

Discipline: CIVIL	Semester: 5TH	Name of Teaching Faculty:- Shri Manoj Ku Beherdalai, Lect. S-II(Civil)
Subject:- SURVEYING	No of Days/ Week Class allotted:- 03	Semester from date: 01.07.2026 to 05.11.2026 No of Weeks: 15
Week	Class/ Day	Theory Topics
1st	1st	UNIT-1: Overview and Classification of Survey Survey- Purpose and Use.
	2nd	Types of surveying- Primary and Secondary, Classification: Plane, Geodetic, Cadastral
	3rd	Types of surveying- Hydrographic, Photo-grammetry and Aerial.
2nd	1st	Principles of Surveying
	2nd	Scales: Engineer' scale, Representative Fraction (RF) and diagonal scale.
	3rd	UNIT-2: Chain Surveying Instruments used in chain survey: Metric Chain, Tapes, Arrow, Ranging rod, Line ranger, Off-set rod, Open cross staff, Optical square.
3rd	1st	Chain survey Station, Base line, Check line, Tie line, Offset, Tie station.
	2nd	Ranging: Direct and Indirect Ranging. Methods of Chaining, obstacles in chaining.
	3rd	Errors in length: Instrumental error, personal error, error due to natural cause, random error.
4th	1st	Types of offsets: Perpendicular and Oblique. Conventional Signs, Recording of measurements in a field book.
	2nd	UNIT-3: Compass Traverse Survey Compass Traversing- open, closed.
	3rd	Geographic/ True Magnetic Meridians and Bearings, Whole Circle Bearing system and Reduced Bearing system and examples on conversion of given bearing to another bearing (from one form to another), Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station, Dip of Magnetic needle, Magnetic Declination.
5th	1st	Types of Compass-prismatic and surveyor compass
	2nd	Components of Prismatic Compass and Surveyor compass and their Functions, Methods of using Prismatic Compass Temporary adjustments and observing bearings.
	3rd	Local attraction, Methods of correction of observed bearings - Correction at station and correction to included angles
6th	1st	Methods of plotting a traverse and closing error, Graphical adjustment of closing error.
	2nd	UNIT-4: Leveling and Contouring Basic terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Bench Marks- GTS, Permanent, Arbitrary and Temporary, Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instruments.
	3rd	Types of levels: Dumpy, Tilting, Auto level, Digital level, Components of Dumpy Level and its fundamental axes, Temporary adjustments of Level.
7th	1st	Types of Leveling Staff: Self-reading staff and Target staff. Reduction of level by Line of collimation and Rise and Fall Method Leveling Types: Simple, Differential, Fly, Profile and Reciprocal Leveling.
	2nd	Contour, contour intervals, horizontal equivalent. Uses of contour maps, Characteristics of contours, Methods of Contouring: Direct and indirect.
	3rd	Measurement of Area and Volume • Components and use of Digital planimeter. • Measurement of area using digital planimeter. • Measurement of volume of reservoir from contour map.

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8th	1st	UNIT-5: Theodolite Surveying • Types and uses of Theodolite, Components of transit Theodolite and their functions, Reading the Vernier of transit Theodolite.
	2nd	Technical terms- Swinging, Transiting, Face left, Face right. • Fundamental axes of transit Theodolite and their relationship • Temporary adjustment of transit Theodolite.
	3rd	Measurement of horizontal angle- Direct and Repetition method, Errors eliminated by method of repetition.
9th	1st	Measurement of magnetic bearing of a line, Prolonging and ranging a line, deflection angle.
	2nd	Measurement of vertical Angle. Theodolite traversing by Included angle method and Deflection angle method.
	3rd	Checks for open and closed traverse, Calculations of bearing from angles.
10th	1st	Traverse computation-Latitude, Departure, Consecutive coordinates, Independent coordinates
	2nd	Balancing the traverse by Bowditch's rule and Transit rule, Gale's Traverse table computation.
	3rd	UNIT-6: Tacheometric surveying and Curve setting Principles of Tacheometry, Anallatic lens.
11th	1st	Tacheometric formula for horizontal distance with telescope horizontal and staff vertical.
	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
12th	1st	Determining horizontal and vertical distances with tacheometer by 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.
13th	1st	UNIT-7: Advanced surveying equipment • Principle of Electronic Distance Meter (EDM), its component parts Functions, use of EDM
	2nd	Use of micro optic Theodolite and Electronic Digital Theodolite.
	3rd	Use of Total Station, Use of function keys
14th	1st	Measurements of Horizontal angles, vertical angles, distances and coordinates using Total Station. Traversing, Profile Survey and Contouring with Total Station
	2nd	UNIT-8: Remote sensing, GPS and GIS • Remote Sensing – Overview, Remote sensing system, Applications of remote sensing in Civil engineering, land use / Land cover, mapping, disaster management.
	3rd	Use of Global Positioning System(G.P.S.) instruments
15th	1st	DGPS
	2nd	Geographic Information System (GIS): Over view, Components, Applications, Software for GIS.
	3rd	Introduction to Drone Surveying.

B. Manoj
28/6/26