

Course No.	CE 214003
Course Title	Geographic Information Systems
Credits	L T P Cr 3 1 0 4
Prerequisites	-
<u>Course Contents:</u>	
<p>Introduction to Geographic Information Systems (GIS): Spatial data, Vector and raster data structures, Formal and informal definitions of GIS, Components of a GIS, General information about GIS.</p> <p>Georeferencing: Datums, Ellipsoids, Geoids, Coordinate systems, The Globe, Map projections: Cylindrical map projections, Mercator, Universal Transverse Mercator; Tissot's indicatrix.</p> <p>Data for GIS: Global positioning system (GPS), In-situ land surveying, Historical spatial information, Remote sensing data collection, Remote sensing process, Aerial photography, Multispectral remote sensing, Hyperspectral remote sensing, Thermal-infrared remote sensing, LiDAR remote sensing, RADAR remote sensing.</p> <p>Data Quality: Metadata, Accuracy and precision, Types of error in geospatial data: Attribute error, Positional error, Topological error, Temporal accuracy, Error visualization, Error propagation, Ecological fallacy, Modifiable Areal unit problem.</p> <p>Spatial Data Models and Databases: GIS data models, Raster data, Vector data, Vector and raster data model conversion, Databases, Data query.</p> <p>Spatial Analysis of Vector and Raster Data: Vector data analysis: Buffering, Overlay; Raster data analysis: Distance measurement, Local raster operation, Neighbourhood raster operation.</p> <p>Network Analysis: Geocoding, Transportation (undirected) network analysis, Geometric utility (directed) Network analysis</p> <p>Spatial Analysis of 3-Dimensional Data: Vector representation and processing of 3-dimensional data: Triangular irregular network (TIN); Raster representation and processing of 3-dimensional data: Spatial interpolation.</p>	
References / Text Books	
<ol style="list-style-type: none"> 1. Jensen J. R. and Jenson R. R., <i>Introductory Geographic Information Systems</i>, Pearson, 2013. 2. Jensen, J. R., <i>Introductory digital image processing: A remote sensing perspective</i>, 4th ed., Pearson, 2016. 3. Longley P. A., Goodchild M., Maguire D. J., and Rhind D. W., <i>Geographic Information Systems and Science</i>, 4th. ed., Wiley Publishing, 2015. 4. Liu, J. G. and Mason, P. J., <i>Image Processing and GIS for Remote Sensing, Techniques and Applications</i>, 2nd ed, Wiley Blackwell: Oxford, 2016. 5. Richards J.A., <i>Remote Sensing Digital Image Analysis</i>, 5th ed., Springer, Berlin Heidelberg, 2013. 	
Any other Remarks:	