Engineering Drawing

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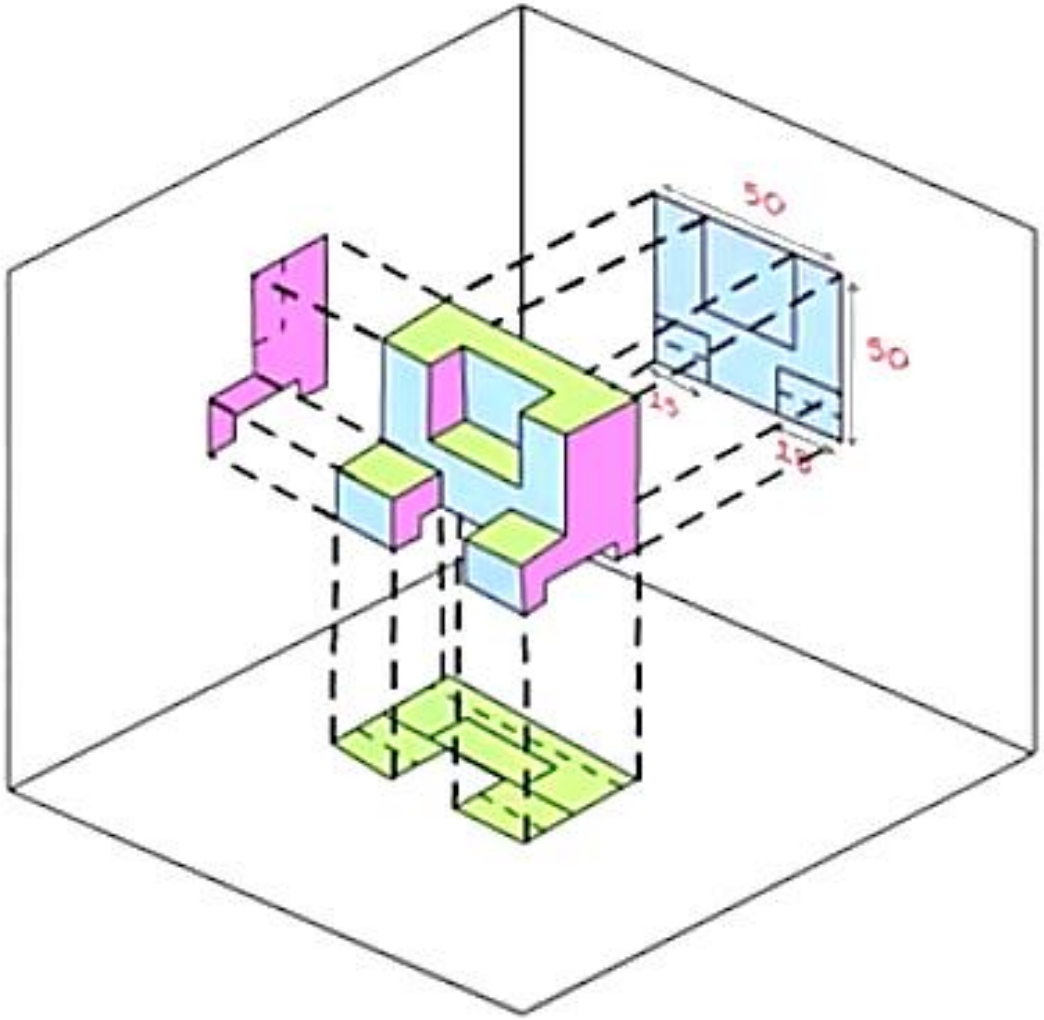
