of GIS, Spatial questions, GIS applications, Data output methods, Structure of spatial data models; Raster and vector data models, Mapping the spherical Earth (3D) into 2D using projection systems, Geo-referencing, Geographical data sources, Data acquisition methods such as aerial photogrammetry, remote sensing, GPS, Data processing methods, GIS operation methods, web GIS, Elements of remote sensing, Characteristics of satellite images; spatial, temporal, spectral and radiometric resolution, Electromagnetic Spectrum and characteristics of major bands, Atmospheric reactions with electromagnetic waves, Different target reactions with waves, spectral signature, GPS concept and applications.

Practical sessions on analysis of spatial problems using ArcGIS.

**Method of teaching and learning:**

A combination of lectures, practical sessions, computer based learning, assignments and small group discussions.

**Assessment:**

In-course assessment and end of semester examination.

**Recommended reading:**

1. Burrough, P. A., & R. A. McDonnell (2011). Principles of Geographical Information Systems; Spatial Information Systems and Geostatistics. 2<sup>nd</sup> edition. Oxford University Press. UK.
2. Fu, P (2010). Web GIS: Principles & Applications. ESRI press, USA.
3. Gorr, W. L (2013). GIS tutorial 1; Basic workbook, 10.1 Edition. ESRI press, USA.
4. Heywood, I., S. Cornelius, & S. Carver (2013). An Introduction to Geographical Information Systems. 4<sup>th</sup> edition. Pearson education Ltd., UK.
5. Law, M (2013). Getting to know ArcGIS for desktop. ESRI press, USA.