

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OFCIVIL ENGINEERING

| IV Year – I Semester | | L | Т | P | C |
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| REMOTE SENSING AND GIS | | | | | |

Course Learning Objectives:

The course is designed to

- 1. Introduce the basic principles of Remote Sensing and GIS techniques.
- 2. learn various types of sensors and platforms
- 3. learn concepts of visual and digital image analyses
- 4. understand the principles of spatial analysis
- 5. appreciate application of RS and GIS to Civil Engineering

Course outcomes

At the end of the course the student will be able to

- a. Be familiar with ground, air and satellite based sensor platforms.
- b. interpret the aerial photographs and satellite imageries
- c. create and input spatial data for GIS application
- d. apply RS and GIS concepts for application in Civil Engineering

UNIT - I

Introduction to Remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, characteristics of remote sensing systems, types of resolutions - advantages & limitations

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT & Recent satellite.

UNIT - II

Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification. : Overlay function-vector overlay operations; raster overlay operations, network analysis.

UNIT – III

Geographic Information System: Basic Principles, components, application areas of GIS, map projections.

Data entry and preparation: spatial data structures, raster and vector data formats, data inputs, data manipulation, data retrieval, data analysis and data display.

UNIT - IV

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban & transportation applications,



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UNIT - V

Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects, groundwater quality monitoring and potential recharge zones, watershed management.

TEXT BOOKS:

- 1. Bhatta B (2008), 'Remote sensing and GIS', Oxford University Press
- 2. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013) 'Remote Sensing and Image Interpretation', Wiley India Pvt. Ltd., New Delhi
- 3. Schowenger, R. A (2006) 'Remote Sensing' Elsevier publishers.
- 4. 'Fundamentals of Remote Sensing' by George Joseph, Universities Press, 2013.
- 5. 'Fundamentals of Geographic Information Systems' by Demers, M.N, Wiley India Pvt. Ltd, 2013.

REFERENCES:

- 1. 'Remote Sensing and its Applications' by Narayan LRA, Universities Press, 2012.
- 2. 'Concepts and Techniques of Geographical Information System' by Chor Pang Lo and A K W Yeung, Prentice Hall (India), 2006