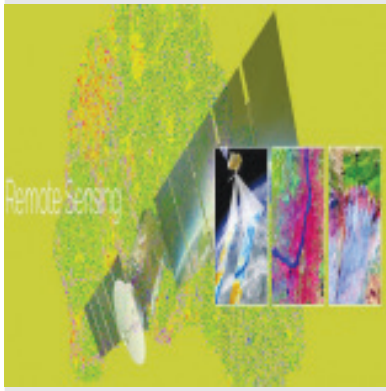
22ELCT203 REMOTE SENSING AND GIS APPLICATIONS



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Hours Per Week :

L	T	P	C
2	0	2	3

PREREQUISITE KNOWLEDGE: Basics of remote sensing.

COURSE DESCRIPTION AND OBJECTIVES:

This course deals with the basics of component of remote sensing, applications, principles, types of sensors used, aerial photography, different types of image processing and GIS application on land and water resources management.

MODULE-1

UNIT-1 **8L+0T+8P=16 Hours**

REMOTE SENSING:

Basic component of remote sensing (RS), advantages and limitations of RS, possible use of RS techniques in assessment and monitoring of land and water resources; electromagnetic spectrum, energy interactions in the atmosphere and with the Earth's surface; major atmospheric windows; principal applications of different wavelength regions; typical spectral reflectance curve for vegetation, soil and water; spectral signatures.

UNIT-2 **8L+0T+8P=16 Hours**

AERIAL PHOTOGRAPHY:

Different types of sensors and platforms: Contrast ratio and possible causes of low contrast, aerial photography, types of aerial photographs, scale of aerial photographs, planning aerial photography- end lap and side lap, stereoscopic vision, requirements of stereoscopic photographs, air-photo interpretation- interpretation elements, photogrammetry- measurements on a single vertical aerial photograph, measurements on a stereo-pair- vertical measurements by the parallax method and ground control for aerial photography.

PRACTICES:

- Familiarization with remote sensing and GIS hardware.
- Use of software for image interpretation.
- Interpretation of aerial photographs and satellite imagery.
- Basic GIS operations such as image display.

MODULE-2

UNIT-1 **8L+0T+8P=16 Hours**

IMAGE PROCESSING :

Satellite remote sensing, multispectral scanner- whiskbroom and push-broom scanner, different types of resolutions, analysis of digital data- image restoration, image enhancement; information extraction, image classification, unsupervised classification, supervised classification, important consideration in the identification of training areas, vegetation indices and microwave remote sensing.

SKILLS:

- ✓ *Prepare land use and land cover map using satellite image.*
- ✓ *Prepare elevation map using differential GPS survey.*

UNIT-2 **8L+0T+8P=16 Hours**

GIS AND BASIC COMPONENTS:

Different sources of spatial data, basic spatial entities, major components of spatial data, Basic classes of map projections and their properties, Methods of data input into GIS, Data editing, spatial data models and structures, Attribute data management, integrating data (map overlay) in GIS, Application of remote sensing and GIS for the management of land and water resources.

PRACTICES:

- Study of various features of GIS software package.
- Scanning, digitization of maps and data editing.
- Data base query and map algebra.
- GIS supported case studies in water resources management.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply assess spectral data and sensors potential for spatial analysis.	Apply	1	1, 2, 7
2	Analyze image interpretation technique to interpret and DIP technique to correct remotely sensed image.	Analyze	1	1, 2, 4
3	Create image enhancement techniques to enhance and improve remotely sensed image.	Create	2	1, 2, 4, 6, 7, 11
4	Create remote sensing image interpretation technique for the advanced uses of agriculture.	Create	2	1, 2, 4, 6, 7, 11

TEXT BOOKS:

1. Jensen, J.R. “Remote Sensing of the Environment: An Earth Resource Perspective” Pearson Education Limited, 2013 UK.
2. Lillesand, T., R.W. Kiefer and J. Chipman. “Remote Sensing and Image Interpretation” 7th Edition, John Wiley and Sons Singapore Pvt. Ltd., 2015 Singapore.

REFERENCES :

1. Elangovan, K. “GIS Fundamentals Applications and Implementations” New India Publication Agency, New Delhi, 2006.
2. George Joseph. “Fundamentals of Remote Sensing” 2nd Edition. Universities Press (India) Private Limited, Hyderabad, 2006.
3. Sabins, F.F. “Remote Sensing: Principles and Interpretation” Third Edition, Waveland Press Inc., Illinois, USA, 2007.
4. Sahu, K.C. “Text Book of Remote Sensing and Geographic Information Systems” Atlantic Publishers and Distributors (P) Ltd., New Delhi, 2008.