

## University Institute of Engineering

### Academic Unit-1

Bachelor of Engineering (CSE, IT, CSE-IBM)

Computer Graphics using CAD Lab. (20MEP114)

**Experiment No. 3**

*Prepared By: Paras Khullar*



PROJECTION OF POINTS

DISCOVER . **LEARN** . EMPOWER

# PROJECTION OF POINTS

## Course Outcome

CO Number	Title After completion of the course the students may be able to:	Level
CO1	Sketch the different conventions and representations of engineering graphics on AutoCAD software.	Remember & Understand
CO2	Explain the use of engineering drawing, compare and predict the geometrical details of common engineering objects.	Understand
CO3	Classify, examine and draw the dimensioned figures expressing information about the shape and size of physical objects	Understand
CO4	Identify and express the geometrical features of a product on AutoCAD software.	Understand
CO5	Draw orthographic views of computer components.	Understand

Will be covered in this lecture

# COURSE OBJECTIVES

Students may be able to

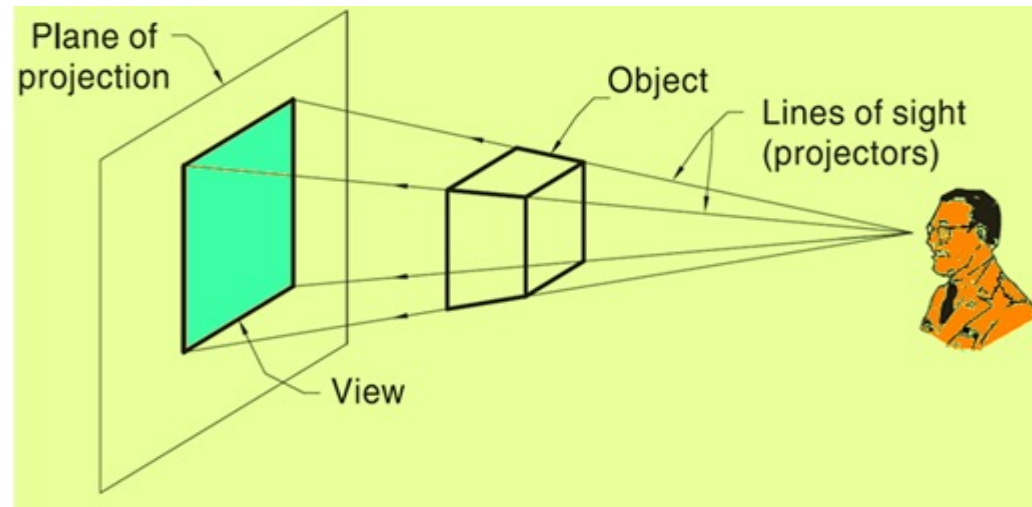
- Understand the concept of orthographic projections
- Differentiate between different views
- Locate a point in orthographic projections
- Understand the placement of a point in different quadrants
- Label the projections in different planes
- Understand the concept of reference planes

# Projection

- View of an object that is visible to the observer from a particular direction
- Projection observed from
  - the top is called as Top View
  - the front is called as Front View
  - the Side is called a Side View
- These types of projections are known as Orthographic Projections as the all the views are observed at and angle of  $90^\circ$  to each other

# Concept of Projections

- To draw projections of any point, following information is must
  1. Object
  2. Observer
  3. Plane of Projection



**Fig. 3.1: Position of Object, Observer & Plane of Projection**

Image Source:

<http://ednotebook.hostgator.co.in/theory-of-projection>

# Orthographic Projections

- Type of technical drawing in which different views of an object are projected on different reference planes
- Views are observed perpendicular to the different reference planes
- All the views are observed at right angles to each other.
- For example front view, top view and side views are drawn by observing perpendicular to each other.

