

## **31033 - SURVEYING I**

### **DETAILED SYLLABUS**

#### **Unit I INTRODUCTION TO SURVEYING AND CHAIN SURVEYING 1.1**

INTRODUCTION TO SURVEYING Definition – Objectives and uses of surveying – Main Divisions of surveying – Plane and Geodetic surveying – Classification of Surveying - Principles of surveying. 1.2

CHAIN SURVEYING Introduction – Instruments used for chaining – Chains and Tapes - Types – Definitions of terms commonly used in chain surveying: Survey stations, base line, check line and tie line - Ranging: Direct and Indirect ranging – Offsets: Definition, types, Instruments used and Procedure of taking an offset – Conventional signs – Chain surveying: Equipment's required, field work and recording field notes – Errors in chaining - Obstacles in chaining: Types – Tape correction and its necessity.

**Unit II COMPASS SURVEYING** Angular measurements – Necessity – Instruments used – Prismatic compass : Construction details, functions and Temporary adjustment – Types of meridians - Types of bearings : Whole circle and Reduced bearings, Fore and Back bearings – Computation of included angles from bearings – Computation of bearings from included angles – Problems - Local attraction : Detection, Correction and Problems - Dip and declination – Compass traversing – Errors in compass surveying.

**Unit III LEVELLING** Levelling – Definition – Level – Parts – Functions – Accessories – Types of levels : Dumpy level, Modern Tilting level, Quick setting level, Automatic and Laser level – Levelling staff - Types – Component parts of Levelling instrument – Definitions of terms

used : Level surface, Horizontal and Vertical surfaces, Datum, Bench marks, Reduced level, Rise, Fall, Line of collimation, Axis of telescope, Axis of bubble tube, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instrument, Focusing and Parallax - Temporary adjustment of a level –Balancing Back sight and Foresight – Principle of levelling - Simple levelling– Theory of Differential levelling (Fly levelling) –Levelling field book - Reduction of levels – Height of collimation and Rise and Fall method – Comparison of methods – Problems on reduction of levels - Missing entry calculations : Problems.

**Unit IV LEVELLING** (CONTD. ) Types of levelling - Check levelling : Definition, Field Procedure and use - Profile levelling or Longitudinal section(L.S) : Definition, use, field procedure and plotting the profile - Crosssectional levelling(C.S) : Definition, use, field procedure and plotting the cross-section – Specimen field book for L.S and C.S - Reciprocal levelling : Definition, use and problems on difference in elevation - Curvature and Refraction : Effects, correction and problems – Errors in levelling - Fundamental lines and desired relationship between them – Permanent adjustments of a dumpy level : Process.

**Unit V CONTOUR SURVEYING AND GLOBAL POSITIONING SYSTEM**

5.1 CONTOUR SURVEYING Definition – Contour – Contouring – Characteristics of contours – Methods of contouring – Direct and Indirect methods – Tacheometric contouring - Interpolation of contours – Different methods – Contour gradient – Uses of contour plan and map – Calculation of capacity of reservoir : Simple problems.

5.2 GLOBAL POSITIONING SYSTEM (GPS) Introduction - Maps – Types of Maps – Various Satellites used by GPS – Differential GPS - Fundamentals of GPS – Application of GPS – GPS Receivers – Hand held GPS Receiver – Function – Field procedure – Observation and processing applications in Civil Engineering.

Reference Book :

1. Kanetkar.T.P. & S.V.Kulkarni, "Surveying and Levelling Part 1 & 2 ", Puna vidyarthi griha, Prakashan, 23rd edition, 2008.
2. Punmia.B.C. Ashok K.Jain & Arun K. Jain, "Surveying Volume I ", Laxmi Publications Private Limited, 16 th edition, 2011.
3. Mimi Das Saikia, Bhargab Mohan Das & Madan Mohan Das, "Surveying", PHI Learning Private Limited, Edition 2010.
4. S. K. Roy, "Fundamentals of Surveying", PHI Learning Private Limited, Edition 2010.
5. Learning Material Development Project – NITTTR, Taramani, Chennai, CD programme on GPS and GIS