GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF CIVIL ENGINEERING

LESSION PLAN

SESSION 2023-24

SUBJECT: LAND SURVEYING-1	BRANCH: CIVIL ENGINEERING
NAME OF THE FACULTY: PIUS RANJAN TANDI	SEMESTER: 4TH

SL NO.	CHAPTER	HOURS	LECTURE NO.	TOPIC TO BE COVERED
1	CHAPTER 01	07		INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS
			1	Definition, Aims and objectives
			2	Principles of survey, Plane surveying, Geodetic Surveying, Instrumental surveying
			3	Precision, accuracy of measurements, instruments used for measurement of distance, Types of tapes and chains.
			4	Precision, accuracy of measurements, instruments used for measurement of distance, Types of tapes and chains.
			5	Errors and mistakes in linear measurement – classification, Sources of errors and remedies
			6	Corrections to measured lengths due to-incorrect length, temperature variation
			7	pull, sag, numerical problem applying corrections
2	CHAPTER 02	07		CHAINING AND CHAIN SURVEYING
			1	Equipment and accessories for chaining
			2	Ranging, Purpose, signalling, direct, Indirect ranging, Line ranger, features and use, error due to incorrect ranging
			3	Methods of chaining, Chaining on flat ground, Chaining on sloping ground, stepping method, Clinometer-features and use, slope correction
			4	Setting perpendicular with chain & tape, Chaining across different types of obstacles, Numerical problems on chaining across obstacles
			5	Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines.
			6	Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square
			7	Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying
3	CHAPTER 03	12		ANGULAR MEASUREMENT AND COMPAS SURVEYING
			1	Measurement of angles with chain, tape & compass
			2	Compass, Types, features, parts, merits & demerits, testing, adjustment of compass
			3	Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing

			4	Quadrantal bearing, Reduced bearing, suitability of application, numerical problems on conversion of bearings
			5	numerical problems on conversion of bearings
			6	Use of compasses, setting in field-cantering, levelling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings
			7	Effects of earth's magnetism, dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination
			8	Errors in angle measurement with compass – sources & remedies
			9	Principles of traversing, open & closed traverse, Methods of traversing
			10	Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction.
			11	Errors in compass surveying – sources & remedies
			12	Plotting of traverse, check of closing error in closed & open traverse, Bowditch's correction, Gales table
4	CHAPTER 04	07		MAP READING CADASTRAL MAPS & NOMENCLATURE
			1	Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols
			2	Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols
			3	Cadastral Map Preparation Methodology
			4	Unique identification number of parcel
			5	Positions of existing Control Points and its types
			6	Adjacent Boundaries and Features
			7	Topology Creation and verification
5	CHAPTER 05	07		PLANE TABLE SURVEYING
			1	Objectives, principles and use of plane table surveying
			2	Instruments & accessories used in plane table surveying
			3	Methods of plane table surveying
			4	Radiation, Intersection, Traversing, Resection
			5	Statements of TWO POINT and THREE POINT PROBLEM
			6	Statements of TWO POINT and THREE POINT PROBLEM
			7	Errors in plane table surveying and their corrections, precautions in plane table surveying

6	CHAPTER 06	15		THEODOLITE SURVEYING AND TRAVERSING
			1	Purpose and definition of theodolite surveying
			2	Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite
			3	concept of vernier, reading a vernier, Temporary adjustment of theodolite
			4	Concept of transiting, Measurement of horizontal and vertical angles
			5	Measurement of magnetic bearings, deflection angle, direct angle
			6	setting out angles, prolonging a straight line with theodolite, Errors in Theodolite observations
			7	Methods of theodolite traversing with, inclined angle method, deflection angle method
			8	bearing method, Plotting the traverse by coordinate method, Checks for open and closed traverse
			9	Traverse computation, consecutive coordinates, latitude and departure
			10	Gale's traverse table, Numerical problems on omitted measurement of lengths & bearings
			11	Closing error, adjustment of angular errors, adjustment of bearings, numerical problems
			12	Closing error, adjustment of angular errors, adjustment of bearings, numerical problems
			13	Closing error – adjustment of angular errors, adjustment of bearings, numerical problems
			14	Balancing of traverse, Bowditch's method, transit method, graphical method
			15	axis method, calculation of area of closed traverse
7	CHAPTER 07	15		LEVELLING AND CONTOURING
			1	Definition and Purpose and types of levelling, concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.
			2	Instruments used for levelling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis
			3	Levelling staff, Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI
			4	Field data entry, level Book, height of collimation method and Rise & Fall method, comparison
			5	Numerical problems on reduction of levels applying both methods, Arithmetic checks
			6	Numerical problems on reduction of levels applying both methods, Arithmetic checks
			7	Effects of curvature and refraction, numerical problems on application of correction
			8	numerical problems on application of correction
			9	Reciprocal levelling, principles, methods, numerical problems, precise levelling
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			11	Errors in levelling and precautions, Permanent and temporary adjustments of different types of levels
			12	Definitions, concepts and characteristics of contours
			13	Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets
			14	contour maps, drawing cross sections contour maps, locating routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map
			15	Map Interpretation, Interpret Human Economic Activities, Interpret Physical landform, Problem Solving and Decision Making

8	CHAPTER 08	05		COMPUTATION OF AREA & VOLUME
			1	Determination of areas, computation of areas from plans
			2	Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule
			3	Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule
			4	Calculation of volumes by prismoid formula, trapezoidal formula, Prismoid corrections, curvature correction for volumes.
			5	Calculation of volumes by prismoid formula, trapezoidal formula, Prismoid corrections, curvature correction for volumes.