# Planes

There are two types of planes

## 1. Principal Planes:

- Horizontal Plane
- Vertical Plane

## 2. Auxiliary Planes:

- Auxiliary Inclined Plane
- Auxiliary Vertical Plane
- Profile Plane

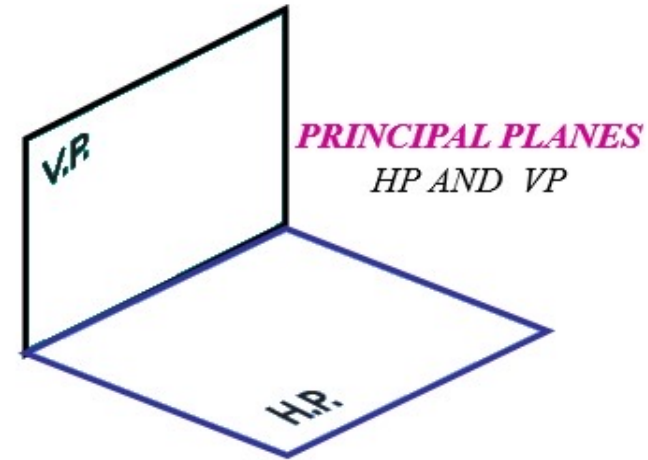


Fig. 3.2: Principal Planes

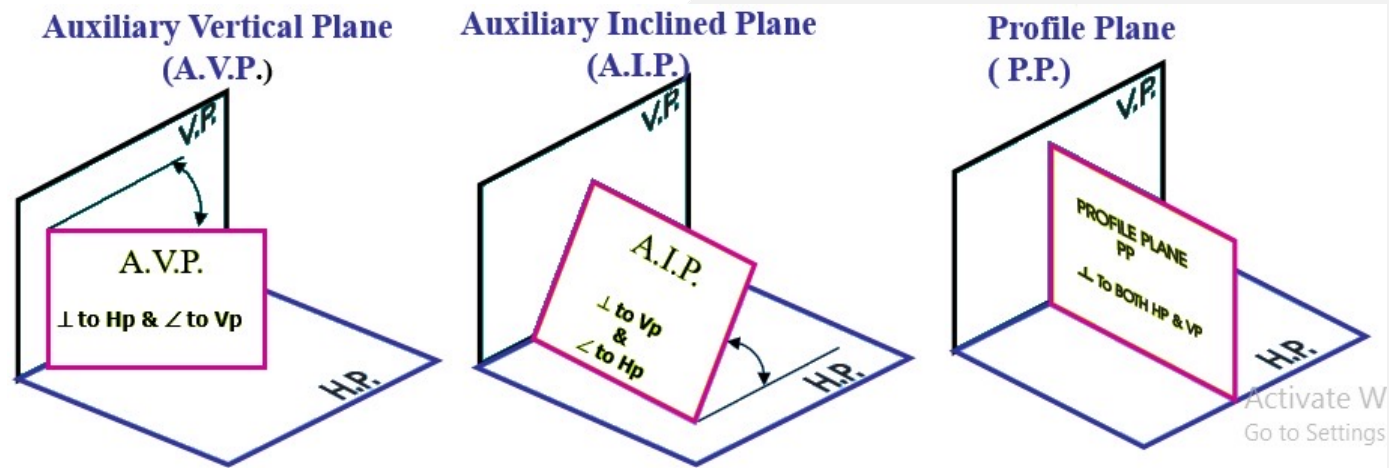
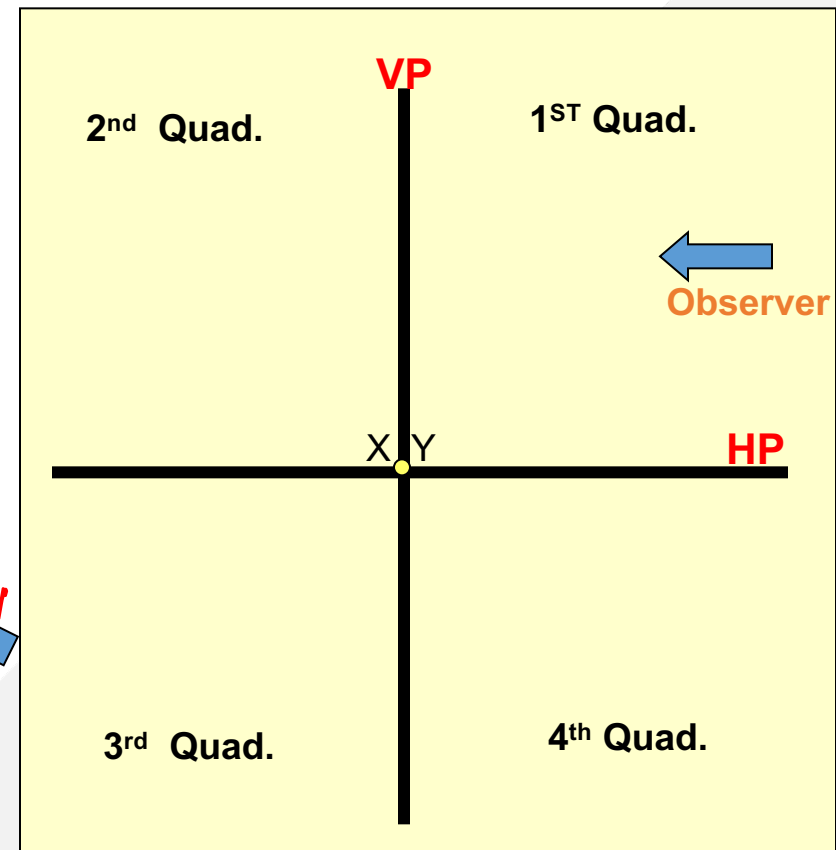
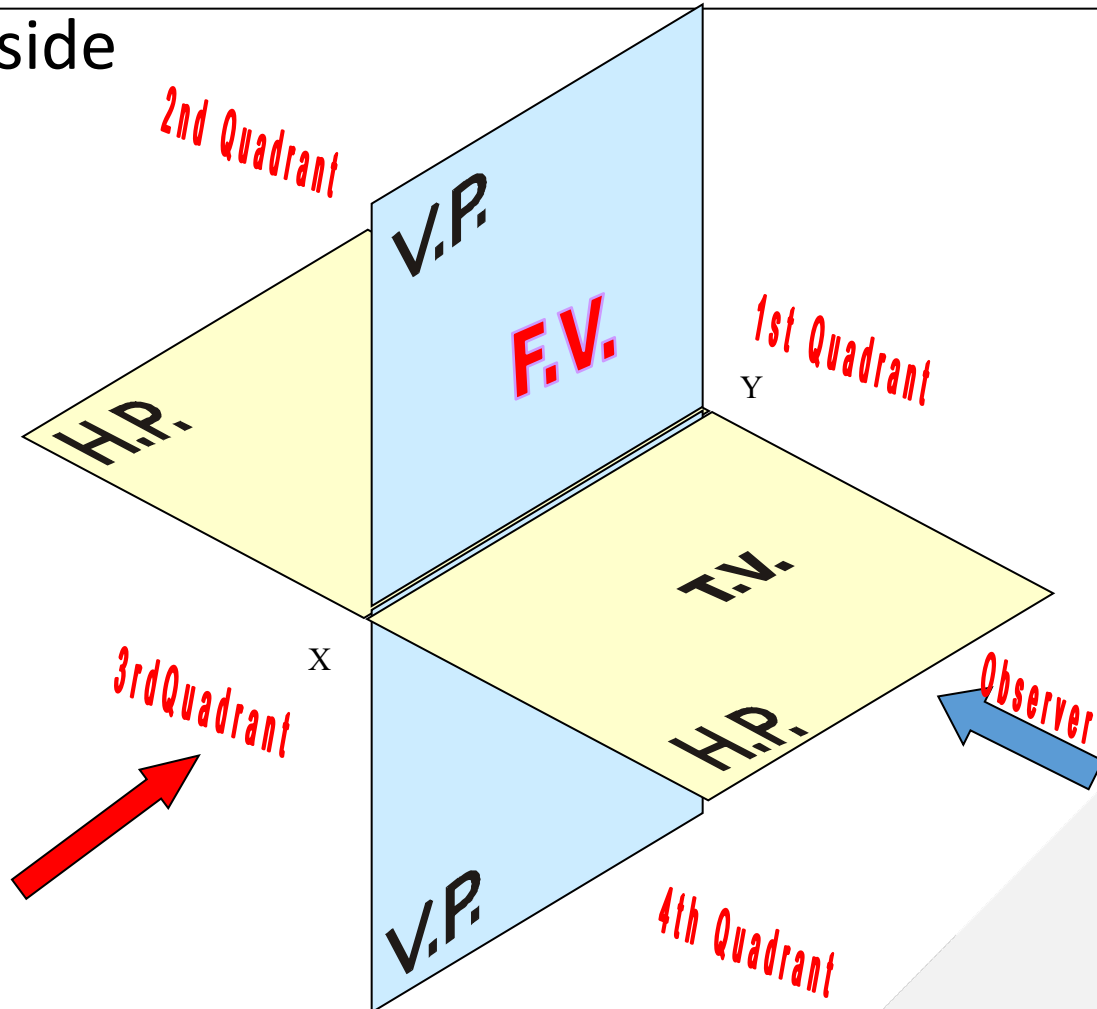


