



(20A01303P) Surveying Lab

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► **PREPARED BY**

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COURSE OUTCOMES

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CO	CO STATEMENT (After the completion of course the student will be able to)	TAXONAMY
C218.1	Determine the angles and distances between the two accessible & inaccessible points by using trigonometrical surveying	Apply
C218.2	Apply the procedures in Traverse Surveying, Levelling & Plane Table Surveying	Apply
C218.3	Align different types of curves	Apply
C218.4	Carry out the setting works for buildings and pipe lines	Apply
C218.5	Conduct the accurate surveying by using the modern instruments	Evaluate



Experiments List as per affiliated University

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List of Experiments:

1. Setting up of Right angles using cross staff
2. Plane table survey; finding the area of a given boundary
3. Two Point Problem by the plane table survey.
4. Fly levelling: Height of the instrument method and rise and fall method.
5. Fly levelling; Longitudinal Section and Cross sections of a given road profile.
6. Theodolite Survey: Determining the Horizontal and Vertical Angles
7. Finding the distance between two inaccessible points using Theodolite
8. Tachometric survey: Heights and distance problems using tachometric principles.
9. One Exercise on Curve setting.
10. Developing a Contour map



List with Additional Experiments

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List of Experiments:

1. Setting up of Right angles using cross staff
2. Plane table survey; finding the area of a given boundary
3. Two Point Problem by the plane table survey
4. Fly levelling: Height of the instrument method and rise and fall method
5. Fly levelling; Longitudinal Section and Cross sections of a given road profile
6. Theodolite Survey: Determining the Horizontal and Vertical Angles
12. Finding the distance between two inaccessible points using Theodolite
13. Tachometric survey: Heights and distance problems using tachometric principles
14. One Exercise on Curve setting

List of Additional Experiments:

1. Traversing Using Total Station
2. Area of Measurements by using Compass



Introduction to Surveying Lab

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Surveying Lab offers additional experience in fundamental land surveying measurement methods for surveying courses, including precision steel taping methods to perform horizontal measurements, digital theodolites to perform angular measurements and traditional and automatic levels for elevation measurements.

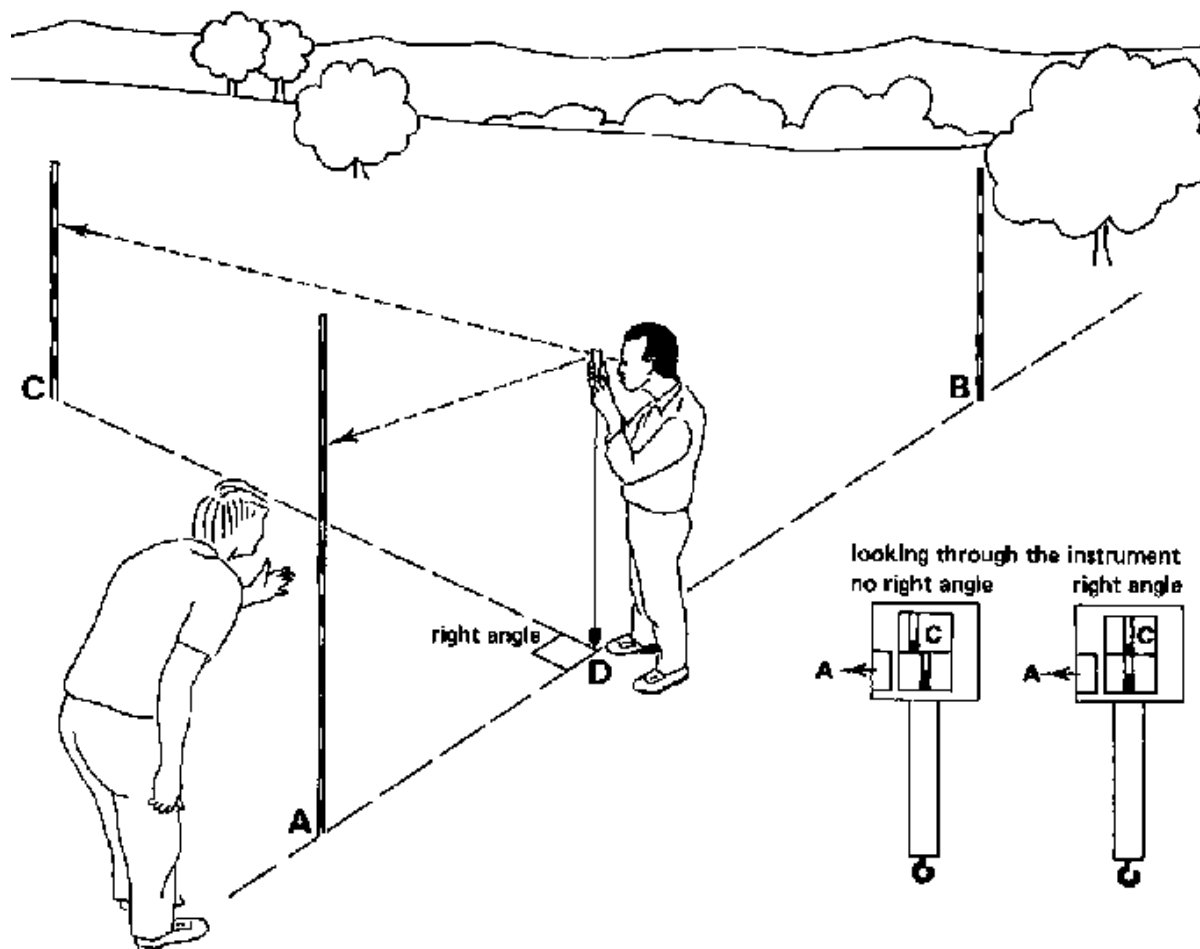
Furthermore, students have opportunity to use total station equipment, which enables horizontal, vertical and angular measurements to be made in one operation.



