

### Part A: Common

**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, ResolutionsSpectral. 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 B: Section 1

**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 C: Section 2

**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, Color transformations (RGB - IHS, CMYK), Indices (Ratios, NDVI, NDWI).

**Image Segmentation and Classification** – Simple techniques.