Fig. 3.3: Auxiliary Planes

# Quadrant System and Reference Planes

- Observer is assumed to view the object from right side





# Quadrant System and Reference Planes

- VP stands for Vertical Plane and HP stands for Horizontal Plane
- For every quadrant, HP rotates by  $90^\circ$  clockwise direction and VP remains stationary
- Front View is always drawn on VP, also known as Vertical Projection
- Top View is always drawn on HP, also known as Horizontal Projection

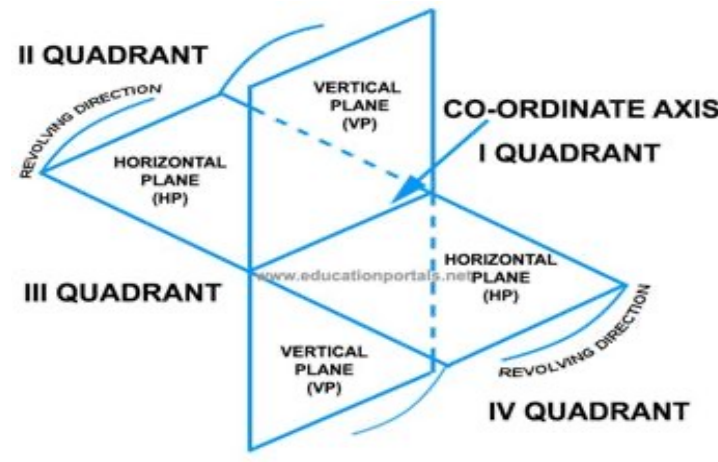


Fig. 3.4: Quadrant System

# Notations

- Every projection has a particular notation
- Every object (point, line, plane, etc.) is always represented by upper case letters. For example:
  - A for a point
  - AB for a line
  - ABCD for a plane
- The projections for the different objects are represented as the same alphabet of its name in the lowercase

S.No	Type of Projection	Drawn on	Notation for object Point A	Line AB	Plane ABCD
1	Top View	HP	a	ab	abcd
2	Front View	VP	a'	a'b'	a'b'c'd'
3	Side View	PP	a''	a''b''	a''b''c''d''

