

COURSE OBJECTIVE:

- To Familiarize Students with Surveying & its Various Divisions
- To Familiarize Students with Surveying Equipment & their Use
- To Familiarize Students with Computation of Areas & Volumes
- To Make the Students Capable of Dealing with Field Problems.

COURSE CONTENT:

Introduction to Surveying: Overview of Surveying, branches of surveying, principles of Surveying. Instruments Used for various measurements, Electronic Distance Measurement (EDM), Various EDM Instruments, Survey Maps, Conventional Symbols of Objects in the Map, Introduction to GIS, GPS, remote sensing and Digital Terrain Models (DTMS), applications of Remote Sensing.

Linear Measurements: Methods and terminologies of linear measurements, linear measurements using chain surveying, various operations in carrying out the chain surveying, various accessories for chaining, different type of chains and tapes, testing of chains.

Running Survey Lines: Ranging, chaining and laying offsets, linear Measurements with chain on level ground /on sloping ground, **Errors in chaining:** Errors in Measurements with Incorrect Chain Length, Linear Measurements with Tape on Smooth Level or Sloping Ground / on Rough Ground, Tape Corrections, Setting out Right Angle on / From a Chain Line, Offsets – Limiting Length of Offset, Effect of Error in Laying out Direction, Effect of Error in Direction and Length Both. **Obstacles in Chain Survey:** Obstacles to Ranging, Obstacles to Chaining, Obstacles to Ranging and Chaining both. Numerical Problems.

Angular measurements: Overview and terminologies, Principle of Compass, Types of Compass, Compass Surveying, Traversing, Traversing with Chain and Compass, Designation of Bearings, Calculation of Included Angle from Bearings, Calculation of Bearing From Included Angles Errors and Precautions in Compass Surveying, Local attraction, Correction to Measured Bearing for Local Attraction, Adjustment of Closing Error. Magnetic Declination, Dip, Introduction Plane Table Surveying, Methods of Plane Table Surveying- Radiation Method and Intersection Method. Introduction to Theodolite. Numerical Problems.

Vertical Measurements: Overview and terminologies, Leveling Instruments-Different Types of Levels, Leveling Staff. Temporary and Permanent Adjustments of a Level. Leveling: Classification Based on Purpose of Leveling –Simple leveling, Differential or Compound or Continuous Leveling, Fly Leveling, Profile or Longitudinal Leveling, Cross-Section Leveling, Reciprocal Leveling, Precise Leveling, Booking and Reducing Levels. Height of Collimation or Height of Instruments Method. Rise and Fall Method, Errors and Precautions in leveling, Balancing Back Sight and Foresight, Error Due to Earth's Curvature and Refraction, Field Problems or Difficulties in Leveling, Numerical Problems.

Measurement of Areas and Volumes: Introduction, Areas: Areas from Field Measurements –Area Consisting of Irregular Boundary, Area from Plan –Graphical Method, Measurement of Area by Planimeter Errors & Precautions in Computation of Area. Volumes: Measurement of Volume. –from Cross Sections, from Spot Levels, from Contours, Area of Sections, Capacity of a Reservoir, Elevation - Capacity Curve, Earthwork, Mass Diagram. Numerical Problems.

COURSE OUTCOMES

After completion of course, student should be able to:

1. To Use Various Surveying Equipments
2. To Perform Survey in the Field and Tackle the Difficulties Faced.

EVALUATION: Evaluation will be continuous an integral part of the class, field as well through external assessment.

REFERENCES:

Text Books

1. *Surveying volume-1 3/e* by S.K. Duggal Publisher Tata McGraw Hill Education
2. *Surveying*, by Mimidas Saikia BM Das, MM Das Publisher PHI Learning
3. *Surveying & Leveling* by N. N. Basak Publisher MC.Graw Hill Education
4. *Plane Surveying* by A.M. Chandra New Age International Publisher
5. *Surveying Vol.1* by B.C. Punmia Publisher Luxmi Publications

Reference Books

1. *Fundamentals of Surveying* by S.K. Roy PHI Learning
2. *Remote Sensing and Image Interpretation 6/e* by Lillesand Kiefer Chipman Willey India Pvt ltd.
3. *Surveying 7/e* by A. Bannister, Stanley Raymond, Raymond Bakesr Publisher Pearson Education.