REMOTE SENSING AND GIS FOR INFRASTRUCTURE

I Semester

Course Code: 19CE2102

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Prerequisite: Surveying, AUTOCAD

Course Outcomes:

At the end of the Course the student shall be able to

CO1 Analyse the principles and components of photogrammetry and remote sensing

CO2 Describe the process of data acquisition of satellite images and their characteristics

CO3 Interpret image visually and digitally with digital image processing techniques

CO4 Explain the concepts and fundamentals of GIS

CO5 Discuss the use of Remote Sensing and GIS in different Civil Engineering applications

UNIT-I **(10 Lectures)**

FUNDAMENTALS OF REMOTE SENSING

Aerial photography: Types of aerial photographs, scale of a vertical aerial photograph.

Photogrammetry: Stereoscopy, Parallax measurement.

Remote Sensing: Definition, Physics of Remote Sensing, Electromagnetic radiation and its interactions with Atmosphere, Spectral reflectance of Earth objects of Vegetation, Water and Soil.

Learning outcomes:

1.Distinguish important aspects of Aerial Photography(L1)

2.Discuss about various elements of Remote Sensing(L2)

3.Illustrate interaction of EMR with atmosphere and Earth Surface (L4)

UNIT-II (10 Lectures)

DATA ACQUISITION

Platforms and Sensors: Characteristics of LANDSAT, IRS, SPOT, High Resolution Commercial Satellites, INSAT & NOAA. Optical, Thermal and Microwave Remote Sensing, Different types of data products.

Learning outcomes:

1.Explain characteristics of various sensors(L2)
2.Discuss on Microwave & Thermal Remote Sensing(L2)
3.Illustrate various aspects of data acquisition(L4)

UNIT-III (10 Lectures)

DATA ANALYSIS: Visual Interpretation keys, Digital Image Processing – Principles, Pre-classification processing, Classification techniques – Supervised and Unsupervised.

Learning outcomes:

1.Explain about classification techniques (L2)
2.Analyse data for visual interpretation (L4)
3.Illustrate Digital Image Processing techniques (L4)

UNIT-IV (10 Lectures)

GEOGRAPHICAL INFORMATION SYSTEM

Introduction to GIS, Components of GIS, Data representation – Raster and Vector - Manual scanning and digitization, manipulation and data analysis – Integration of Remote sensing, GPS and GIS.

Learning outcomes:

1.Integrate Remote Sensing, GPS and GIS(L2)
2. Discuss overall work flow of GIS (L2)
3.Illustrate raster, vector and digitization(L4)

UNIT-V **(10 Lectures)**

GEOGRAPHICAL INFORMATION SYSTEM APPLICATIONS

Conservation and management of natural resources – Land use/land cover mapping –Waste land management – Site selection studies - Flood control – Urban and Coastal Zone Management. Air Pollution – EIA – Detection and identification of pollution sources of surface and groundwater – Water quality mapping and monitoring.

Learning outcomes:

1.Geographical Information System on various fields(L1)
2. Detect and identify pollution sources of various water sources(L2)
3. Illustrate Land use and wasteland management (L4)

Text Books:

1. Anjireddy,M., *Remote Sensing and Geographical Information Systems*, 3rd Edition, B.S. Publications, 2006

2. Chandra,A.,M., Ghosh,S.,K., *Remote Sensing and Geographical Information System*, 1st Edition, Narosa Publishing house, 2007

References:

1. Bernhardsen, *Geographic Information Systems, an Introduction*, 3rd Edition, Published by John Wiley Sons, 2006
2. Lillesand T.M. and Kiefer R.W. *Remote Sensing and Image Interpretation*, 5th Edition John Wiley and Sons, 2008.
3. Peter A Burrough, *Principles of Geographical Information Systems*, 1st Edition, Oxford publisher, 1998.