Table 3.1: Notations for the Objects

# Locations of the Point w.r.t. Reference Planes

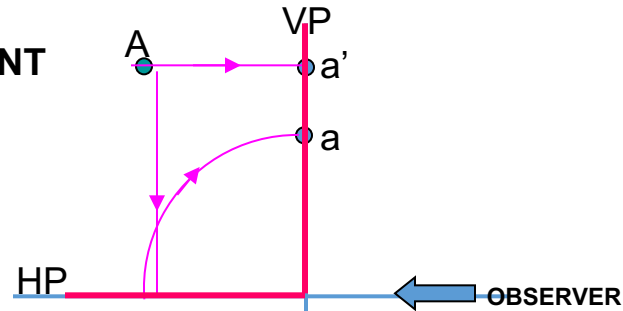
- As the position of the observer is fixed, the location of the point is determined as follows:
- If point A
  - lies above HP and in front of VP the point lies in 1st quadrant
  - lies above HP and behind VP, the point lies in 2nd quadrant
  - lies below HP and behind VP, the point lies in 3rd quadrant
  - lies below HP and in front of VP, the point lies in the 4th quadrant

# Locations of the Point w.r.t. Reference Planes

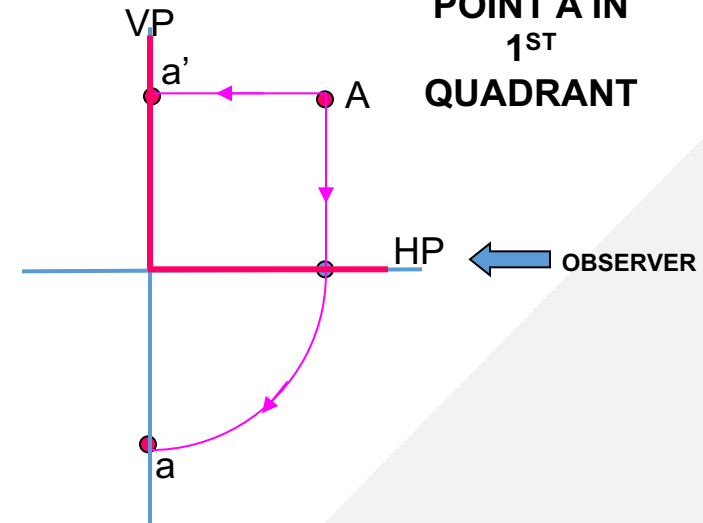
- First quadrant: V.P is above X-Y line and H.P is below X-Y line
- Second quadrant: V.P and H.P both are above X-Y line
- Third quadrant: H.P is above X-Y line and V.P is below X-Y line
- Fourth quadrant: V.P and H.P both are below X-Y line