Course Objectives

- ✓ To determine the relative position of any objects or points of the earth.
- ✓ To determine the distance and angle between different objects.
- ✓ To prepare a map or plan to represent an area on a horizontal plan.
- ✓ To develop methods through the knowledge of modern science and the technology and use them in the field.
- ✓ To solve measurement problems in an optimal way.

Setting up of Right angles using cross staff



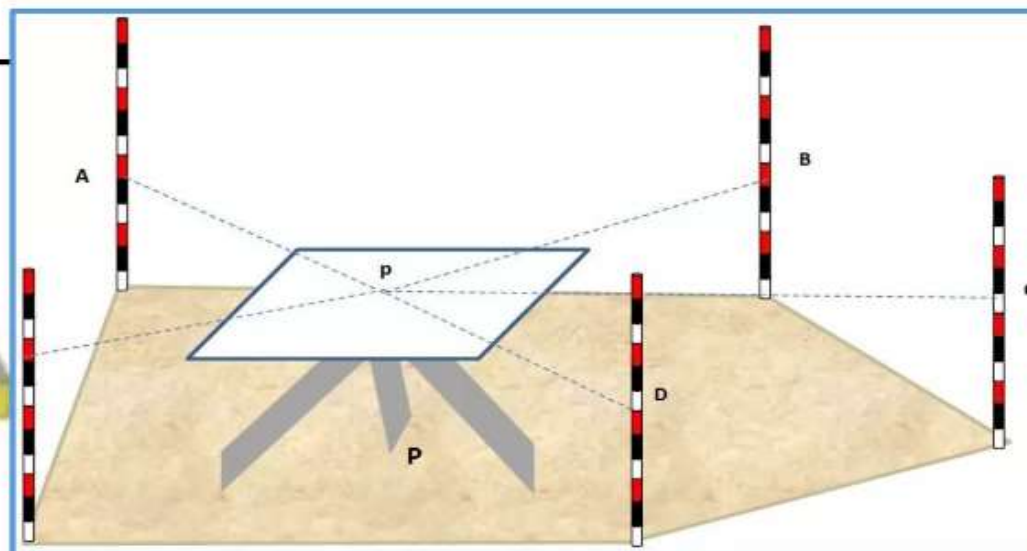


Plane table survey; finding the area of a given boundary

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PLANE TABLE SURVEY

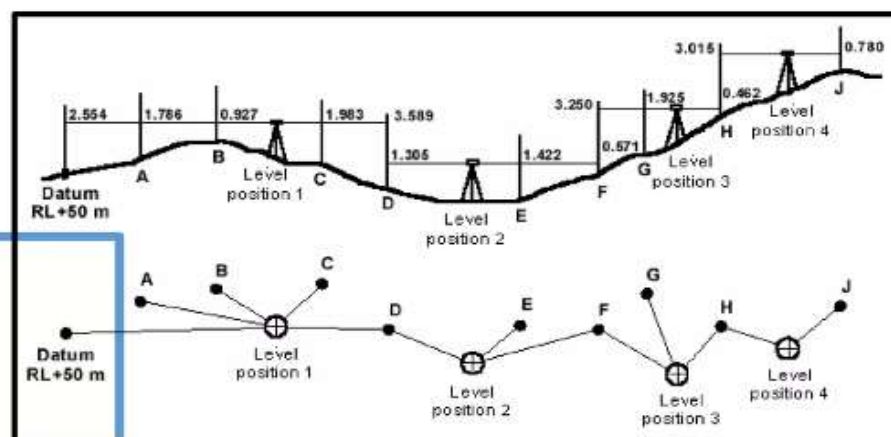
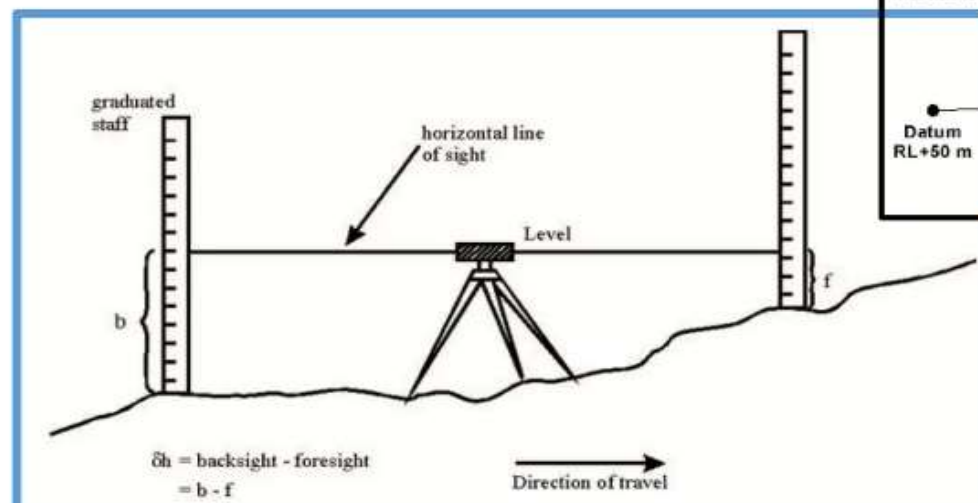
- It's a graphical method of surveying in which field works and plotting both are done simultaneously.



Fly Levelling

LEVELLING SURVEY

- The type of survey is used to determine the vertical distances (elevation) and relative heights of points with the help of an instrument known as level.



