



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

SYLLABUS

Introduction - Definition- Principle of Remote Sensing- History of Development of Remote Sensing- Stages in Remote Sensing- Electromagnetic Radiation and the Electromagnetic Spectrum- Interactions With the Atmosphere- Atmospheric Scattering- Atmospheric Absorption- Atmospheric Windows- Refraction- Interaction of EMR with the Earth's Surface Reflection- Transmission- Spectral Signature.

Platforms & Sensors- Remote Sensing Systems- Remote Sensing From Space- Remote Sensing Sensors- Resolution- Imaging Sensors- Optical Infrared (OIR) Imagers- Optical Sensors Thermal Sensors- Microwave Sensors- Active Microwave Sensors- Data Pre-processing- Remote Sensing in India.

Introduction to Image Interpretation- Basic Principles of Image Interpretation- Elements of Image Interpretation- Techniques of Image Interpretation- Interpretation Keys- Introduction to Digital Image Processing- Digital Image- Image Rectification and Registration- Geometric Correction- Image Enhancement Techniques (Only Concepts)- Image Classification - Unsupervised Classification and Supervised Classification- Digital Photogrammetry - Stereo Images from Satellites - Data Merging .

Geographic Information Systems (GIS)- Definitions and Related Technology- GIS Operations. GIS Elements- GIS Concepts and Practice- Map Projection and Coordinate System. Vector Data Model- Introduction- Vector Data Representation- Geometric Objects- Topology. Vector Data Analysis- Introduction- Buffering- Applications of Buffering- Map Overlay- Feature Type and Map Overlay- Map Overlay Methods- Slivers- Error Propagation in Map – Overlay. Distance Measurement- Map Manipulation. Raster Data Analysis- Introduction- Analysis Environment- Local Operations- Local Operations With a Single Grid- Local Operations With Multiple Grids- Neighbourhood Operations- Zonal Operations. GIS Models and Modeling- Introduction- GIS Modeling- Binary Models- Index Models.

Terrain Mapping and Analysis- Introduction- Data for Terrain Mapping and Analysis- Surface Models-DEM- TIN. Remote Sensing & GIS Application in Water Resources, Geology, Urban planning, Natural resources management and other fields– Some Case Studies from Literature.



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MODEL PAPER

Answer any 5 out of the given questions.

1. a) Describe the definition and principle of remote sensing. How has remote sensing evolved over time?
b) Explain the stages in the development of remote sensing and discuss the importance of electromagnetic radiation in remote sensing.
2. a) Discuss the different remote sensing platforms and the types of sensors used in remote sensing.
b) Explain the difference between active and passive remote sensing and their respective advantages and disadvantages.
3. a) Explain the basic principles of image interpretation in remote sensing.
b) Describe the various techniques of image interpretation and provide examples of when each technique would be most appropriate.
4. a) What is a Geographic Information System (GIS)? Discuss the definitions, related technology and operations of a GIS.
b) Discuss the map projection and coordinate system used in GIS.
5. a) Discuss the importance of terrain mapping and analysis in geography and geology.
b) Discuss the applications of remote sensing and GIS in different fields, such as water resources engineering and management.
6. a) Analyse the different methods and techniques used for vector data analysis in GIS
b) Explain the various types of GIS modelling techniques.
7. a) Discuss the role of interpretation keys in image interpretation and explain how they are used in remote sensing.
b) Explain the concepts of Digital Elevation Models (DEM) and Triangulated Irregular Network (TIN) and their importance in terrain mapping.
8. a) Discuss the interactions between electromagnetic radiation and the atmosphere
b) Discuss various Indian Remote Sensing satellites.

