



# **SNS COLLEGE OF TECHNOLOGY**

**An Autonomous Institution  
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A+ Grade  
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

## **DEPARTMENT OF AGRICULTURE ENGINEERING**

**19AGT201 – SURVEYING AND LEVELING**

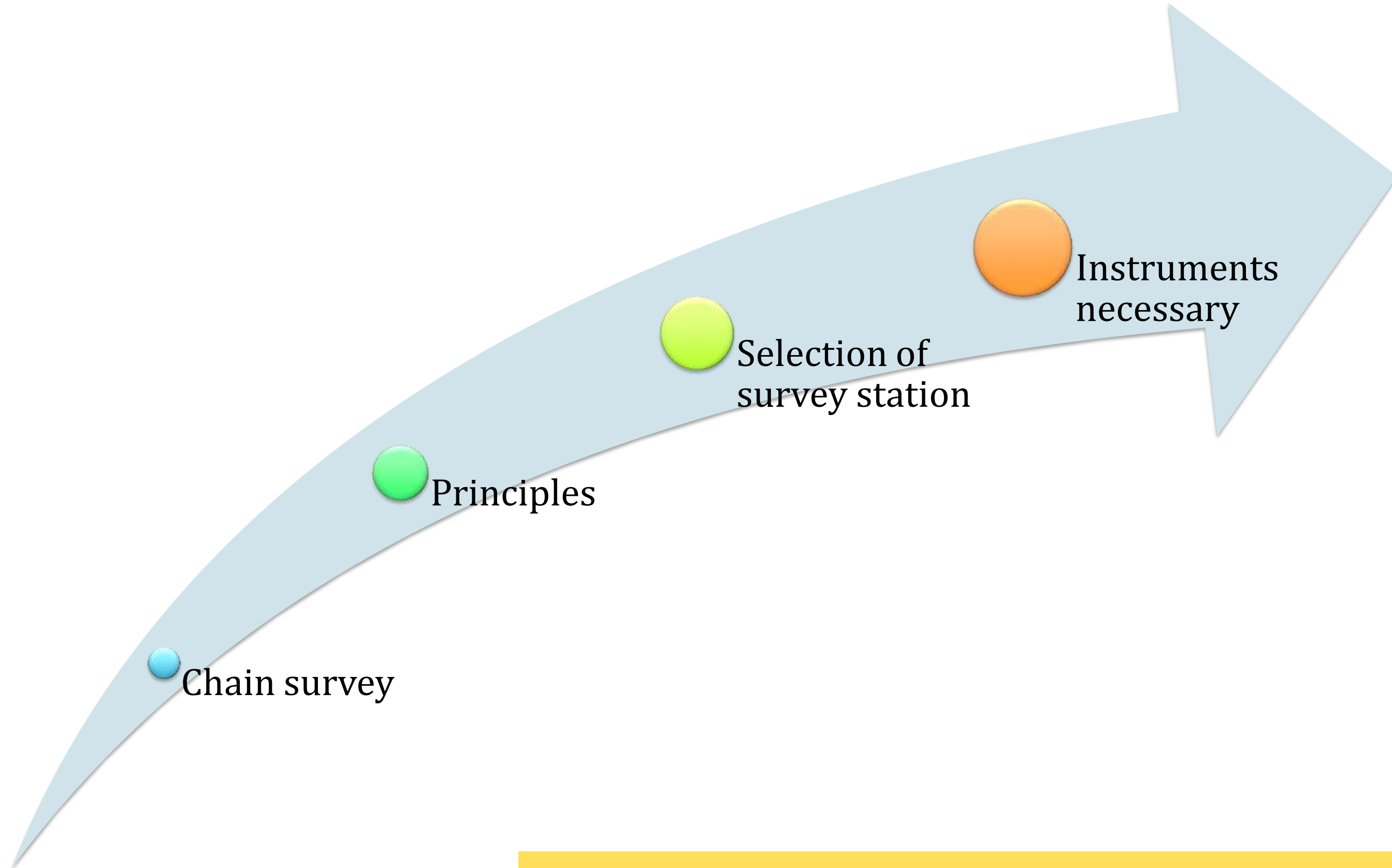