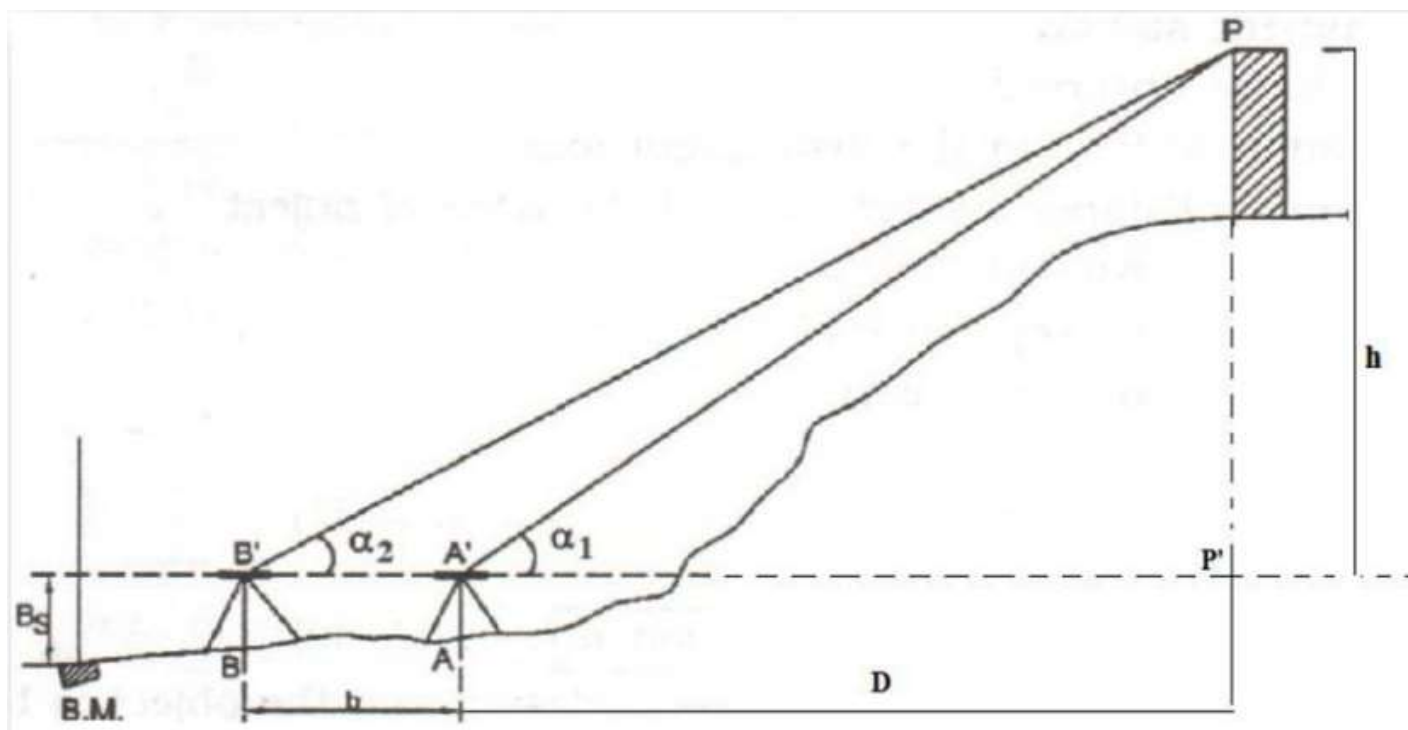
Theodolite Survey

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THEODOLITE SURVEY

- THEODOLITE Is a precision instrument for measuring angles in the horizontal and vertical planes.



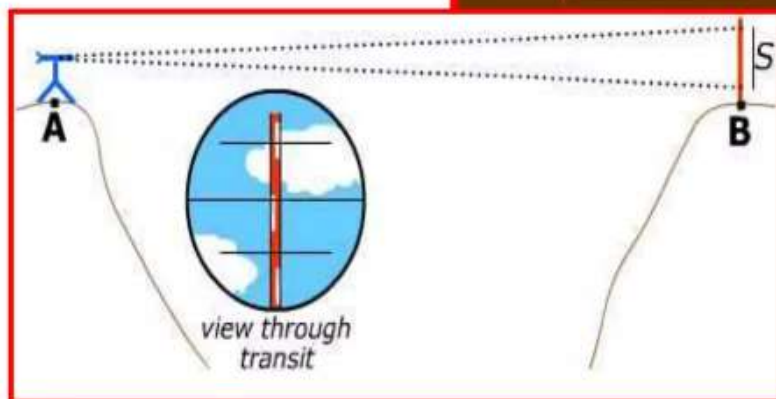
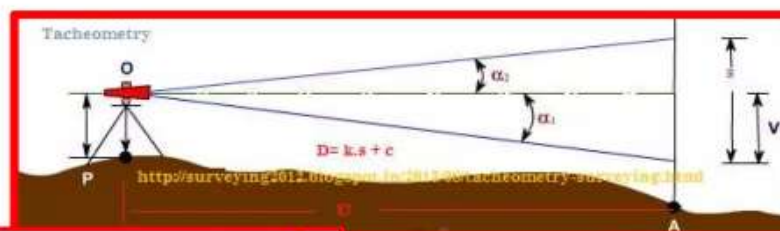