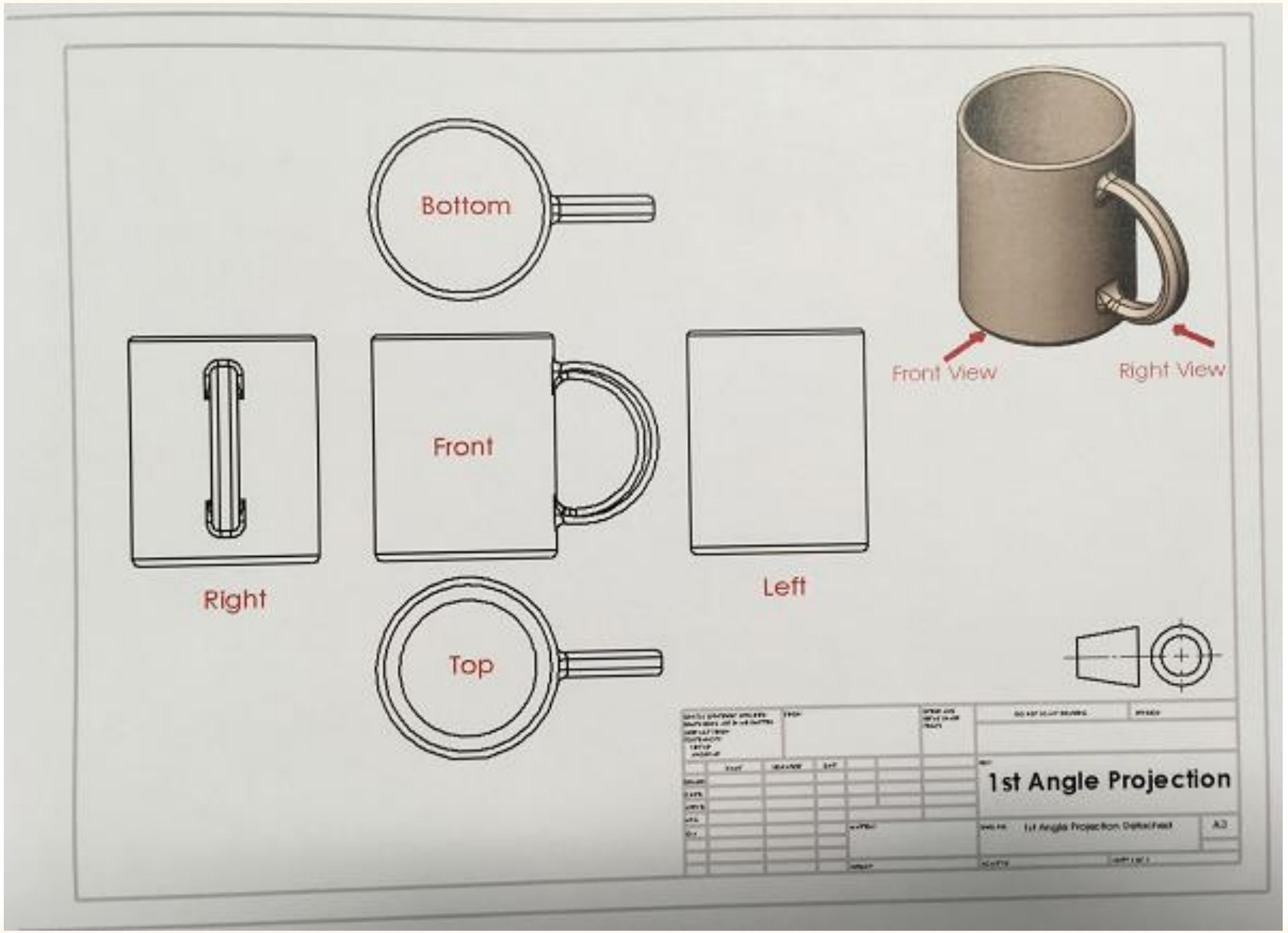
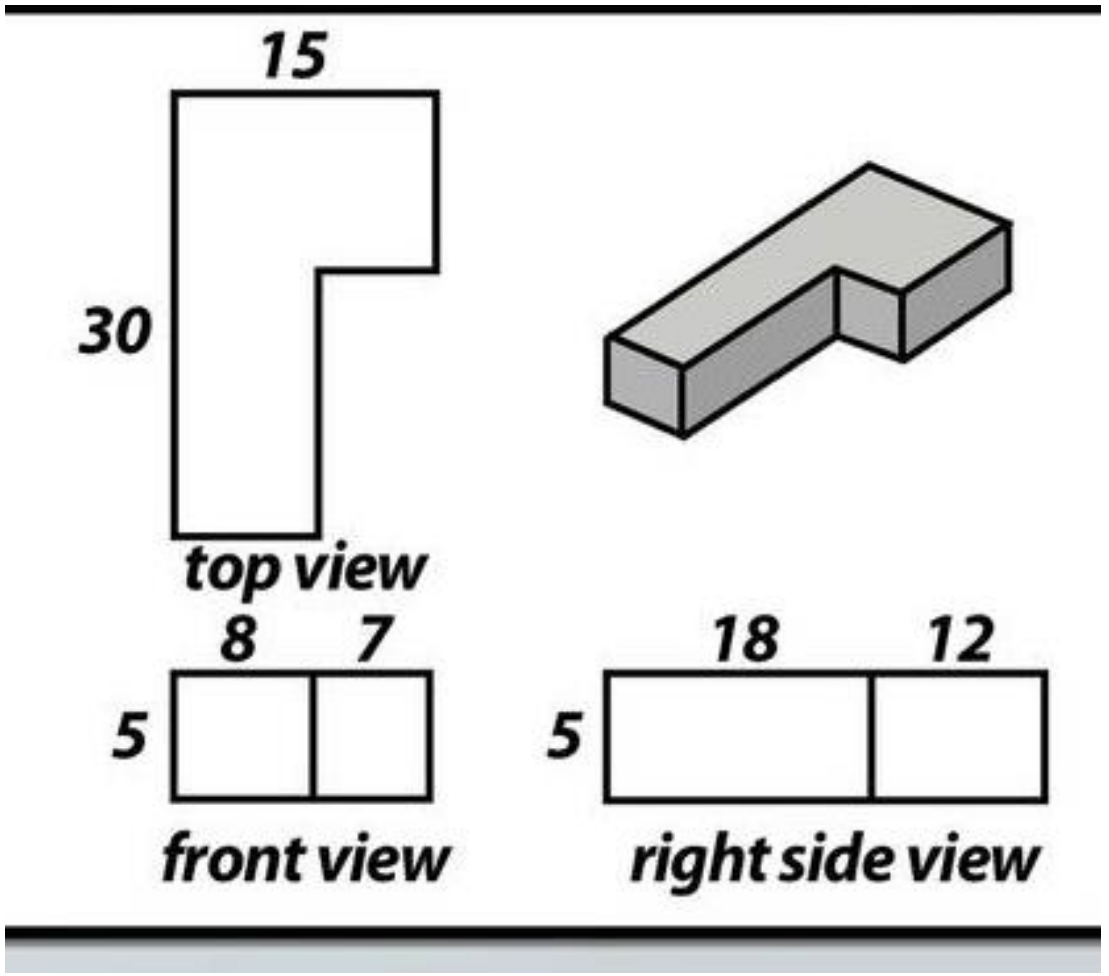
What is Engineering Drawing?