**II – YEAR III SEMESTER**

**UNIT 2 – CHAIN SURVEYING**

**TOPIC 2 – OFFSET, CROSS STAFF AND OPTICAL SQUARE**



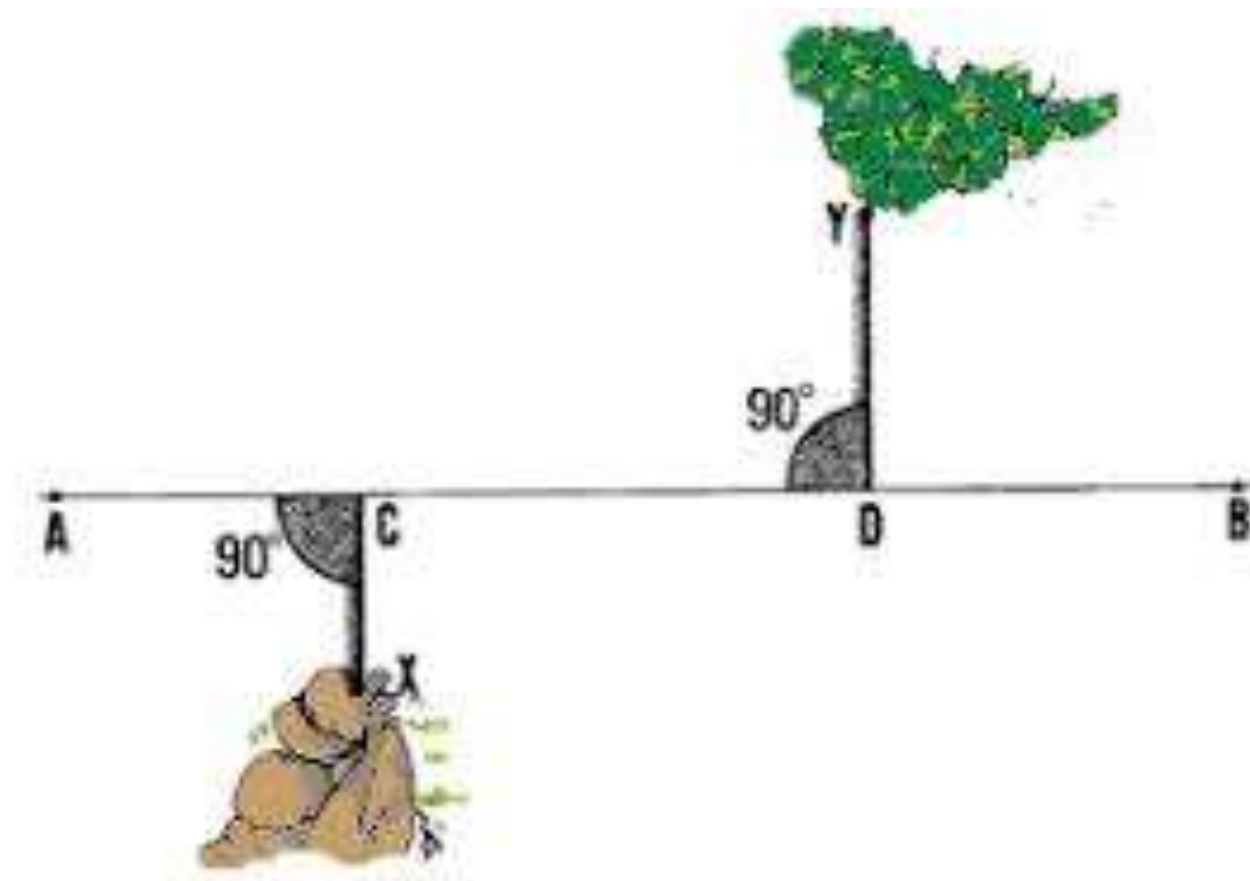
# Last Class Review





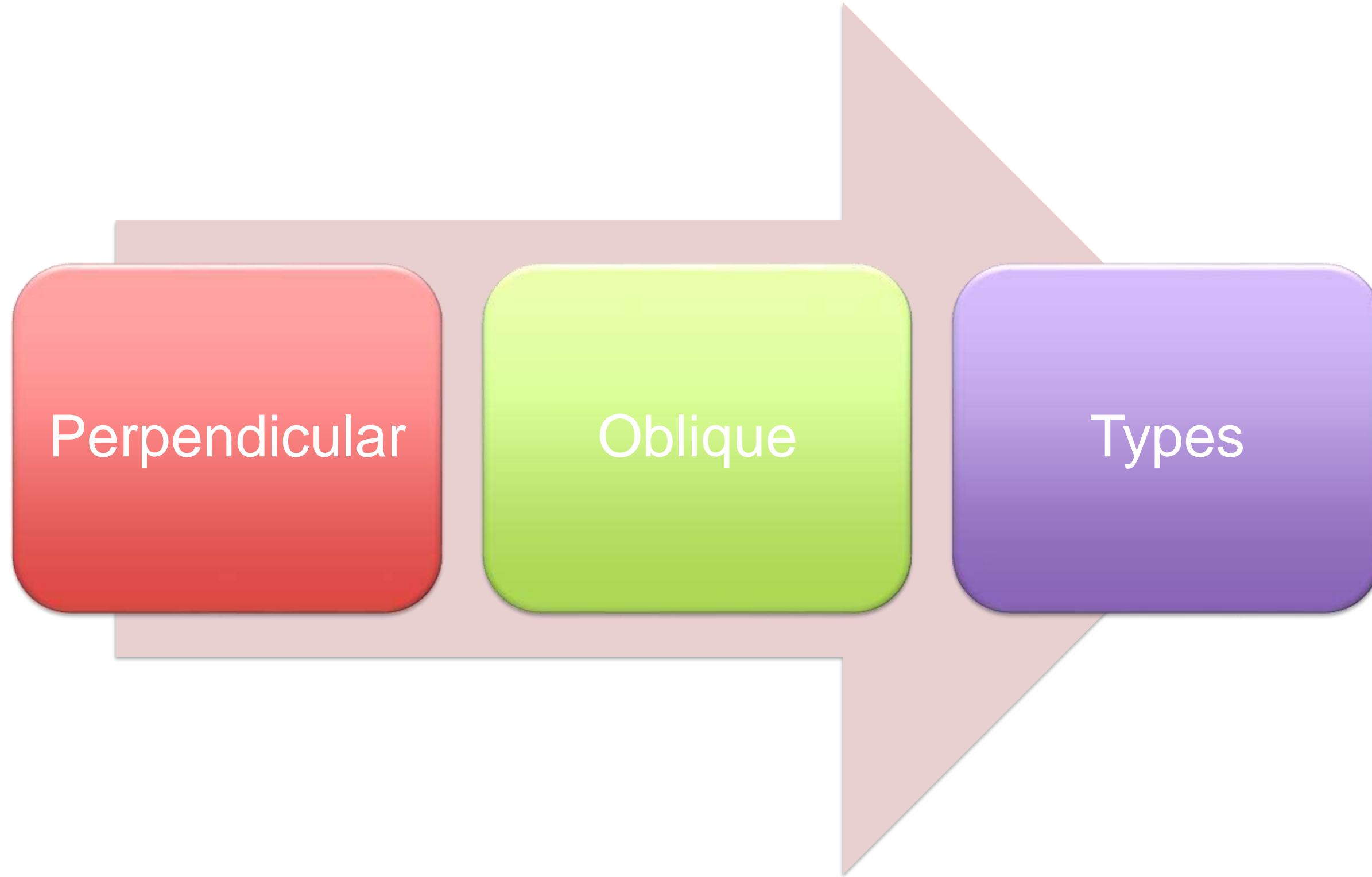
# Offset

- ❖ The lateral measurement taken from an object to the chain line is known as 'offset'. Offsets are taken to locate objects with reference to the chain line.





# Types





# Perpendicular Offset

- ❖ When the lateral measurements are taken perpendicular to the chain line, they are known as perpendicular offsets