Tacheometric Survey

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TACHEOMETRIC SURVEY

- is a system of rapid surveying, by which the positions, both horizontal and vertical, of points on the earth surface relatively to one another are determined without using a chain or tape or a separate leveling instrument.



Curves

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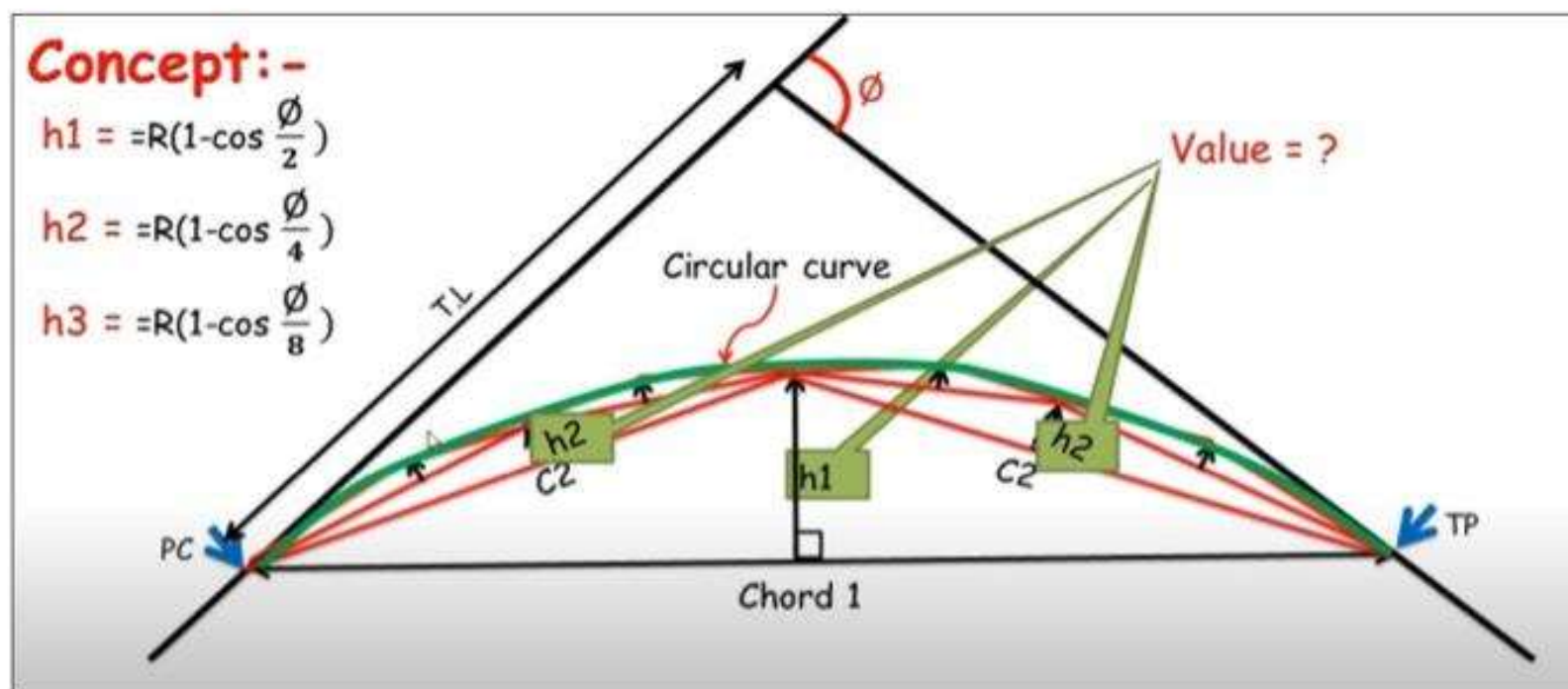
Guide to Computation

