

GE**Geomatics Engineering****Part A: Common Section**

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

Remote Sensing: Basic concept, Physical Principles of Remote Sensing, Spectral signature, Resolutions: Spectral, Spatial, Temporal, Radiometric, Platforms and Sensors, Remote Sensing Data Products- PAN, Multispectral, Microwave, Thermal, Hyperspectral data; 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, DBMS, Creation of Databases (spatial and non-spatial), Basic 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: Levelling instruments, Levelling methods, Compass, Theodolite, Total Station and COGO functions, Tachometer, Trigonometric levelling, Traversing, Triangulation and Trilateration.

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

Part B2: Image Processing and Analysis

Data Quantization and Processing: Sampling and quantization theory Principle of Linear System, Convolution.

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

Basic Radiometric and Geometric Corrections: Registration and Resampling techniques.

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

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

Basic Image Classification and Segmentation: Supervised and unsupervised techniques, accuracy analysis.