



GOVT. POLYTECHNIC KORAPUT

ACADEMIC SESSION 2020-2021

SEMESTER- 4<sup>th</sup>

BRANCH - CIVIL ENGINEERING

SUBJECT – LAND SURVEY I

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Period	Module/ Number	Topic to be covered
	<b>UNIT-1</b>	<b>INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:</b>
1		Surveying: Definition, Aims and objectives : The importance of surveying in many phases of engineering.
2		Principles of survey(a) Location of a point by measurement from two points of reference (b) working from whole to part ; Plane surveying- Geodetic Surveying- Instrumental surveying
3		Difference between Precision and accuracy of measurements, instruments used for measurement of distance: (a) direct method (b) optical method (c) electromagnetic method
4		Types of tapes : (a) linen or cloth tape (b)glass fibre tape (c)metallic tape (d)steel tape (e)invar tape and Types of chains: (a)metric chain (b)Gunter' chain (c) engineer's chain (d)revenue chain (e)steel band chain
5		Errors and mistakes in linear measurement – classification: mistakes ,systematic error and accidental error, Sources of errors: Instrumental error, Personal error and natural error and remedies
6		Corrections to measured lengths due to-incorrect length, temperature variation
7		Corrections to measured lengths due to- pull, sag, numerical problem applying corrections
	<b>UNIT-2</b>	<b>CHAINING AND CHAIN SURVEYING :</b>
8		Equipment and accessories for chaining : chain or tape, arrows , pegs, ranging rod, offset rod, plasterer's lath and whites , plumb bob
9		Ranging – Purpose, signaling :signal by the surveyor and action by the assistant ,two methods of ranging: direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging
10		Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction
11		Setting perpendicular with chain & tape: (a) To erect a perpendicular to a chain line from a point on it (b) To drop a perpendicular to a chain line from a point outside it , Chaining across different types of obstacles:(a) obstacles to ranging but not chaining (b)obstacle to chaining but not ranging (c)obstacle to both chaining and ranging –Numerical problems on chaining across obstacles
12		Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines
13		Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square , Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying

14		OMR TEST 1
	<b>UNIT-3</b>	<b>ANGULAR MEASUREMENT AND COMPAS SURVEYING :</b>
15		Measurement of angles with chain, tape & compass
16		Compass – Types: (a)prismatic compass (b)surveyor compass, features, parts, merits & demerits, testing & adjustment of compass: (a)temporary adjustment (b)permanent adjustment
17		Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing,
18		suitability of application, numerical problems on conversion of bearings
19		Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing,
20		Numerical problems on computation of interior & exterior angles from bearings.
21		Effects of earth’s magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination
22		Errors in angle measurement with compass – sources & remedies
23		Principles of traversing – open & closed traverse, Methods of traversing
24		Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction
25		Errors in compass surveying – sources & remedies
26		Plotting of traverse – check of closing error in closed & open traverse, Bowditch’s correction, Gales table
	<b>UNIT-4</b>	<b>MAP READING CADASTRAL MAPS &amp; NOMENCLATURE:</b>
27		Study of direction, Scale, Grid Reference and Grid Square
28		OMR TEST 2
29		Cadastral Map Preparation Methodology ,Study of Signs and Symbols
30		Unique identification number of parcel Positions of existing Control Points and its types
31		Adjacent Boundaries and Features , Topology Creation and verification
32		DISCUSSIONS ON CHAPTERS COVEREDS
	<b>UNIT-5</b>	<b>PLANE TABLE SURVEYING :</b>
33		Objectives and principles of plane table surveying
34		use of plane table surveying
35		Instruments & accessories used in plane table surveying :1. The plane table with leveling head having arrangements for (a) leveling (b) rotation about vertical axis and (c)clamping in any required position 2. Alidade for sighting 3. Plumbing fork and plumb bob 4. Spirit level 5. Compass 6. Drawing paper with a rainproof cover
36		CLASS TEST
37		Methods of plane table surveying – (1) Radiation, (2) Intersection ,Methods of plane table surveying – (3) Traversing, (4) Resection.
38		Statements of TWO POINT and THREE POINT PROBLEM. Errors in plane table surveying and their corrections, precautions in plane table surveying.

39		DISCUSSIONS ON CHAPTERS COVERED
	<b>UNIT-6</b>	<b>THEODOLITE SURVEYING AND TRAVERSING:</b>
40		Purpose and definition of theodolite surveying
41		Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite
42		DISCUSSION ON CLASS TEST QUESTIONS AND DISTRIBUTION OF EVALUATED ANSWER SHEETS
43		concept of vernier, reading a vernier, Temporary adjustment of theodolite ,Concept of transiting –Measurement of horizontal and vertical angles
44		Measurement of magnetic bearings, deflection angle, direct angle, setting out angles
45		prolonging a straight line with theodolite, Errors in Theodolite observations
46		Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method
47		Plotting the traverse by coordinate method, Checks for open and closed traverse.
48		Traverse computation – consecutive coordinates, latitude and departure, Gale’s traverse table
49		Numerical problems on omitted measurement of lengths & bearings
50		Closing error – adjustment of angular errors, adjustment of bearings, numerical problems on closing error
51		Balancing of traverse – Bowditch’s method
52		transit method, graphical method, axis method, concept of vernier, reading a vernier, Temporary adjustment of theodolite
53		OMR TEST 3
	<b>UNIT-7</b>	<b>LEVELLING AND CONTOURING :</b>
54		Definition and Purpose and types of leveling– concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.
55		Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis.
56		Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.
57		Field data entry – level Book – height of collimation method and Rise & Fall method, comparison
58		Numerical problems on reduction of levels applying both methods, Arithmetic checks
59		Effects of curvature and refraction, numerical problems on application of correction.
60		Reciprocal leveling – principles, methods, numerical problems, precise leveling
62		Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels
63		Definitions, concepts and characteristics of contours
64		Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets
65		Use of contour maps on civil engineering projects – drawing crosssections from contour maps,

66		locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure
67		OMR TEST 4
68		Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.),
69		Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making
	<b>UNIT-8</b>	<b>COMPUTATION OF AREA &amp; VOLUME:</b>
70		Determination of areas computation of areas from plans
71		Calculation of area by using ordinate rule
72		trapezoidal rule
73		Simpson's rule. Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes
74		OMR TEST 5
75		Revision