

## **Ph.D. COURSE WORK SYLLABUS**

### **Paper- Recent trends in Geoinformatics**

**Time Duration: 3hrs**

**M.M. - 100**

#### **UNIT I: BASIC PRINCIPLES**

- Remote Sensing: Definition, Advantages and Limitations, Concept & Principles
- Electromagnetic Radiation (EMR): Wavelength regions and their applications Atmospheric windows, Interaction of EMR with atmosphere & Earth's Surface
- Spectral response pattern, Resolutions- Spectral, Spatial, Temporal and Radiometric

#### **UNIT II: REMOTE SENSING SATELLITES**

- Remote Sensing Systems: Geostationary & Sun Synchronous Satellites, classification: Active and Passive
- Earth Resource Satellite Sensor: IRS Series of Satellites, LANDSAT, SPOT, IKONOS, QUICKBIRD, MODIS, RADARSAT, ERS, etc.
- Weather & Communication Satellites: Introduction, NOAA, TERRA, MOS, INSAT, GOES, etc.
- Advances in remote sensing technologies: Thermal, RADAR, Microwave, Hyperspectral, Lidar etc.

#### **UNIT III: GEOGRAPHIC INFORMATION SYSTEM**

- Basic concepts about spatial information, Spatial vs. non-spatial data, Components of GIS
- Spatial data models – Raster and Vector, Data base design - editing and topology creation in GIS, Linkage between spatial and non-spatial data
- Integration of Raster & Vector Data, Feature Based Topological functions
- Interactive Data Exploration, Vector Data Query, Attribute Data Query

#### **UNIT IV: CARTOGRAPHY & GLOBAL POSITIONING SYSTEM**

- Introduction to cartography, Map and Scale, Important Map Projections, Generalization- Elements, Control & Classification ( Semantic & Geometric)
- Introduction to Global Positioning System, GPS Segments, GPS Positioning Types- Absolute, Differential, Geopositioning, GNSS: NAVSTAR, GLONASS, GALILEO etc.

#### **UNIT V: IMAGE INTERPRETATION**

- Concepts about digital image and its characteristics, Visual and Digital Satellite Image Interpretation
- Elements of Image Interpretation
- Radiometric enhancement techniques, Spatial enhancement techniques, Contrast stretching: Linear and non-linear methods, Band ratio, Types of Vegetation indices
- Classification- supervised & unsupervised

#### **RECOMMENDED READINGS**

- Jensen, J.R., (2006) "Remote Sensing of the Environment – An Earth Resources Perspective", Pearson Education, Inc. (Singapore) Pte. Ltd., Indian edition, Delhi.
- George Joseph, (2004) "Fundamentals of remote sensing", Universities press (India) P Ltd.,
- Lo and Albert K.W. Yeung (2006) "Concepts and Techniques of Geographic Information Systems" Prentice Hall of India, New Delhi.
- Burrough, Peter A. and Rachael McDonnell,(1998), ' Principles of Geographical Information Systems' Oxford University Press, New York.
- Ramesh, P. A., (2000): Fundamentals of Cartography, Concept Publishing Co., New Delhi.
- Leica. A., (2003), GPS Satellite Surveying, John Wiley & Sons, use. New York Terry-Karen Steede, (2002)