LESSON PLAN FOR LAND SURVEYING-I

Discipline: Civil Engineering	Semester :4TH	Name of the Teaching Faculty: SUBRAT KUMAR PANIGRAHI
Subject - LAND SURVEYING-I	Numbers of classes per week:5	Semester from date: 04.02.2025 to date:17.05.2025 No. of weeks: 15 Session: 2024-25 (SUMMER)
week	Class day	Theory
1st		INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:
	1	1.1 Surveying: Definition, Aims and objectives
	2	1.2 Principles of survey-Plane surveying- Geodetic Surveying-Instrumental surveying.
	3	1.3 Precision and accuracy of measurements, instruments used for measurement of distance, Types of tapes and chains
	4	1.4 Errors and mistakes in linear measurement – classification, Sources of errors and remedies.
	5	1.5 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.
2nd	6	2.1 Equipment and accessories for chaining
	7	2.2 Ranging – Purpose, signaling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging.
	8	2.3 Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction.
	9	2.4 Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles.
	10	2.5 Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines.
3rd	11	2.7 Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square.
	12	2.8 Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.
	13	3.1 Measurement of angles with chain, tape & compass
	14	3.2 Compass – Types, features, parts, merits & demerits, testing & adjustment of compass
	15	3.3 Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing
4th	16	Reduced bearing, suitability of application, numerical problems on conversion of bearings
	17	Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing
	18	Numerical problems on computation of interior & exterior angles from bearings.
	19	Effects of earth's magnetism – dip of needle, magnetic declination,

		variation in declination
	20	, numerical problems on application of correction for declination.
5th	21	Errors in angle measurement with compass – sources & remedies.
	22	3.7 Principles of traversing – open & closed traverse, Methods of traversing.
	23	3.8 Local attraction – causes, detection, errors, corrections,
	24	Numerical problems of application of correction due to local attraction.
	25	3.9 Errors in compass surveying – sources & remedies.
6th	26	Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table
	27	4.1 Study of direction, Scale, Grid Reference and Grid Square
	28	Study of Signs and Symbols
	29	4.2 Cadastral Map Preparation Methodology
	30	4.3 Unique identification number of parcel
7th	31	4.4 Positions of existing Control Points and its types
	32	4.5 Adjacent Boundaries and Features, Topology Creation and verification.
	33	4.5 Adjacent Boundaries and Features, Topology Creation and verification.
	34	5.1 Objectives, principles and use of plane table surveying.
	35	5.2 Instruments & accessories used in plane table surveying.
8th	36	5.3 Methods of plane table surveying – (1) Radiation, (2) Intersection
	37	(3) Traversing, (4) Resection.
	38	5.4 Statements of TWO POINT and THREE POINT PROBLEM
	39	Errors in plane table surveying and their corrections, precautions in plane table surveying.
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9th	41	6.1 Purpose and definition of theodolite surveying
	42	6.2 Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite, concept of vernier,
	43	reading a vernier, Temporary adjustment of theodolite
	44	6.3 Concept of transiting –Measurement of horizontal and vertical angles.
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10th	46	6.4 Measurement of magnetic bearings, deflection angle, direct angle, setting out angles,
	47	prolonging a straight line with theodolite, Errors in Theodolite observations.
	48	6.5 Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method,
	49	Plotting the traverse by coordinate method, Checks for open and closed traverse.
	50	6.6 Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table
11th	51	Numerical problems on omitted measurement of lengths & bearings
	52	6.7 Closing error – adjustment of angular errors, adjustment of bearings, numerical problems
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		bearings, numerical problems
	54	6.8 Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse
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12th	56	7.1 Definition and Purpose and types of leveling– concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.
	57	7.2 Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis.
	58	7.3 Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.
	59	7.4 Field data entry – level Book – height of collimation method and Rise & Fall method, comparison,
	60	Numerical problems on reduction of levels applying both methods, Arithmetic checks.
13th	61	7.5 Effects of curvature and refraction, numerical problems on application of correction.
	62	7.6 Reciprocal leveling – principles, methods, numerical problems, precise leveling.
	63	7.7 Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.
	64	7.8 Definitions, concepts and characteristics of contours.
	65	7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.
14th	66	7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.
	67	7.10 Use of contour maps on civil engineering projects – drawing cross-sections from contour maps, locating proposal routes of roads / railway / canal on a contour map,
	68	computation of volume of earthwork from contour map for simple structure.
	69	7.11 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.),
	70	Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making
15th	71	8.1 Determination of areas, computation of areas from plans.
	72	8.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule.
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	74	8.3 Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes.
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3/2/25 3/2/25

Lecturer HOD (Civil) Academic Co-ordinator Principal

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