

4/4 B.Tech. SEVENTH SEMESTER

CE7T2

REMOTE SENSING AND GIS APPLICATIONS

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Pre-requisites: Mathematics, Surveying

Learning objectives:

- To use the techniques of Remote Sensing and GIS Technology has opened the door for immense opportunities in large scale mapping, updating existing maps and practical planning and decision making.
- To gain the basic concepts of Remote Sensing & GIS and their applications in Civil Engineering field.

Course outcomes: At the end of course the student will have:

1. Understanding of aerial photographs, stereoscopy and remote sensing sensors and platforms, their properties and calibration.
2. Understanding of image processing sequence and its importance in Remote Sensing & Spatial Analysis and Map Projections.
3. Knowledge of Technical issues relating to the acquisition, storage, management, analysis and display of spatial data using raster data models, and vector data models.
4. Apply GIS land cover and land use management, agriculture, forestry, & disaster management.
5. Understanding of GIS urban planning, traffic management and urban change mapping.

UNIT – I

INTRODUCTION TO PHOTOGRAMMETRY & REMOTE SENSING

Principle of photogrammetry and types of Aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Stereoscopic Parallax, Orthophotograph. Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation.

UNIT – II

DIGITAL IMAGE PROCESSING & GEOGRAPHICAL INFORMATION SYSTEM

Basic character of Digital Image; Pre-processing, Geometric correction methods, Atmospheric correction methods, Image Registration, Image Enhancement Techniques, Spatial Filtering Techniques, Low pass filters, high pass filters, Image Classifications, Supervised Classifications, Unsupervised Classifications. Introduction & Definition of GIS (GEOGRAPHICAL INFORMATION SYSTEM). GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS, Classification of Maps, Types of Projections.

UNIT – III

GIS DATA REPRESENTATION & GIS SPATIAL ANALYSIS

Types of Data Representation, Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping, GIS Data File Management. Visual Analysis Methods (VAM), Data storage-vector data storage, attributes data storage, overview of the data manipulation and analysis. Buffering Techniques.

UNIT – IV

WATER RESOURCES APPLICATIONS

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics. Water Resources Management and Monitoring, Ground Water Targeting, Identification of sites for Artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

UNIT – V

APPLICATION FOR URBAN PLANNING

Urban Planning: Introduction, urban planning theory, stages of urban planning, land use/and cover mapping, base maps for urban areas, urban infrastructure & utility mapping, Remote sensing platforms and sensors application in urban studies. Aerial photography and satellite data in urban studies, traffic management, urban change detection and mapping.

Learning resources:

Text books:

1. Remote Sensing and Geographical Information systems, (2nd edition) by Anji Reddy M.B.S. Publications, JNTU Kakinada, 2008.
2. Remote Sensing and GIS, (2nd edition) By Basudeb Bhatta Oxford Higher Education.

Reference books:

1. Remote Sensing and Image Interpretation, (6th edition) by Thomas Lillesand.M and Ralph Kiefer W., 2007
2. Basics of Remote Sensing & GIS by Kumar S.Laxmi Publications, 2005.

e-learning resources:

<http://nptel.ac.in/courses.php>

<http://jntuk-coeerd.in/>