

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 B: Section I - 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 B: Section II - 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, Color transformations (RGB - IHS, CMYK), Indices (Ratios, NDVI, NDWI).

Image Segmentation and Classification – Simple techniques.