



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY  
SERGARH-756060, BALASORE (ODISHA)  
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## LESSON PLAN

**SUBJECT: Th-3 (LAND SURVEY-I)**

### **CHAPTER WISE DISTRIBUTION OF PERIODS**

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Introduction To Surveying, Linear Measurements	8	9
2	Chaining and Chain Surveying	12	14
3	Angular Measurement and Compas Surveying	12	14
4	Map Reading Cadastral Maps & Nomenclature	12	14
5	Plane Table Surveying	8	10
6	Theodolite Surveying and Traversing	8	10
	Total Period:	60	72

Discipline: CIVIL ENGINEERING	Semester: 4th	Name of the Teaching Faculty: Er. LOTAK KUMAR MOHAPATRA	
		SESSION : 2023-24	EXAMINATION : 2024 (S)
Week	Class Day	Topics to be Covered	
1 <sup>st</sup>	1 <sup>st</sup>	1.1 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, Types of tapes and chains	
	4 <sup>th</sup>	1.4 Errors and mistakes in linear measurement – classification, Sources of errors and remedies.	
2 <sup>nd</sup>	1 <sup>st</sup>	1.4 Errors and mistakes in linear measurement – classification, Sources of errors and remedies.	
	2 <sup>nd</sup>	1.5 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.	
	3 <sup>rd</sup>	1.5 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.	
	4 <sup>th</sup>	2.1 Equipment and accessories for chaining 2.2 Ranging – Purpose, signaling, 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>	2.5 Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines.	
4 <sup>th</sup>	1 <sup>st</sup>	2.7 Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square	
	2 <sup>nd</sup>	2.8 Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.	
	3 <sup>rd</sup>	3.1 Measurement of angles with chain, tape & compass	
	4 <sup>th</sup>	3.2 Compass – Types, features, parts, merits & demerits, testing & adjustment of compass	

5 <sup>th</sup>	1 <sup>st</sup>	3.3 Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of
	2 <sup>nd</sup>	3.3 Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of
	3 <sup>rd</sup>	3.4 Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from
	4 <sup>th</sup>	3.4 Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior &
6 <sup>th</sup>	1 <sup>st</sup>	3.5 Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination.
<b>Week</b>	<b>Class Day</b>	<b>Topics to be Covered</b>
6 <sup>th</sup>	2 <sup>nd</sup>	3.6 Errors in angle measurement with compass – sources & remedies.
	3 <sup>rd</sup>	3.7 Principles of traversing – open & closed traverse, Methods of traversing.
	4 <sup>th</sup>	3.8 Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction.
7 <sup>th</sup>	1 <sup>st</sup>	3.9 Errors in compass surveying – sources & remedies. Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table
	2 <sup>nd</sup>	4.1 Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols
	3 <sup>rd</sup>	4.1 Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols
	4 <sup>th</sup>	4.2 Cadastral Map Preparation Methodology
8 <sup>th</sup>	1 <sup>st</sup>	4.3 Unique identification number of parcel
	2 <sup>nd</sup>	4.4 Positions of existing Control Points and its types
	3 <sup>rd</sup>	4.5 Adjacent Boundaries and Features, Topology Creation and verification.
	4 <sup>th</sup>	4.5 Adjacent Boundaries and Features, Topology Creation and verification.
9 <sup>th</sup>	1 <sup>st</sup>	5.1 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, (3) Traversing, (4) Resection
	4 <sup>th</sup>	5.3 Methods of plane table surveying – (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection
10 <sup>th</sup>	1 <sup>st</sup>	5.4 Statements of TWO POINT and THREE POINT PROBLEM. Errors in plane table surveying and their corrections, precautions in plane table surveying.
	2 <sup>nd</sup>	5.4 Statements of TWO POINT and THREE POINT PROBLEM. Errors in plane table surveying and their corrections, precautions in plane table surveying.
	3 <sup>rd</sup>	5.4 Statements of TWO POINT and THREE POINT PROBLEM. Errors in plane table surveying and their corrections, precautions in plane table surveying.
	4 <sup>th</sup>	6.1 Purpose and definition of theodolite surveying

<b>11<sup>th</sup></b>	<b>1<sup>st</sup></b>	6.2 Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of
	<b>2<sup>nd</sup></b>	6.2 Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of theodolite
<b>Week</b>	<b>Class Day</b>	<b>Topics to be Covered</b>
<b>11<sup>th</sup></b>	<b>3<sup>rd</sup></b>	6.3 Concept of transiting –Measurement of horizontal and vertical angles
	<b>4<sup>th</sup></b>	6.4 Measurement of magnetic bearings, deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite, Errors in Theodolite observations.
<b>12<sup>th</sup></b>	<b>1<sup>st</sup></b>	6.4 Measurement of magnetic bearings, deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite, Errors in Theodolite
	<b>2<sup>nd</sup></b>	6.5 Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method, Plotting the traverse by coordinate method, Checks for open and closed
	<b>3<sup>rd</sup></b>	6.5 Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method, Plotting the traverse by coordinate method, Checks for open
	<b>4<sup>th</sup></b>	6.6 Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table, Numerical problems on omitted measurement of lengths & bearings
<b>13<sup>th</sup></b>	<b>1<sup>st</sup></b>	6.6 Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table, Numerical problems on omitted measurement of lengths &
	<b>2<sup>nd</sup></b>	6.7 Closing error – adjustment of angular errors, adjustment of bearings, numerical problems
	<b>3<sup>rd</sup></b>	6.7 Closing error – adjustment of angular errors, adjustment of bearings, numerical problems
	<b>4<sup>th</sup></b>	6.8 Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.
<b>14<sup>th</sup></b>	<b>1<sup>st</sup></b>	6.8 Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.
	<b>2<sup>nd</sup></b>	7.1 Definition and Purpose and types of leveling– concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.
	<b>3<sup>rd</sup></b>	7.2 Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis.
	<b>4<sup>th</sup></b>	7.3 Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.
<b>15<sup>th</sup></b>	<b>1<sup>st</sup></b>	7.4 Field data entry – level Book – height of collimation method and Rise & Fall method, comparison, Numerical problems on reduction of levels applying both methods, Arithmetic
	<b>2<sup>nd</sup></b>	7.5 Effects of curvature and refraction, numerical problems on application of correction.
	<b>3<sup>rd</sup></b>	7.6 Reciprocal leveling – principles, methods, numerical problems, precise leveling.
	<b>4<sup>th</sup></b>	7.7 Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.
<b>16<sup>th</sup></b>	<b>1<sup>st</sup></b>	7.7 Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.
	<b>2<sup>nd</sup></b>	7.8 Definitions, concepts and characteristics of contours
	<b>3<sup>rd</sup></b>	7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.
	<b>4<sup>th</sup></b>	7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.

<b>17<sup>th</sup></b>	<b>1<sup>st</sup></b>	7.10 Use of contour maps on civil engineering projects – drawing crosssections from contour maps, locating proposal routes of roads / railway / canal on a contour map, computation of
<b>Week</b>	<b>Class Day</b>	<b>Topics to be Covered</b>
<b>17<sup>th</sup></b>	<b>2<sup>nd</sup></b>	7.11 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern
	<b>3<sup>rd</sup></b>	7.11 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern
	<b>4<sup>th</sup></b>	8.1 Determination of areas, computation of areas from plans.
<b>18<sup>th</sup></b>	<b>1<sup>st</sup></b>	8.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule
	<b>2<sup>nd</sup></b>	8.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule
	<b>3<sup>rd</sup></b>	8.3 Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes.
	<b>4<sup>th</sup></b>	Revision