SURVEYING

UNIT I – INTRODUCTION

Introduction to surveying –Primary dividions of surveying, Classification of surveying, Principles of surveying, Plan and map, Scales, Problem besed on scale, field work anf office work. **Chain surveying** – Method of linear measurement, Introduction to chain surveying, Survey stations and lines, Instruments used for chaining, Chaining, Chaining on sloping or uneven ground, Setting a right angle in chain line. **Ranging** – Ranging, Direct ranging, Direct ranging by line ranger, Indirect ranging, Random line ranging, Reciprocal ranging. **Obstacles in chaining** – Introduction, Chaining Obstructed but vision free, Chaing free but vision obstructed, Both chaining and vision obstructed, problem based on obstacles in chaing. **Convensional signs** – Field work and office work, Plotting of chain surveying, Conventional signs. **Errors in linear measurements and their corrections** – Accuracy and errors, Types of errors, Accidental errors and mistakes, Errors in chaing, Incorrect length of chain, Tape corrections, Problems based on error in linear measurement. **Compass surveying** – Introduction to compass surveying, Prismatic compass, Surveyor compass, Difference between surveyor and prismatic compass, Angles and bearings, Designation of bearings, Fore bearing and back bearing. **Conversion of bearing and included angles** – Conversion of bearing from one system to the other, Problems based on conversion from W.C.B to R.B, Problems based on conversion from R.B to W.C.B, Calculation of angles from bearing, Problems based on included angle. **Local attraction and magnetic declination** – Local attraction, Elimination of local attraction, Problems based on local attraction, Dip of the magnetic needle, Magnetic declination, Problems based on magnetic declination.**Plane table surveying** - Introduction to plane table surveying, Plane table instruments and accessories, Working operations, Radiation, Intersection, Resection, Traversing, Resection by three point problem, Resection by two point problem, Errors in plane table surveying.

UNIT II - LEVELLING AND CONTOURING

Levelling - Introduction to leveling, Basic terms used in leveling, Instruments used in leveling, Levelling staff. **Adjustments in leveling** - Temporary adjustments, Permanent adjustments. **Booking and reducing levels**- Height of collimation method, Rise and fall method, Problem on height of instrument method, Problem on rise and fall method. **Balancing of sights curvature and refraction** - Balancing back sights and fore sights, Balancing sight on a slope, Problem based on collimation error, Balancing of sights curvature, Refraction, Problems on curvature and refraction correction. **Methods of leveling** - Direct leveling, Differential levelling or fly leveling, Reciprocal leveling, Longitudinal levelling or longitudinal sectioning, Cross levelling or cross sectioning, Levelling problems, Errors in leveling, **Contouring** – Characteristics of contour, Methods of contouring, Use of contour, Interpolation of contours.

UNIT III - COMPUTATION OF AREAS AND VOLUMES

Computation of areas - Introduction to computation of areas, Computation by dividing area into triangles, Computation by offsets to base line, Computation by latitudes and departures,

Computation of area by co-ordinates, Problems based on computations of areas. **Computation of volumes**- Introduction to computation of volumes, Computation from cross sections, Embankments and cuttings, Embankment and cutting for a level section, Embankment and cutting for two level section, Prismoidal and trapezoidal formula, The curvature correction, Computation of volume from spot levels, Computation from contours, Problems based on volume of embankment, Problems based on capacity of reservoir, Problems based on volume of cutting.

UNIT IV - THEODOLITE SURVEYING

Introduction to theodolite surveying- Theodolite surveying, Essential parts of theodolite, Fundamental terms of theodolite, Application of theodolite. **Adjustments of vernier transit**- Temporary adjustments, Permanent adjustments, Adjustments of plate level, Adjustment of line of sight, Adjustment of the horizontal axis, Adjustment of altitude level and vertical index frame. **Angle measurement** - Measurement of horizontal angles, Horizontal angles by repetition method, Horizontal angles by reiteration method, Measurement of vertical angles. **Trigonometrical leveling -** Trigonometrical leveling, Height and distance, Base of object inaccessible, Problems related to trigonometrical leveling. **Traversing–** Traversing, Methods of traversing, Chain traversing, Chain and compass traversing, Theodolite traversing, Traversing by direct observation of angles.

UNIT V - TACHEOMETRIC SURVEYING, CURVES AND ADVANCED SURVEYING

Tacheometric surveying - Introduction to tacheometric surveying, Instruments used in tacheometric survey, Holding of staff, Methods of reading the staff, Different systems of tacheometric measurements. **Stadia tacheometry**-Principle of stadia tacheometry, Theory of stadia tacheometry, Determination of stadia constant, Staff held vertical to the line of sight, Staff held normal to the line of sight, Problems based on stadia tacheometry. **Tangential method** - Tangential method of tacheometry, Problems based on tangential method,Disadvantages of tangential method of tacheometry. **Circular curves**- Introduction to circular curves, Definitions and notations, Designation of curve, Elements of simple curve. **Setting out of simple curves** - Setting out simple curves, Linear methods of setting out, By ordinates from the long chord, By successive bisection of arcs or chords, By offsets from the tangents, By deflection distances, Instrumental methods, Two theodolite method, Tacheometric method. **Compound and reverse curves**- Elements of compound curves, Setting out compound curve, Elements of a reverse curve. **Total station–** Introduction, Parts of total station, Important operations in total station, Features of total station, Advantages of total station, Disadvantages of total station. **Classification of total station system** - Classification of total station system, Electro optical system, Infrared instruments, Geodimeters, Wild tachymat, Microwave system, Microwave instrument, Tellurometer. **Global positioning system**- Introduction to GPS, Details of GPS segment, Space segment, Control segments, Types of control segments, User segment, GPS signal structure. **Global information system** - Introduction to GIS, Components of a GIS, Types of geographic information, Layer concept in GIS, Uses and applications of GIS in civil engineering.