RSGT – 101  FUNDAMENTALS OF REMOTE SENSING

Unit – 1
1.1 Remote Sensing – history & development, definition, concept and principles
1.2 Energy Resources, radiation principles, EM Radiation and EM Spectrum
1.3 Black body radiation, Laws of radiation
1.4 Interaction of EMR with atmosphere and Earth’s surface

Unit – 2
2.1 Platforms – Types and their characteristics
2.2 Satellites and their characteristics – Geo-stationary and sun-synchronous
2.3 Earth Resources Satellites – LANDSAT, SPOT, IRS, IKONOS satellite series
2.4 Meteorological satellites – INSAT, NOAA, GOES

Unit – 3
3.1 Sensors – Types and their characteristics, Across track (whiskbroom) and Along track (pushbroom) scanning
3.2 Optical mechanical scanners – MSS, TM, LISS, WIFS, PAN
3.3 Concept of Resolution – Spatial, Spectral, Temporal, Radiometric
3.4 Basic concept and principles of Thermal, microwave and hyperspectral sensing

Unit – 4
4.1 Basic principles, types, steps and elements of image interpretation
4.2 Techniques of visual interpretation and interpretation keys
4.3 Multispectral, multispectral and multidisciplinary concepts
4.4 Instruments for visual interpretation

Unit – 5
5.1 Remote Sensing Data Products and their procurement
5.2 Ground Truth Collection – Spectral Signatures
5.3 Commonly used Ground Truth equipments – use of Radiometers
5.4 Display Forms – Computer printouts, Thematic maps

Books Recommended

RSGT - 102  AERIAL PHOTOGRAPHY AND PHOTOGRAMMETRY

Unit - 1
1.1  Introduction to aerial photography – Basic information and specifications of aerial photographs
2.2  Planning and execution of photographic flights
2.3  Aerial cameras – Types and their characteristics
2.4  Aerial film negative and its processing - completion of photographic task

Unit - 2
2.1  Introduction – Definition and terms in Photogrammetry
2.2  Types of aerial photographs
2.3  Geometry of Aerial Photographs
2.4  Introduction to digital photogrammetry - Orthophotos and digital orthophotography

Unit - 3
3.1  Orientation of aerial photographs, Aerial mosaics
3.2  Scale of aerial photographs and its determination
3.3  Stereovision and stereoscopes
3.4  Stereoscopic parallax and Parallax equations

Unit - 4
4.1  Making measurements from aerial photographs, Measurement of height from Aerial Photograph
4.2  Relief displacement of vertical features and its determination
4.3  Vertical exaggeration and slopes – Factor affecting vertical exaggeration and its determination
4.4  Elements of photointerpretation, Symbols and colour schemes used in photointerpretation

Unit - 5
5.1  Principles of stereo photogrammetry
5.2  Model deformation and rectification
5.3  Simple plotting Instruments – simple and stereoplotters
5.4  Aerial triangulation, control and mapping

Books Recommended

RSGT - 103 CARTOGRAPHY AND GLOBAL POSITIONING SYSTEM

Unit - 1
1.1 Introduction to cartography, nature and scope of cartography
1.2 Digital cartography - elements of digital cartography Relation between digital cartography, RS & GIS
1.3 Conventional mapping VS Digital mapping
1.4 Scale, reference and coordinate system

Unit - 2
2.1 Cartographic transformations and reasons for transforming cartographic data
2.2 Map Projection – concept and classification
2.3 Azimuthal, cylindrical, conical and rectangular projection system
2.4 Choice of map projection – Satellite image and map projection

Unit - 3
3.1 Mechanics of map construction - Principles of drawing, Base materials -Instruments
3.2 Cartographic design - map design principles, symbolisation and lay out
3.3 Study of different types of maps, Survey of India national series maps, layout and numbering of topographical maps
3.4 Thematic maps and base maps

Unit - 4
4.1 Representation of natural and cultural features, relief representations
4.2 Map digitization and Map Compilation
4.3 Fair drawing and editing of maps
4.4 Map reproduction process

Unit - 5
5.1 Introduction to Global Positioning System (GPS) – Fundamental concepts
5.2 GPS system elements and signals
5.3 GPS measurements and accuracy of GPS
5.4 Classification of GPS receivers

Books Recommended
Anji Reddy,M. 2004 : Geoinformatics for environmental management, B.S. Publications
Rampal K. K. 1993: Mapping and compilation, Concept publication
Taylor, D.R.F. 1985: Education and Training in contemporary cartography, John Willey
RSGT – 104 DIGITAL IMAGE PROCESSING

Unit – 1
1.1 Introduction to digital image processing- Concept of digital image, steps in DIP
1.2 Image processing systems – hardware and software considerations
1.3 Digitization of photographic images, converting digital image to visual form image
1.4 Digital image data formats, image data storage and retrieval

Unit – 2
2.1 Radiometric correction of remotely sensed data
2.2 Geometric correction of remotely sensed data
2.3 Image registration – definition, principle and procedure
2.4 Basic statistical concept in DIP and use of probability methods in DIP

Unit – 3
3.1 Image enhancement techniques – an overview
3.2 Contrast Enhancement - Linear and non-linear, Histogram equalisation and Density slicing
3.3 Spatial filtering and Edge enhancement
3.4 Multi image manipulation – addition, subtraction and Band rationing

Unit 4
4.1 Principal Component Analysis
4.2 Enhancement by using colours – advantages, Types of colour enhancements
4.3 BGR – coding and generation of FCC’s
4.4 Image transformation – Intensity Hue Saturation (IHS)

Unit – 5
5.1 Pattern recognition and image classification, Unsupervised classification – advantages, disadvantage and limitations
5.2 Supervised classification – training site selection, Classifiers used in supervised classification – Minimum distance to mean, Parallelepiped, maximum likelihood
5.3 Classification accuracy assessment
5.4 Hyperspectral image analysis

Books Recommended