(AG512) Remote Sensing & GIS Applications	**L**	**T**	**P**	**To**	**C**
	3	1	-	4	4

Unit 1

Introduction, History of remote sensing, Physics of Radiant Energy –Electromagnetic spectrum and its nature, Interactions of electromagnetic radiation with different media, Atmospheric effects in remote sensing, Spectral Reflectance curves of vegetation, soil and water, Ideal and real remote sensing. Atmospheric windows, Active and Passive remote sensing; Remote Sensing Platforms and Sensors: Introduction, Earth Resources Satellites – IRS series, Landsat Series and SPOT, Meteorological and Other satellites, Sensor Parameters and Sensor Systems used in Imaging; Resolution: Spatial, Spectral, Radiometric and Temporal

Unit II

Aerial Remote Sensing: Introduction to Photogrammetry, Geometry of vertical photograph, Stereo viewing, Stereoscopic depth perception, Use of stereoscopes, Mosaicing; Microwave Remote Sensing: Introduction, radar principle, radar image properties, distortions, applications. Radar Polarimetry. SAR Images. Radiometry for crop monitoring and hydrologic forecasting; Data Products, Visual and Digital Image Processing; Image analysis: Visual interpretation, digital processing, preprocessing, enhancement, transformation, classification, Integration; Image interpretation: Basic principles, factors governing quality of an image, factors governing interpretability, visibility of objects, techniques of interpretation, digital image processing;

Unit III

Satellite data Products, their different types, Visual Image Interpretation and its key elements, Introduction and Basic character of digital image, Image Preprocessing and Image registration; Applications of RS: RS in Agricultural Engineering, agriculture, hydrology, land cover, mapping etc; Image interpretation for water resources development and soil conservation survey.

Fundamentals of GIS, Introduction to GIS, Roots of GIS, Overview of Information System, GIS definitions and terminology,

Unit IV

GIS architecture, Framework of GIS, Spatial data modeling , Vector GIS models and Raster GIS models, GIS data management. Database management system: Data file management, database models, storage of GIS data, object based data models, Topology, DBMS in GIS. Data input and editing: data stream, data input methods, GPS for data capture, data editing. Data quality issues: Introduction, accuracy, precision and resolution, consistency, completeness, sources of error in GIS, modeling errors, error evaluation by GIS.

Unit V

Data analysis and modeling: Introduction, format conversion, data medium conversion, spatial measurement methods, reclassification, buffering techniques, overlay analysis, modeling surfaces: DTM, TIN, slope model, GIS outputs. Integration of RS and GIS: RS and GIS synergy need for integration, facilities for integration, RS & GIS applications in Agrl. Engineering. Entering data in computer, digitizer – scanner- data compression.

TEXT BOOKS:

1. Scanda, E. (1976). *Remote sensing for environmental sciences.* Springer.
2. Anji Reddy M. (2006). *Remote sensing & GIS*. BS Publications.

3. Crocknell, A.P. (1981). *Remote sensing in meteorology Oceonography and hydrology*.
4. Lillesand and Keifer. (1994). *Remote sensing and image interpretation.* John Wiley.
5. Philip H.S et al . (1978). *Remote sensing the quantitative approach*. Mc Graw Hill.
6. Agarwal, C. S. & Garg, P. K. (2000). *Remote Sensing*. Wheeler publishing.

REFERENCE BOOKS:

1. Sabins, F. (1978). *Remote sensing principles and interpretation.*
2. Burroughs, P. A. (1986). *Principles of Geographic Information Systems for land Resources Assessment.* Clarendon Press, Oxford.
3. Chang, K. T. (2006). *Inroduction to GIS.* Tata McGraw Hill.
4. Jensen, J R. (1996). *Introductory Digital Image Processing*. Prentice Hall .
5. Jensen, J. R. (2000). *Remote Sensing of the Environment.* Pearson Education.
6. Langley P, McGuire D, Goodchild M F and Rhind, D. (2001). *GIS- Principles and Applications.* Longman.