GEO INFORMATICS ENGINEERING

Surveying: Chain surveying, compass surveying, plane table surveying, leveling, theodolite surveying Temporary and permanent adjustments for level and theodolite, trigonometric leveling, tacheometry, traversing, contouring, Computation of areas and volumes, Curve setting, simple, compound and reverse curves, transition curves, vertical curves construction surveying, hydrographic surveying, route survey, triangulation , astronomical survey, Electromagnetic distance measurement, Total station and GPS surveying, adjustment of errors in surveying, least square adjustment, weights of observations

Remote Sensing: Components of RS, electromagnetic spectrum,wave theory, particle theory, Kepler's Law, Stefan Boltzmann law and Wien's law, EMR interaction with atmosphere and earth materials, platforms and sensors, data product types- resolution concepts, elements of visual interpretation, interpretation keys, Principles and Characteristics and applications of thermal, hyperspectral, microwave and LiDAR images -Data analysis methods.

Digital Image Processing: Sources of Image degradation and correction procedures, preprocessing, image enhancement techniques, image classification, spectral discrimination, pattern recognition concepts, Baye's approach, signature and training sets, separability test, supervised classification, minimum distance to mean, parallelepiped, MLC, unsupervised classifiers, ISODATA, K-means, support vector machine, segmentation (spatial, Spectral), tree classifiers, accuracy assessment metrics, fuzzy set classification, sub_pixel classifier, hybrid classifiers, texture and object based classifiers, artificial neural nets, Hebbian leaning, expert system, types and examples, knowledge systems.

Photogrammetry: Types of photographs, photographic overlaps, film, based and digital aerial cameras, Camera calibration, geometric properties of aerial photographs, stereo plotters & orientation, aerotriangulation, terrain modeling, ortho rectification and ortho images , digital photogrammetry , work station basic system function, storage system, stereoscopic viewing and measuring system, photogrammetry project planning, other acquisition systems, UAV, terrestrial imaging, oblique photography, close range photogrammetry, terrestrial and mobile LiDAR –terrestrial LiDAR.

Cartography and GIS: Cartography, Functions, uses and types of maps, map composition, elements, scale , projections, geodesy, coordinate system, Components Data structure and formats, Spatial data models, Raster and vector, Data base design, Linkage between spatial and non-spatial data, Digitizing Errors, Topological Editing and Non-topological Editing, Topological Rules, Locational, atomic and ecological fallacy, Spatial autocorrelation, heterogeneity and interaction, Attribute Data Query, classification,

Spatial analysis: Modifiable areal unit problem, Travelling salesman problem , Uncertain geographic context problem, overlay analysis, Digital Terrain Analysis and Modeling, Map algebra-operators, site selection, hotspot detection, Geographic Visualization Data Classification, Spatial Interpolation and Geostatistics, Surface representation and analysis, Trend surface analysis, regression model, Thiessen polygons, density estimation, Inverse Distance weighted Interpolation, Kriging: Ordinary Kriging and Universal Kriging, Address Geocoding, Optimum Routing, Closest facilities, Resource Allocation, Network Analysis, Single criteria vs. Multiple criteria Decision-making, Spatial neural networks

GNSS: GPS Components and Types, GPS Errors GPS Positioning Modes: GPS point positioning, GPS relative positioning; RTK GPS, Factor affecting GPS accuracy, Differential RTK, Wide Area Augmentation System (WAAS), GPS Tracking, Utility, Mapping, Cadastral Surveying.