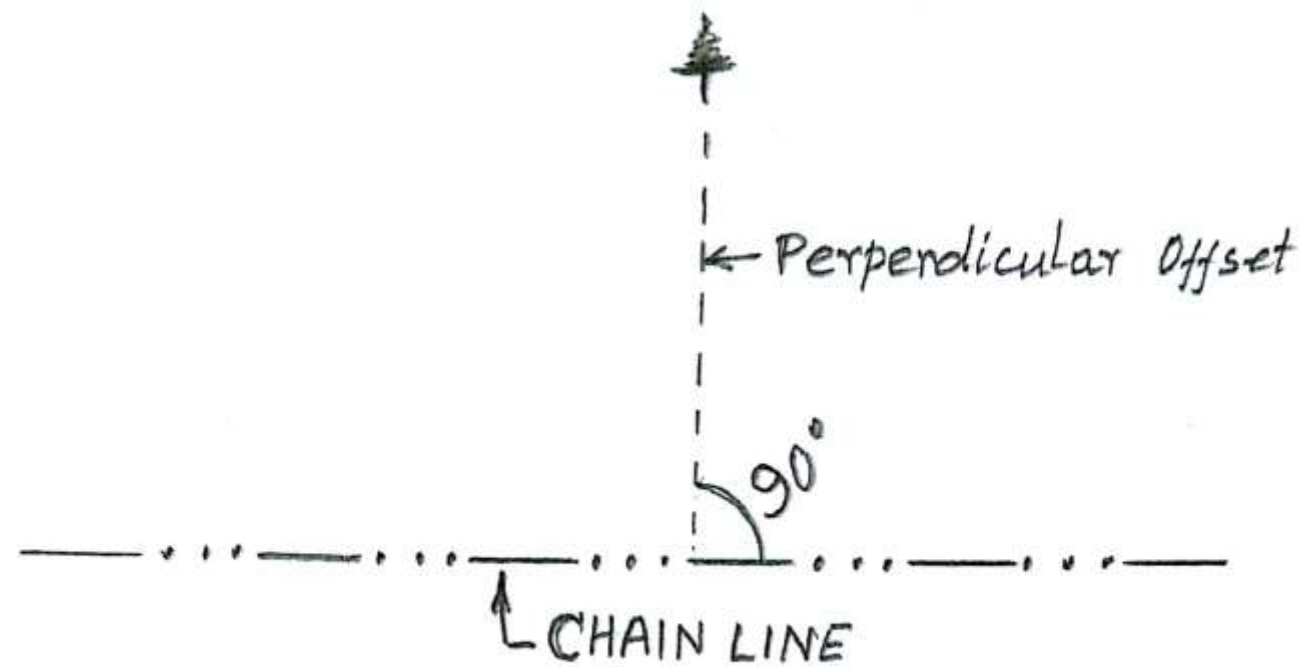


Fig. 10



# Steps to take perpendicular offset

1. By setting a perpendicular by swinging a tape from the object to the chain line. The point of minimum reading on the tape will be the base of the perpendicular (**Fig. 11.a**)

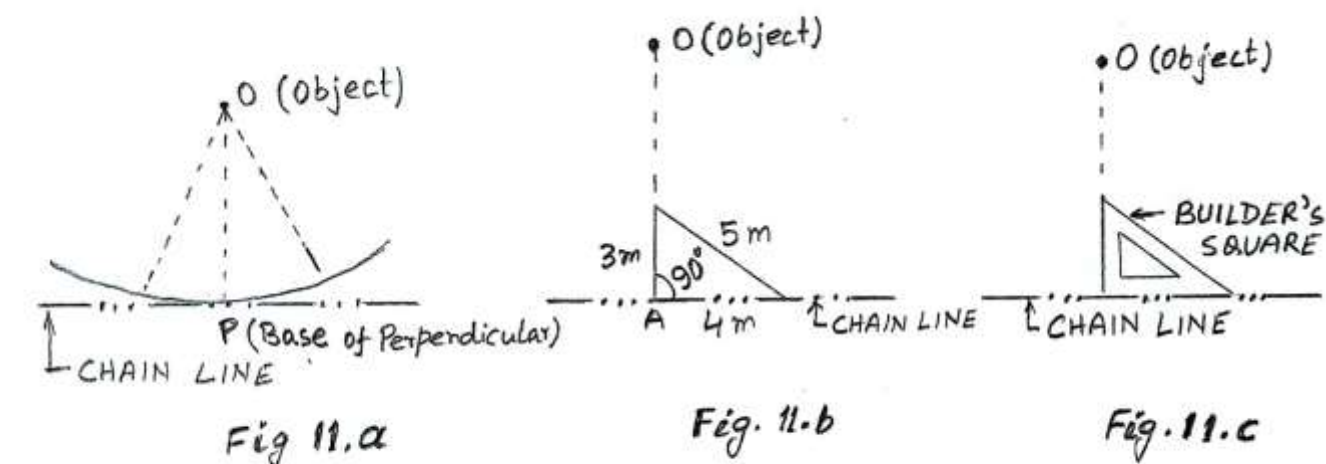
2. By setting a right angle in the ratio 3:4:5 or 5:12:13 (**Fig. 11.b**)

3. By setting a right angle with the help of builder's square or tri-square (**Fig. 11.c**)

4. By setting a right angle by cross-staff or optical square.

Perpendicular offset are preferred for the following reasons:

- (i) The can be taken very quickly.
- (ii) The progress of survey is not hampered.
- (iii) The entry in the field book becomes easy.
- (iv) The plotting of the offsets also becomes easy.





# Assessment



- **Mention the stations of survey**
- **What is a main survey line**





## Cross Staff

- ❖ Cross-head, cross-sight, surveyor's cross or cross - a drum or box shaped device mounted on a pole. It had two sets of mutually perpendicular sights.
- ❖ This device was used by surveyors to measure offsets. Sophisticated versions had a compass and spirit levels on the top.
- ❖ The French versions were frequently eight-sided rather than round.







## Uses of Cross staff



- ❖ To find the foot of the perpendicular from an object on a **chain** line, the **cross staff** is held vertically at an approximate position of the required object and turned until one of the saw cuts or (the pair of sights) is ranged along the **chain** line.