# Locations of the Point w.r.t. Reference Planes

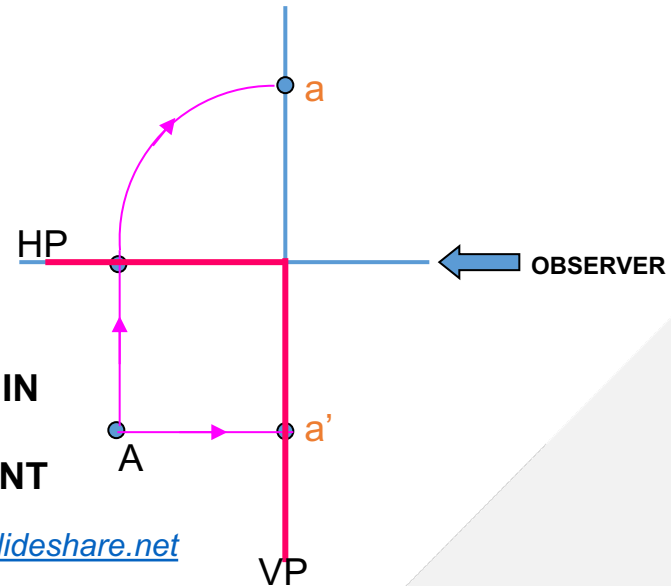
POINT A IN  
2<sup>ND</sup>  
QUADRANT



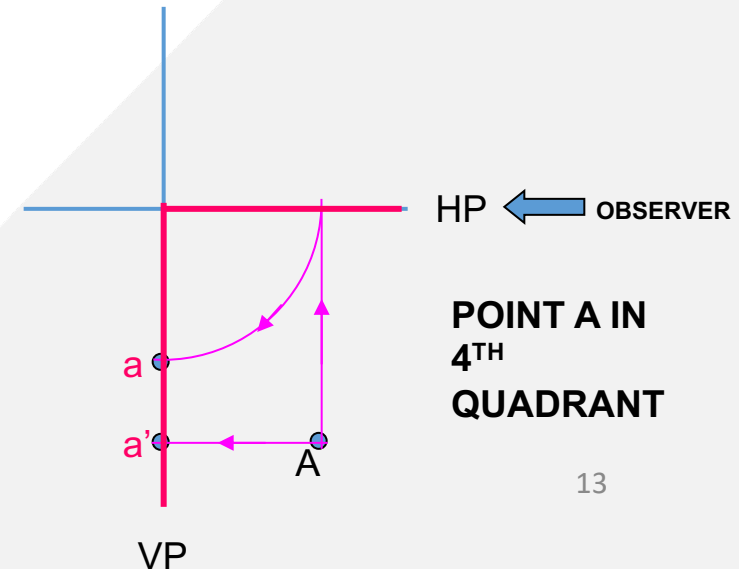
POINT A IN  
1<sup>ST</sup>  
QUADRANT



POINT A IN  
3<sup>RD</sup>  
QUADRANT

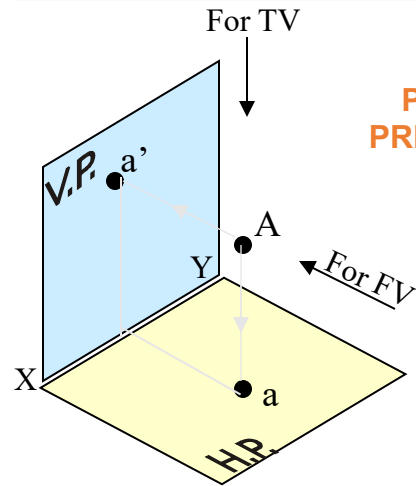


POINT A IN  
4<sup>TH</sup>  
QUADRANT



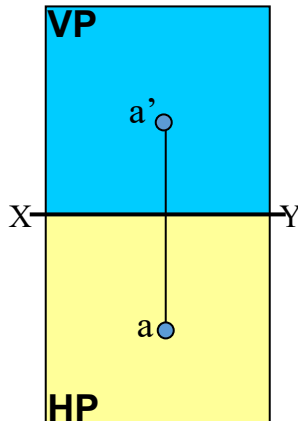
# Projections of Point in 1st quadrant

**POINT A ABOVE HP  
& IN FRONT OF VP**

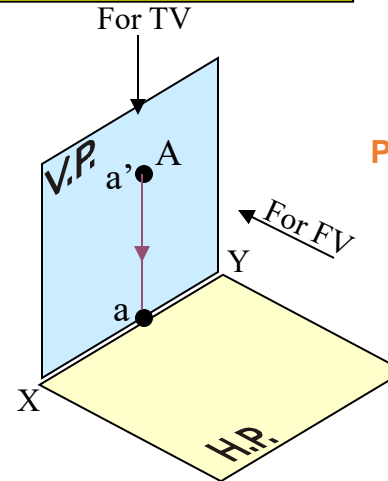


PICTORIAL  
PRESENTATION

*FV above XY,  
TV below XY.*

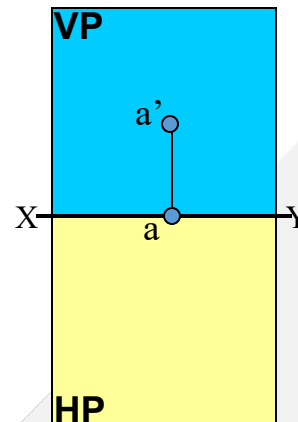


**POINT A ABOVE HP  
& IN VP**

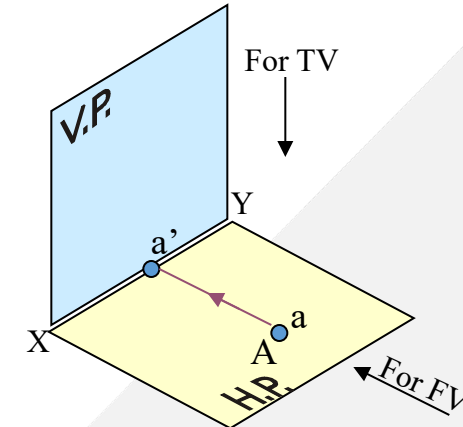


PICTORIAL  
PRESENTATION

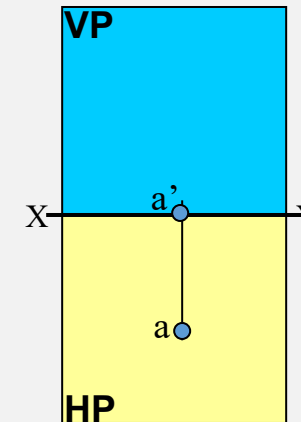
*FV above XY,  
TV on XY.*



**POINT A IN HP  
& IN FRONT OF VP**



*FV on XY,  
TV below XY.*



ORTHOGRAPHIC PRESENTATIONS  
OF ALL ABOVE CASES.

# Applications

- Projection of points are applicable for fitting of bulbs in the buildings.
- These are also used for the installation of towers and poles.

# Summary

- In this PPT we have studied the concept of projections
- The concept of object observer and plane of projection
- Quadrant system and its rules
- Various principal planes
- Views of orthographic projections
- Nomenclature of various views of orthographic projections



# Assessment Pattern

Sr. No.	Type of Assessment Task	Weightage of actual conduct	Frequency of task	Final Weightage in Internal Assessment (Prorated Marks)	Remarks
