GE	Geomatics Engineering

Part-A (Common): Engineering Mathematics and Basic Geomatics

Engineering Mathematics: Surveying measurements, Accuracy, Precision, Most probable value, Errors and their adjustments, Regression analysis, Correlation coefficient, Least square adjustment, Statistical significant value, Chi square test.

Remote Sensing: Basic concept, Electromagnetic spectrum, Spectral signature, Resolutions- Spectral. Spatial, Temporal and Radiometric, Platforms and Sensors, Remote Sensing Data Products - PAN, Multispectral, Microwave, Thermal, Hyperspectral, Visual and digital interpretation methods

GNSS: Principle used, Components of GNSS, Data collection methods, DGPS, Errors in observations and corrections.

GIS: Introduction, Data Sources, Data Models and Data Structures, Algorithms, DBMS, Creation of Databases (spatial and non-spatial), Spatial analysis - Interpolation, Buffer, Overlay, Terrain Modeling and Network analysis.

Part-B1: Surveying and Mapping

Maps: Importance of maps to engineering projects, Types of maps, Scales and uses, Plotting accuracy, Map sheet numbering, Coordinate systems- Cartesian and geographical, map projections, map datum – MSL, Geoid, spheroid, WGS-84.

Land Surveying: Various Levels, Levelling methods, Compass, Theodolite and Total Station and their uses, Tachometer, Trigonometric levelling, Traversing, Triangulation and Trilateration.

Aerial Photogrammetry: Types of photographs, Flying height and scale, Relief (height) displacement, Stereoscopy, 3-D Model, Height determination using Parallax Bar, Digital Elevation Model (DEM), Slope.

Part-B2: Image Processing and Analysis

Data Quantization and Processing: Sampling and quantization theory, Principle of Linear System, Convolution, Continuous and Discrete Fourier Transform.

Digital Image Processing: Digital image characteristics: image histogram and scattergram and their significance, Variance-Covariance matrix, Correlation matrix and their significance.

Radiometric and Geometric Corrections: Registration and Resampling techniques.

Image Enhancement: Contrast Enhancement: Linear and Non-linear methods; Spatial Enhancement: Noise and Spatial filters.

Image Transformation: Principal Component Analysis (PCA), Discriminant Analysis, Colour transformations (RGB - IHS, CMYK), Indices (Ratios, NDVI, NDWI).

Image Segmentation and Classification: Simple techniques.