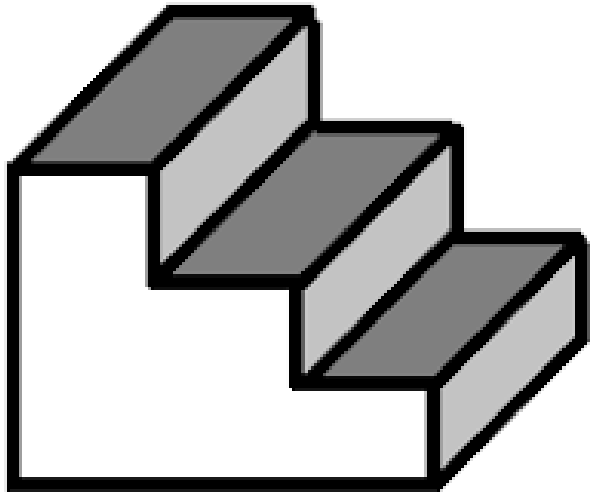
- ✓ Engineering drawing is a drawing of an object that contains all information like actual shape, accurate size, manufacturing methods, etc., of the object.
- ✓ It is the graphic language from which a trained person can visualise objects.
- ✓ Drawings prepared in one country may be utilised in any other country irrespective of the language spoken.
- ✓ Hence, engineering drawing is called the *Universal Language of Engineers*.