Concept: -

$$h1 = R(1 - \cos \frac{\phi}{2})$$

$$h2 = R(1 - \cos \frac{\phi}{4})$$

$$h3 = R(1 - \cos \frac{\phi}{8})$$



Total Station

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Total Station

It is an **electronic transit theodolite** with an **electronic distance meter (EDM)**.

The **crosshairs** on the **reflector** of **TS** are **aligned** to the **ranging** rod and the **vertical** and **horizontal** angles are **measured** along with **slope distances** **simultaneously**.

It is used to take the measurement of-

1. **Horizontal angles:** The **rotation** of the optical **axis** of TS from the **instrument** north in a **horizontal plane** gives the horizontal angle.
2. **Vertical angle:** The **inclination** of the optical axis of **TS** from the local **vertical** gives a **vertical angle**.
3. **Slope distance:** The distance between **TS** and **target** gives the **slope distance**.

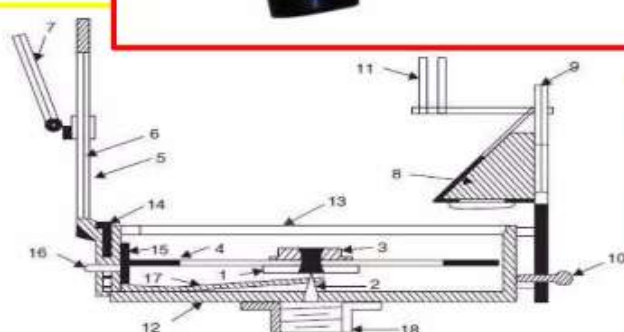


Compass Surveying

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COMPASS SURVEY

□ The angles are measured with the help of a magnetic compass.



1. Needle
2. Pivot
3. Agate cap
4. Graduated disc
5. Slit metal frame
6. Horse hair
7. Mirror
8. Reflecting prism with cap

10. Focussing stud
11. Dark sunglasses
12. Box
13. Glass cover
14. Lifting pin
15. Light spring
16. Brake pin or knob
17. Lifting lever





Major Equipments List

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S. No.	Equipment	Quantity	Cost / unit (RS)	Total cost in RS
1.	Dumpy Level	2	6000	12000
2.	Leveling Staff - 4m (Al)	10	1000	10000
3.	Auto Level	5	10600	53000
4.	Survey Chain - 30m with arrows	10	1000	10000
5.	Prismatic Compass - 5"	6	1750	10500
6.	Plane table with all accessories	6	3500	21000
7.	Pentax Total Station	1	290000	290000
8.	Vernier Theodolite	3	19300	57900
9.	Prismatic Compass - 5"	6	1750	10500
10.	Vernier Theodolite	3	19000	57000
	Total			531900



Do's and Don'ts

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DO s:

- ✓ Maintain proper dress code and discipline in the lab.
- ✓ Clean all the equipment after completion of experiment.
- ✓ Learn the lab procedure and know all equipment to be operated before starting of the experiment.
- ✓ Handle the equipment with care.
- ✓ Every student should wear a white cap and should have a water bottle while working in the field.
- ✓ Do accurate centering, levelling, focusing while operating surveying equipment.
- ✓ Take the measurements with most accuracy.
- ✓ Pack the equipments in respective boxes after completion of experiments.
- ✓ Fold the chain and tape properly as per the guidance of lab in charge.

DON'T s:

- ✓ Never operate the equipment on your own.
- ✓ Never wear any ornaments while working in the field.
- ✓ Never take any equipment to the field without permission of lab in charge.
- ✓ Never misuse the equipment.



Safety Measures in the Laboratory

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Fire Extinguishers



First Aid Box



Miniature Circuit Breaker's (MCB's).



CC Camera surveillance