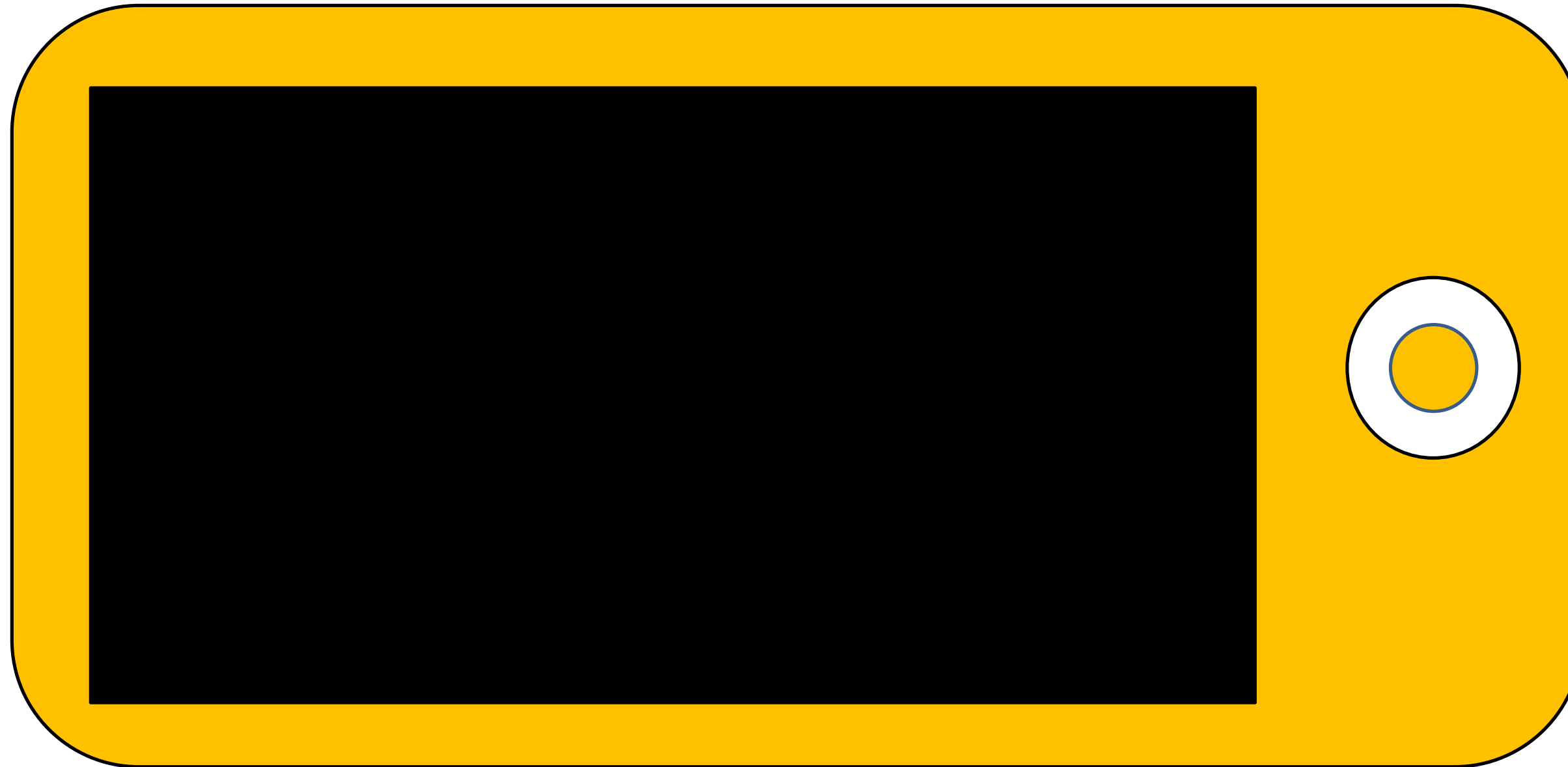
# Optical Square



- ❖ An improved version of the cross-head, the optical square used two silvered mirrors at  $45^\circ$  to each other.
- ❖ This permitted the surveyor to see along both axes of the instrument at once
- ❖ An optical square is a hand instrument used by surveyor's to lay off right angles that are multiples of  $90^\circ$  or of  $45^\circ$ .
- ❖ They normally comprise of two optical glass penta prisms in a sturdy housing.
- ❖ Used for placing points on a line, offset measurements, setting out curves or determining horizontal plans



# Reference Videos





**See You at Next Class!!!!**