50
50
15
15

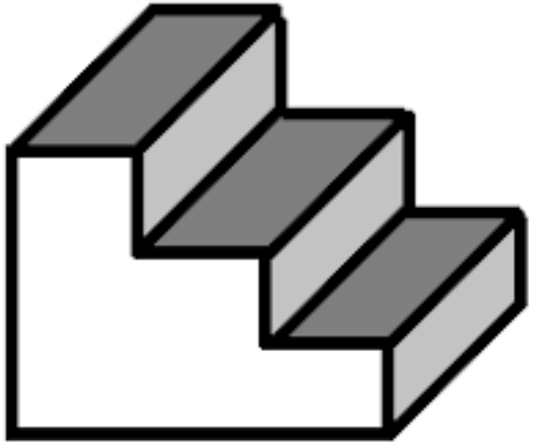

Bottom
Front
Right
Left
Top
Front View
Right View
1st Angle Projection


15
30
top view
8
7
5
front view
18
12
5
right side view

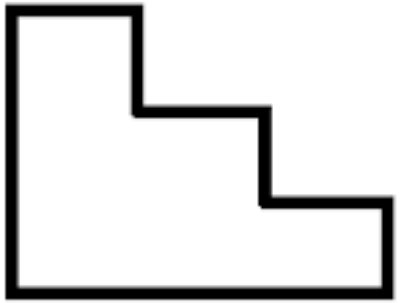
3D object



3D object



Orthographic projection from front



Orthographic projection from top

Role of Engineering Drawing

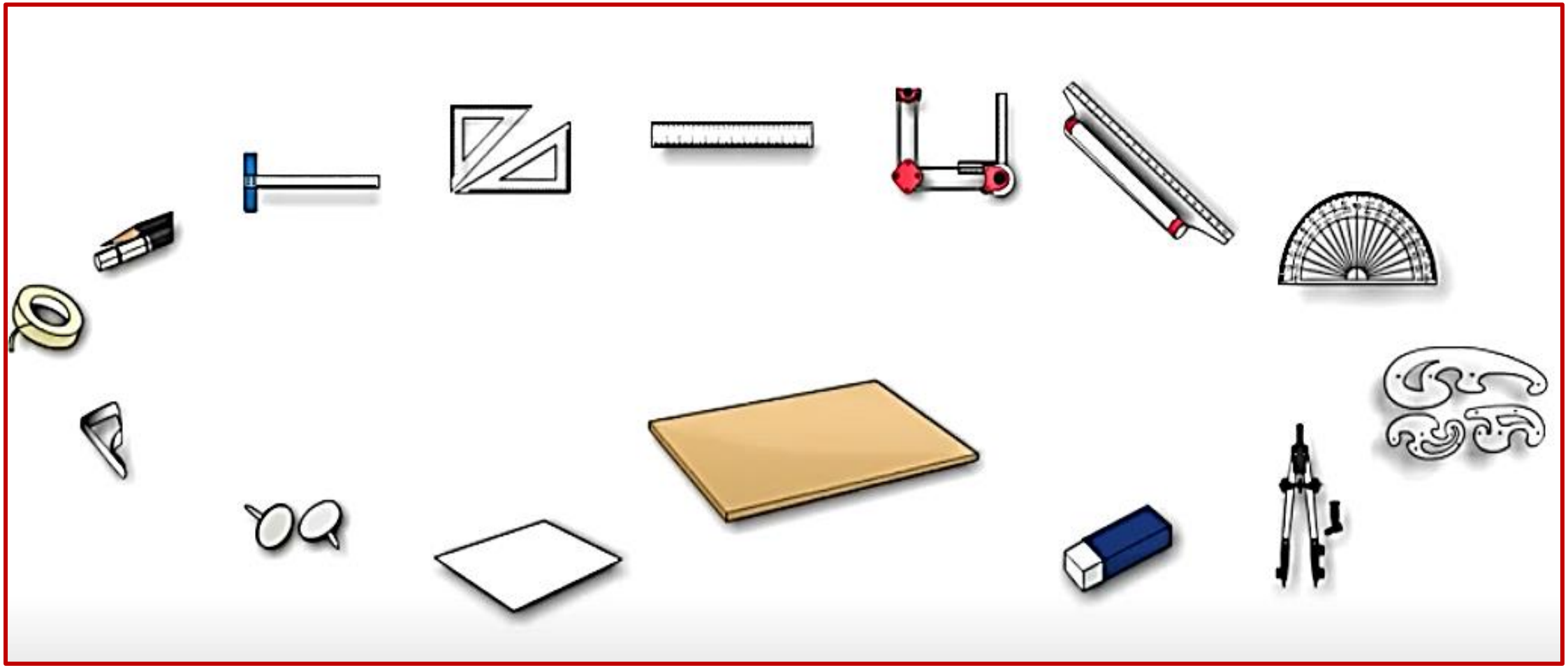
- ✓ The ability to read drawing is the most important requirement of all technical people in any profession.
- ✓ Some of the applications are : building drawing for civil engineers, machine drawing for mechanical engineers, circuit diagrams for electrical and electronics engineers, computer graphics for one and all.
- ✓ The subject in general is designed to impart the following skills.

