

**INTERDISCIPLINARY COURSE (IDC)****/ SEMESTERS – 1/2/3 (for H)****GEO-H-IDC01-1/2/3-Th – Geomatics and Spatial Analysis – 50 Marks / 2 Credits****Unit I: Cartography**

1. Concept and applications of scales and projections. Components and classification of maps [4]
2. Bearing: Magnetic and true, whole-circle and reduced. Concept of geoid and spheroid with special reference to WGS-84. [3]
3. Map projections: Classification, properties and uses with special reference to simple conical projection and Universal Transverse Mercator (UTM) [5]

**Unit II: Surveying**

4. Basic concepts of surveying, survey equipment, and their capabilities: Dumpy level, theodolite, total station, and Global Navigation Satellite System (GNSS) [10]

**Unit III: Remote Sensing and Geographical Information System**

5. Principles of remote sensing (RS). Types of RS satellites and sensors with reference to IRS and Landsat missions [5]
6. Principles of • preparing standard false colour composites (FCCs) and • supervised image classification [4]
7. GIS data types: Spatial and non-spatial (attribute table and metadata), raster and vector [2]
8. Principles of preparing attribute tables, data manipulation, query, and overlay [7]

**References****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, XanEdu Publishing.
- 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 (2017 reprint), Alphaneumera-Kolkata.
- Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.

- 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.
- Vaidyanadhan, R., Subbarao, K.V. 2014. Landforms of India from Topomaps and Images, Geological Society of India.

## 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](http://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>

## **GEO-H-IDC01-1/2/3-P – Geomatics and Spatial Analysis Lab – 25 Marks / 1 Credit**

*An A3- or tabloid-size laboratory notebook, comprising class assignments of the following is to be prepared and submitted. The exercises are to be drawn in pencil with photocopied representation of source materials where necessary. All texts are to be handwritten.*

1. Construction of simple conical projection with one standard parallel [6]
2. Traverse survey and plotting UTM coordinates using smartphone GNSS application [8]
3. Identification of land use / land cover features from standard FCCs and preparation of inventories [8]
4. Change detection of riverbank or coastline shift from multi-dated maps and images [8]
5. Viva voce based on laboratory notebook (5 Marks)

### References

- Basu, P. 2021. Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied.
- Basu, R., Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Pub.
- Bhatta, B. 2020. Remote Sensing and GIS, 3rd ed, Oxford Univ. Press.
- 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.
- Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.
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- Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.