Content Product
Detailed syllabus
SURVEYING - I

UNIT I - FUNDAMENTALS AND CHAIN SURVEYING

Introduction to surveying - Surveying, Objectives and purpose of surveying, Primary divisions of surveying, Classification of surveying, Principles of surveying, Plan and map, Scales, Problem, Field work and office work. **Chain surveying** -Method of linear measurement, Introduction to chain surveying, Principle of 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. **Errors in linear measurements and their corrections** - Accuracy and errors, Types of errors, , Accidental errors and mistakes, Errors in chaining, Incorrect length of chain, Tape corrections, Problems. **Obstacles in chaining –** Introduction, Chaining obstructed but vision free, Chaining free but vision obstructed, Both chaining and vision obstructed, Problems. **Traversing –** Traversing, Methods of traversing, Chain traversing, Field work and office work, Plotting of chain, surveying, Conventional signs. **Planimeter -**Introduction to planimeter, Working principle of planimeter, Specifications of electronic planimeter, Function keys of electronic planimeter, Measurement of area using electronic planimeter.

UNIT II - COMPASS SURVEYING

Compass surveying - Introduction to compass surveying, Prismatic compass, Surveyor compass, Difference between surveyor and prismatic compass, Angles and bearings, Designation of bearings, Whole circle and quadrantal bearing, 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, Included angle. **Local attraction and magnetic declination -** Local attraction and their detection, Elimination of local attraction, Problems, Dip of the magnetic needle, Magnetic declination, Problems based on magnetic declination, Chain and compass traversing, Closing error, Balancing the traverse. **Plane table surveying -** Introduction to plane table surveying, Advantages and disadvantages of 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 III - LEVELLING

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, Problems on height of instrument method, Problems on rise and fall method. **Balancing of sights curvature and refraction** -Balancing back sights and fore sights, Balancing sight on a slope, Problems, Balancing of sights curvature, Refraction, Problems on curvature and refraction correction, **Methods of leveling -** 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.

Precise leveling -Introduction to precise leveling, Levelling instrument for precise leveling, Precise levelling staff, Field procedure for precise leveling, Field notes, Daily adjustment of precise level.

UNIT IV - LEVELLING APPLICATIONS

Longitudinal and cross section leveling - Profile leveling, Plotting of the profile leveling, Cross sectioning, Plotting of the cross sections. **Contouring –** Contouring, Characteristics of contour, Methods of contouring, Use of contour, Interpolation of contour. **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, Prismoidal and Trapezoidal formula, The curvature correction, Computation from spot levels, Computation from contours, Problems based on computation of volumes. **Mass haul diagram -** Introduction to mass haul diagram, Terms related to mass haul diagram, Construction and properties of mass haul diagram.

UNIT V - 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, Base of object accessible, Problems related to trigonometrical leveling. **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. **Anallatic lens -** Anallactic lens, Anallactic lens with inclined slight, Advantages and disadvantages of anallactic lens, Anallatic lens with internal focusing telescope, Problem based on anallatic lens. **Movable hair method or subtense method** - Principle of subtense method, Subtense diaphragm, Subtense bar, Problems.