    1. Ability to read and prepare engineering drawings.
    2. Ability to make free - hand sketching of objects.
    3. Power to imagine, analyse and communicate, and
    4. Capacity to understand other subjects

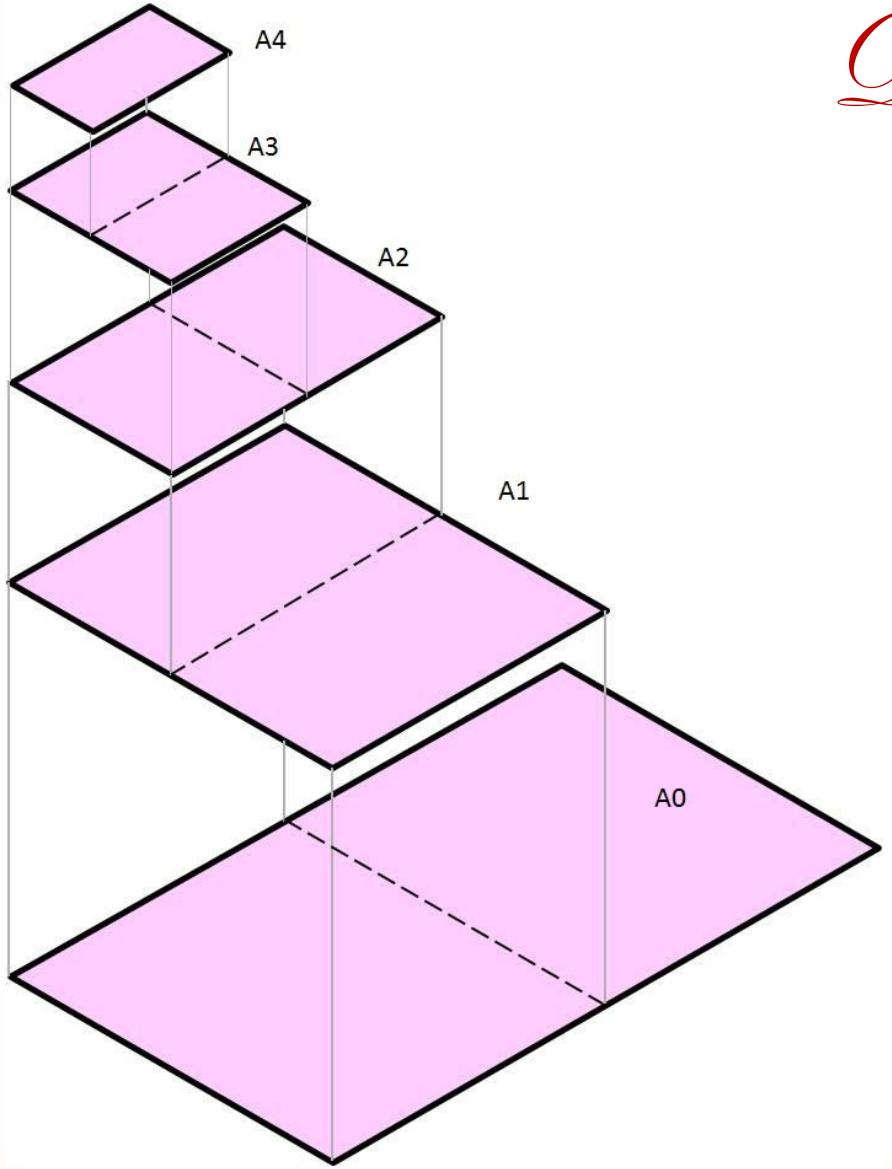
Drawing Instruments

The Instruments and other aids used in draughting work are listed below:

