TMS - 457: REMOTE SENSING AND GIS

Credits: 3

Course Objectives:

1. To introduce the concept of remote sensing and GIS
2. To study maps and special information
3. To study the components of GIS
4. To understand spatial and attribute data
5. To Learn digitization and structuring of Map data
6. To understand GIS data analyzing, classification and integration
7. To understand spatial interpolation

Course Outcomes:

CO1: The course will help develop the basic knowledge of Remote sensing and its applications
CO2: Gain knowledge on GIS and its applications.
CO3: Develop knowledge of map making and cartography
CO4: Understand digitization and data editing
CO5: Learn how to analyze GIS data and interpret
CO6: Understand different types of sensors
CO7: Understand various data structures

Pedagogy: Assignment, Cases and Seminars, Lecture-cum-discussions, lab work.

UNIT I Introduction: History and concept of Remote Sensing, Electromagnetic Spectrum. Energy Interaction with atmosphere and earth surface features. Basic concepts of visible, Optical. Thermal (Infrared) and Microwave remote sensing. Platforms and Sensors.

UNIT II Basics of Geographic Information System: Definition, components, packages, capabilities and purpose of GIS. History of Geographic Information System, Development of GIS as an information and decision-making system, Application of GIS in India.

UNIT III Definition - Maps and spatial information, Components of GIS, maps and spatial data- Thematic characteristics of spatial data, other sources of spatial data - sensors, survey data, air photos, satellite images and field data.

Unit IV Spatial and Attribute Data, spatial entities, raster and vector spatial data structure, comparison of raster and vector methods, linking spatial and attribute data.

UNIT V Digitization, Editing and Structuring of Map Data: Mode of digitization, editing, topology creation and structuring map data. Data Quality and Sources of Errors: Nature of geographic data, sources of errors in GIS database, data quality parameters, handling errors in GIS.

UNIT VI GIS Data and Analysis: Spatial Analysis, Classification, Overlay, Polygon Neighborhoods, Data analyzing operations in GIS, Buffering and neighboring functions ,

integrated data, raster and vector overly method, problems of vector and raster overlay, spatial interpolation, GIS for surface analysis and network analysis.

References:

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3. Schowengerd R.A.1995 Techniques for Image processing and classification in Remote Sensing, Academic, Press New York.
4. Siegel, B.S and Gillespie, A.R. 1994, (eds). Remote sensing and Image Interpretations, John Wiley and Sons, New York.
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8. Rees, W.G.1990, Physical Principles of Remote sensing, Cambridge University Press.22. Wolf, P.R.19083, Elements of Photogrammetry, 2nd Ed, MC Graw-Hill, New York.
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11. Demers, Michael; Fundamental of Geographic Information System, John Wiley, 1999(Indian Print).
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13. Heywood, Carnelin and Carven, An Introduction to Geographic Information System by, Prentice Hall, 1998.