

BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK
DEPARTMENT OF CIVIL ENGINEERING



LESSON PLAN

SUBJECT: SURVEYING (TH-1)

ACCADEMIC SESSION: 2026-27

FACULTY: MR TAPAS KUMAR MALLICK, LECTURER(STAGE-II)

SEMESTER: 5TH

SEC: B

Sd/-

H O D (Civil Engg.)

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COURSE OUTCOMES

- CO1:** EXPLAIN THE PRINCIPLES, CLASSIFICATIONS, SCALES, AND APPLICATIONS OF SURVEYING AND SELECT SUITABLE SURVEY METHODS FOR ENGINEERING WORKS.
- CO2:-** PERFORM CHAIN AND COMPASS SURVEYING TO MEASURE DISTANCES, DETERMINE BEARINGS, RECORD FIELD DATA, AND PREPARE SURVEY PLANS WITH NECESSARY CORRECTIONS.
- CO3:-** CONDUCT LEVELLING AND CONTOURING OPERATIONS, DETERMINE REDUCED LEVELS, AND COMPUTE AREAS AND VOLUMES USING CONVENTIONAL AND DIGITAL METHODS.
- CO4:-** APPLY THEODOLITE AND TACHEOMETRIC SURVEYING TECHNIQUES FOR TRAVERSE COMPUTATION, ANGLE MEASUREMENT, DISTANCE DETERMINATION, AND CURVE SETTING IN ENGINEERING PROJECTS.
- CO5:-** USE MODERN SURVEYING TECHNOLOGIES INCLUDING EDM, TOTAL STATION, GPS/DGPS, REMOTE SENSING, GIS, AND DRONE SURVEYING FOR ACCURATE DATA ACQUISITION AND MAPPING.

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Discipline: Civil Engineering	Semester: 5th B	Name of the teaching faculty: Mr Tapas Kumar Mallick
Subject: Surveying	No. of Days/ per week class allotted: 03 periods per week.	Semester From Date: 01-07-2026 To Date: 05-11-2026 No. of weeks: 19 weeks
Week	Class Day	Theory Topics
1 st	1st	Unit-I: Overview and Classification of Survey – Purpose and Uses of Surveying.
	2nd	Types of Surveying – Primary and Secondary Survey
	3rd	Classification of Surveys.
2 nd	1st	Principles of Surveying,
	2nd	Scales – Engineer's Scale, RF and Diagonal Scale.
	3rd	Unit-II: Chain Surveying – Instruments used in Chain Survey.
3 rd	1st	Chain Survey Terminology – Base Line, Tie Line, Check Line, Offset and Stations.
	2nd	Direct and Indirect Ranging, Methods of Chaining and Obstacles in Chaining.
	3rd	Errors in Length Measurement – Instrumental, Personal and Natural Errors.
4 th	1st	Types of Offsets – Perpendicular and Oblique Offsets. Conventional Signs and Recording Measurements in Field Book.
	2nd	Unit-III: Compass Traverse Survey – Open and Closed Traverse. Meridians and Bearings, WCB and RB Systems, Conversion of Bearings.
	3rd	Fore Bearing, Back Bearing, Internal and External Angles. Types of Compass – Prismatic and Surveyor's Compass.

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5 th	1st	Components and Temporary Adjustments of Prismatic Compass.
	2nd	Local Attraction and Correction of Bearings.
	3rd	Methods of Plotting Traverse and Graphical Adjustment of Closing Error.
6 th	1st	Unit-IV: Levelling and Contouring – Basic Terminologies in Levelling. Types of Levels and Components of Dumpy Level.
	2nd	Types of Levelling Staff and Temporary Adjustments of Level.
	3rd	Reduction of Levels by Height of Instrument Method. Reduction of Levels by Rise and Fall Method.
7 th	1st	Types of Levelling – Simple, Differential, Fly, Profile and Reciprocal Levelling.
	2nd	Contours, Contour Interval and Horizontal Equivalent. Characteristics and Uses of Contour Maps.
	3rd	Class Test – I
8 th	1st	Methods of Contouring – Direct and Indirect Methods.
	2nd	Measurement of Area using Digital Planimeter and Volume from Contour Maps.
	3rd	Unit-V: Theodolite Surveying – Types and Uses of Theodolite.
9 th	1st	Components, Vernier Reading and Technical Terms.
	2nd	Fundamental Axes and Temporary Adjustments of Transit Theodolite.
	3rd	Measurement of Horizontal Angles – Direct and Repetition Methods.
10 th	1st	Measurement of Vertical Angles and Magnetic Bearing of a Line.
	2nd	Internal Assessment – I

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	3rd	
11 th	1st	Theodolite Traversing by Included Angle and Deflection Angle Method.
	2nd	Traverse Computation – Latitude, Departure and Coordinates.
	3rd	Balancing Traverse by Bowditch's Rule and Transit Rule.
12 th	1st	Unit-VI: Tacheometric Surveying and Curve Setting – Principles of Tacheometry and Anallatic Lens.
	2nd	Tacheometric formula for horizontal distance with telescope horizontal and staff vertical.
	3rd	Field method for determining constants of tacheometer, Determining horizontal and vertical distances with tacheometer by fixed hair method and staff held vertical, Limitations of tacheometry.
13 th	1st	Field method for determining constants of tacheometer, Determining horizontal and vertical distances with tacheometer by fixed hair method and staff held vertical, Limitations of tacheometry.
	2nd	Types of curves used in roads and railway alignments. Designation of curves.
	3rd	Setting simple circular curve by offsets from long chord and Rankine's method of deflection angles.
14 th	1st	Setting simple circular curve by offsets from long chord and Rankine's method of deflection angles.
	2nd	Unit-VII: Advanced Surveying Equipment – Principle of Electronic Distance Meter (EDM), its component parts and their Functions, use of EDM.
	3rd	Use of micro optic Theodolite and Electronic Digital Theodolite. .

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15 th	1st	Use of Total Station, Use of function keys.
	2nd	Measurements of Horizontal angles, vertical angles, distances and coordinates using Total Station,
	3rd	Traversing, Profile Survey and Contouring with Total Station.
16 th	1st	Unit-VIII: Remote sensing, GPS and GIS:- Remote Sensing – Overview, Remote sensing system,
	2nd	Applications of remote sensing in Civil engineering, land use / Land cover, mapping, disaster management.
	3rd	Use of Global Positioning System (G.P.S.) instruments, and DGPS
17 th	1st	Geographic Information System (GIS): Over view, Components, Applications, Software for GIS
	2nd	Introduction to Drone Surveying.
	3rd	Class Test – II
18 th	1st	Revision of entire Syllabus
	2nd	Internal Assessment – II
	3rd	Internal Assessment – II
19 th	1st	Previous year Question practice
	2nd	Previous year Question practice
	3rd	Previous year Question practice