

GOVERNMENT POLYTECHNIC JAJPUR

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DEPARTMENT OF CIVIL ENGINEERING LESSON PLAN

Discipline: Civil Engg.	Semester: 5th	Name of the Teaching faculty: ER.SHIBASIS PANDA
Subject: SURVEYING G TH - 1	No of Days/Week class allotted: 3	Semester from Date: 01.07.2026 Date: 05.11.2026 No of weeks: 16
Week	Class Day	Topics
1st	1st	Survey- Purpose and Use.
	2nd	Types of surveying- Primary and Secondary, Classification: Plane
	3rd	Geodetic, Cadastral, Hydrographic
2nd	1st	Photogrammetry and Aerial & Principles of Surveying.
	2nd	Scales: Engineer's scale, Representative Fraction (RF) and diagonal scale.
	3rd	Instruments used in chain survey: Metric Chain, Tapes, Arrow, Ranging rod
3rd	1st	Line ranger, Off-set rod, Open cross staff, Optical square
	2nd	Chain survey Station, Base line, Check line, Tie line, Offset, Tie station
	3rd	Ranging: Direct and Indirect Ranging & Methods of Chaining, obstacles in chaining.
4th	1st	Errors in length: Instrumental error, personal error, error due to natural cause, random error. Types of offsets: Perpendicular and Oblique. Conventional Signs, Recording of measurements in a field book.
	2nd	Compass Traversing- open, closed.
	3rd	Technical Terms: 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)
5th	1st	Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station, Dip of Magnetic needle, Magnetic Declination.
	2nd	Types of Compass-prismatic and surveyor compass 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. Methods of plotting a traverse and closing error, Graphical adjustment of closing error
6th	1st	Basic terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Bench Marks- GTS, Permanent, Arbitrary and Temporary, Reduced Level
	2nd	Rise, Fall, Line of collimation, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instruments. Types of levels: Dumpy, Tilting, Auto level, Digital level, Components of Dumpy Level and its fundamental axes, Temporary adjustments of Level
	3rd	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.
7th	1st	Contour, contour intervals, horizontal equivalent. Uses of contour maps, Characteristics of contours, Methods of Contouring: Direct and indirect
	2nd	Components and use of Digital planimeter. Measurement of area using

8th	1st	Temporary adjustment of transit Theodolite.
	2nd	Measurement of horizontal angle- Direct and Repetition method, Errors eliminated by method of repetition
	3rd	Measurement of magnetic bearing of a line, Prolonging and ranging a line, deflection angle.
9th	1st	Measurement of vertical Angle. Theodolite traversing by Included angle
	2nd	Theodolite traversing by Deflection angle method. Checks for open and closed traverse, Calculations of bearing from angles.
	3rd	Traverse computation-Latitude, Departure, Consecutive coordinates, Independent coordinates,
10th	1st	Balancing the traverse by Bowditch's rule and Transit rule, Gale's Traverse table computation. (Simple numerical problems and concept only)
	2nd	Principles of Tacheometry, Anallatic lens. Tacheometric formula for horizontal distance with telescope horizontal and staff vertical.
	3rd	Field method for determining constants of tacheometer
11th	1st	Determining horizontal and vertical distances with tacheometer by fixed hair method
	2nd	Determining horizontal and vertical distances with tacheometer by staff held vertical, Limitations of tacheometry.
	3rd	Types of curves used in roads and railway alignments.
12th	1st	Designation of curves by offset from long chord method
	2nd	Setting simple circular curve Rankine's method of deflection angles
	3rd	Principle of Electronic Distance Meter (EDM), its component parts and their Functions, use of EDM.
13th	1st	Use of micro optic Theodolite and Electronic Digital Theodolite
	2nd	Use of Total Station, Use of function keys.
	3rd	Measurements of Horizontal angles, vertical angles
14th	1st	Measurement of distances and coordinates using Total Station, Traversing, Profile Survey and Contouring with Total Station
	2nd	Remote Sensing – Overview, Remote sensing system, Applications of remote sensing in Civil engineering,
	3rd	Land use / Land cover, mapping, disaster management
15th	1st	Use of Global Positioning System (G.P.S.) instruments, and DGPS
	2nd	Geographic Information System (GIS): Over view, Components, Applications, Software for GIS.
	3rd	Introduction to Drone Surveying.
16th	1st	Introduction to Drone Surveying ,,drone technology Drone survey report
	2nd	. Previous year question paper discussion
	3rd	Previous year question paper discussion

Learning Resources:

Sl No.	Author Name	Name of the Book
1	N.N. BASAK	Surveying and Levelling
2	B.C PUNIMA	Surveying Vol. I and Surveying Vol. II,
3	Kanetkar, T. P.; Kulkarni,	Surveying and Levelling Part I and II,

ER.SHIBASIS PANDA
FACULTY SIGNATURE