1.	Practical Worksheet (In Journal Category) and Class-room Learning	20 marks for each experiment	8-10 experiments	40 marks	Depending upon no. of experiments
2.	Mid-Term Test	20 marks	1 per semester	12 marks	At-least after the completion of 5 experiments.
3.	Discussion Forum/Short Digital Assignment/Journal to submit design/Portfolio	4 marks for each task	1 per semester	4 marks	
4.	Presentation*	-----		Non Graded: Engagement Task	
5.	Attendance and BB Engagement Score	-----		4 marks	End Semester

**Table 3.2: Assessment Pattern**

# Frequently Asked Questions

- What is orthographic projection?
- What are the basic requirements in order to draw projections?
- On which plane is front view drawn?
- How will be the front view of point A represented?
- What is the position of object in 3rd angle projection?

# Recommended Books

- Rhodes R.S, Cook L.B; Basic Engineering Drawing, Pitman Publishers,
- Rana and Shah; Engineering Drawing, Pearson Education India Publishers.
- Jolhe D.A; Engineering Drawing: With an Introduction to AutoCAD, Tata McGraw Hill
- Gill P.S; Engineering Drawing, S.K. Kataria and Sons Publications.
- Dhawan R. K; Engineering Drawing, S. Chand and Sons Publishers.

# References & Image Links

- Engineering Drawing by P. S. Gill
- Engineering Drawing by Dr. R. K. Dhawan
- Engineering Drawing and Computer Graphics by Harwinder Singh
- [www.educationportals.net](http://www.educationportals.net)
- <http://ednotebook.hostgator.co.in/theory-of-projection>
- <https://www.slideshare.net/kashyapshah11/projection-of-lines-12770216>



# THANK YOU

For queries  
Email: [paras.me@cumail.in](mailto:paras.me@cumail.in)

