

**Academic lesson plan for 4Thsemester civil engg. (summer 2022)**

Name of teaching faculty: Chinmaya Maharana

Discipline/Deptt: Civil Engineering

Semester: 4<sup>th</sup>

Subject (Theory): Land Surveying – I

No. of periods per week: 5

Total Periods: 75

End semester Exam: 80

Class test: 20

Total marks: 100

Week	Period	Unit/Chapter	Topics to be covered
1 <sup>st</sup>	1 <sup>st</sup>	1.1	INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS: Surveying: Definition, Aims and objectives
	2 <sup>nd</sup>	1.2	Principles of survey-Plane surveying- Geodetic Surveying- Instrumental surveying.
	3 <sup>rd</sup>	1.3	Precision and accuracy of measurements, instruments used for measurement of distance
	4 <sup>th</sup>	1.3	Types of tapes and chains
	5 <sup>th</sup>	1.4	Errors and mistakes in linear measurement – classification
2 <sup>nd</sup>	1 <sup>st</sup>	1.4	Sources of errors and remedies.
	2 <sup>nd</sup>	1.5	Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag
	3 <sup>rd</sup>	1.5	numerical problem applying corrections
	4 <sup>th</sup>	2.1	CHAINING AND CHAIN SURVEYING : Equipment and accessories for chaining
	5 <sup>th</sup>	2.2	Ranging – Purpose, signalling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging
3 <sup>rd</sup>	1 <sup>st</sup>	2.3	Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction
	2 <sup>nd</sup>	2.4	Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles
	3 <sup>rd</sup>	2.5	Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines
	4 <sup>th</sup>	2.7	Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square.
	5 <sup>th</sup>	2.8	Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.
4 <sup>th</sup>	1 <sup>st</sup>	3.1	ANGULAR MEASUREMENT AND COMPAS SURVEYING : Measurement of angles with chain, tape & compass
	2 <sup>nd</sup>	3.2	Compass – Types, features, parts, merits & demerits, testing & adjustment of compass
	3 <sup>rd</sup>	3.3	Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application
	4 <sup>th</sup>	3.3	numerical problems on conversion of bearings
	5 <sup>th</sup>	3.4	Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing
5 <sup>th</sup>	1 <sup>st</sup>	3.4	Numerical problems on computation of interior & exterior angles from bearings.
	2 <sup>nd</sup>	3.5	Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination
	3 <sup>rd</sup>	3.5	Numerical problems on application of correction for declination.
	4 <sup>th</sup>	3.6	Errors in angle measurement with compass – sources & remedies
	5 <sup>th</sup>	3.7	Principles of traversing – open & closed traverse, Methods of traversing.
6 <sup>th</sup>	1 <sup>st</sup>	3.8	Local attraction – causes, detection, errors, corrections

	2 <sup>nd</sup>	3.8	Numerical problems of application of correction due to local attraction.
	3 <sup>rd</sup>	3.9	Errors in compass surveying – sources & remedies
	4 <sup>th</sup>	3.9	Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table
	5 <sup>th</sup>	4.1	MAP READING CADASTRAL MAPS & NOMENCLATURE: Study of direction, Scale, Grid Reference
7 <sup>th</sup>	1 <sup>st</sup>	4.1	Grid Square Study of Signs and Symbols
	2 <sup>nd</sup>	4.2	Cadastral Map Preparation Methodology
	3 <sup>rd</sup>	4.3	Unique identification number of parcel
	4 <sup>th</sup>	4.4	Positions of existing Control Points and its types
	5 <sup>th</sup>	4.5	Adjacent Boundaries and Features, Topology Creation and verification.
8 <sup>th</sup>	1 <sup>st</sup>	5.1	PLANE TABLE SURVEYING : Objectives, principles and use of plane table surveying.
	2 <sup>nd</sup>	5.2	Instruments & accessories used in plane table surveying.
	3 <sup>rd</sup>	5.3	Methods of plane table surveying – (1) Radiation, (2) Intersection
	4 <sup>th</sup>	5.3	(3) Traversing, (4) Resection.
	5 <sup>th</sup>	5.4	Statements of TWO POINT and THREE POINT PROBLEM.
9 <sup>th</sup>	1 <sup>st</sup>	5.4	Errors in plane table surveying and their corrections, precautions in plane table surveying.
	2 <sup>nd</sup>	6.1	THEODOLITE SURVEYING AND TRAVERSING: Purpose and definition of theodolite surveying
	3 <sup>rd</sup>	6.2	Transit theodolite- Description of features, component parts,
	4 <sup>th</sup>	6.2	Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of theodolite
	5 <sup>th</sup>	6.3	Concept of transiting –Measurement of horizontal and vertical angles
10 <sup>th</sup>	1 <sup>st</sup>	6.4	Measurement of magnetic bearings, deflection angle, direct angle, setting out angles
	2 <sup>nd</sup>	6.4	Prolonging a straight line with theodolite, Errors in Theodolite observations.
	3 <sup>rd</sup>	6.5	Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method
	4 <sup>th</sup>	6.5	Plotting the traverse by coordinate method, Checks for open and closed traverse
	5 <sup>th</sup>	6.6	Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table
11 <sup>th</sup>	1 <sup>st</sup>	6.6	Numerical problems on omitted measurement of lengths & bearings
	2 <sup>nd</sup>	6.7	Closing error – adjustment of angular errors, adjustment of bearings
	3 <sup>rd</sup>	6.7	numerical problems
	4 <sup>th</sup>	6.8	Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.
	5 <sup>th</sup>	6.8	NUMERICAL PROBLEM SOLVING
12 <sup>th</sup>	1 <sup>st</sup>	7.1	LEVELLING AND CONTOURING : Definition and Purpose and types of leveling
	2 <sup>nd</sup>	7.1	concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.
	3 <sup>rd</sup>	7.2	Instruments used for leveling
	4 <sup>th</sup>	7.2	concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis
	5 <sup>th</sup>	7.3	Leveling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.
13 <sup>th</sup>	1 <sup>st</sup>	7.4	Field data entry – level Book – height of collimation method and Rise & Fall method, comparison
	2 <sup>nd</sup>	7.4	Numerical problems on reduction of levels applying both methods, Arithmetic checks
	3 <sup>rd</sup>	7.5	Effects of curvature and refraction, numerical problems on application of correction.
	4 <sup>th</sup>	7.6	Reciprocal leveling – principles, methods, numerical problems, precise leveling.
	5 <sup>th</sup>	7.7	Errors in leveling and precautions, Permanent and temporary adjustments of

			different types of levels.
14 <sup>th</sup>	1 <sup>st</sup>	7.8	Definitions, concepts and characteristics of contours
	2 <sup>nd</sup>	7.9	Methods of contouring, plotting contour maps, Interpretation of contour maps, top sheets
	3 <sup>rd</sup>	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
	4 <sup>th</sup>	7.10	Computation of volume of earthwork from contour map for simple structure.
	5 <sup>th</sup>	7.11	Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making
15 <sup>th</sup>	1 <sup>st</sup>	8.1	COMPUTATION OF AREA & VOLUME: Determination of areas, computation of areas from plans.
	2 <sup>nd</sup>	8.2	Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule
	3 <sup>rd</sup>	8.3	Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes.
	4 <sup>th</sup>		PREVIOUS YEAR QUESTIONS PRACTICE
	5 <sup>th</sup>		PREVIOUS YEAR QUESTIONS PRACTICE