Multi-Disciplinary Course Offered by Geography

3 Credits [45 hours of teaching]

GEOHMD101M — Geomatics and Spatial Analysis

Unit I: Cartography

1. Concept and applications of scales and projections. Components and classification of maps
2. Map projections: Classification, properties and uses with special reference to simple conical projection and Universal Transverse Mercator (UTM)
3. Construction of simple conical projection with one standard parallel

Unit II: Surveying

4. Basic concepts of surveying, survey equipment, and their capabilities: Dumpy level, theodolite, total station, and Global Navigation Satellite System (GNSS)
5. Bearing: Magnetic and true, whole-circle and reduced. Concept of geoid and spheroid with special reference to WGS-84.
6. Traverse survey and plotting UTM coordinates using smartphone GNSS application

Unit III: Remote Sensing

7. Principles of remote sensing (RS). Types of RS satellites and sensors with reference to IRS and Landsat missions
8. Principles of • preparing standard false colour composites (FCCs) and • supervised image classification
9. GIS data types: Spatial and non-spatial (attribute table and metadata), raster and vector
10. Principles of preparing attribute tables, data manipulation, query, and overlay
11. Identification of land use / land cover features from standard FCCs and preparation of inventories
12. Change detection of riverbank or coastline shift from multi-dated maps and images

Reading List

BOOKS:

Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford University Press.

Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEduPublishing.

Joseph, G., Jagannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Orient Blackswan.

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.

Lillesand, T.M., Kiefer, R.W., Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

WEBSITES

ISRO Bhuvan 2D and 3D Platforms:

https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php https://bhuvan-app1.nrsc.gov.in/globe/3d.php

National Remote Sensing Centre: www.nrsc.gov.in; Survey of India: https://www.surveyofindia.gov.in

USGS Global Visualization Viewer: https://glovis.usgs.gov; USGS Landsat Missions: https://www.usgs.gov/landsat-missions