1. Drawing board
2. Mini drafter
3. Instrument box
4. Set squares
5. Protractor
6. Set of scales
7. French curves
8. Drawing sheets
9. Pencils
10. Templates



Drawing sheets



Standard sizes of drawing sheets as per BIS

Designation	Trimmed Size (mm)	Untrimmed size (mm)
A0	841 x 1189	880 x 1230
A1	594 x 841	625 x 880
A2	420 x 594	450 x 625
A3	297 x 420	330 x 450
A4	210 x 297	240 x 330

A2 size

Drawing sheets : Title box

An important feature – a must in every drawing sheet – for technical and administrative details

- ✓ Location - Bottom right corner – **185 mm x 65 mm (BIS)**

Divided into two zones

Identification zone

- ✓ Registration or identification number
- ✓ Drawing title
- ✓ Name of the legal owner of the drawing, i.e., name of the firm or the company

Additional information zone

- ✓ Indicative items –symbol indicating the system of projection, main scale of drawing, etc.
- ✓ Technical items – method of indicating surface texture, geometric tolerances, etc.
- ✓ Administrative items

Drawing Pencils

Wooden pencils – are graded and designated by numbers and letters

- ….7B, 6B, 5B, 4B, 3B, 2B, B :- in decreasing order of softness and blackness
- **HB** to F – Medium grade
- **H, 2H,** 3H, 4H, 5H, 6H, 7H, 8H, 9H…. :– increasing order of hardness.

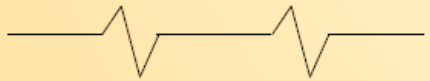
Drawings are done using 2H pencils and finished with H and HB pencils – to be practiced in this course.

Syllabus

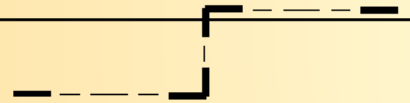
Credits: 01 **Semester I/II** **L–T–P: 0–0–2**

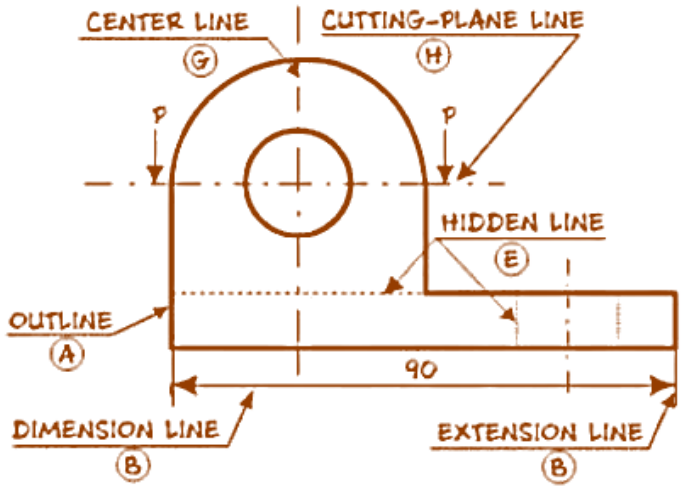
Module No.	Content	Teaching Hours
I	**Introduction** Drawing instruments and their uses, BIS conventions, lettering dimensioning and free hand practicing (2 Drawing sheets) **Geometric construction & engineering Scales** Basic geometric construction -Dividing a given straight line into any number of equal parts, drawing a regular polygon given one side, conic sections – ellipse – parabola. Concepts of scales –Plain, Diagonal & scale of chord. (2 Drawing sheets) **Orthographic projection** Introduction to projection &orthographic Projections *Projections of points* lying in four quadrants *Projection of lines*- parallel and inclined to one or both planes *Projection of planes*- inclined to one or both planes. *Projections of solids* - axis perpendicular to HP, axis perpendicular to VP and axis inclined to one or both planes. (4 Drawing sheets) **Sectioning of solids-** Section planes perpendicular to one plane and parallel or inclined to other plane. (1Drawing sheets) **Development of surfaces-** Development of prisms, pyramids and cylindrical & conical surfaces (1Drawing sheets) **Isometric projection -**Isometric projection and isometric views of different planes and simple solids (1Drawing sheets) **Computer aided drafting** Introduction to computer aided drafting package to make 2-D drawings.	24

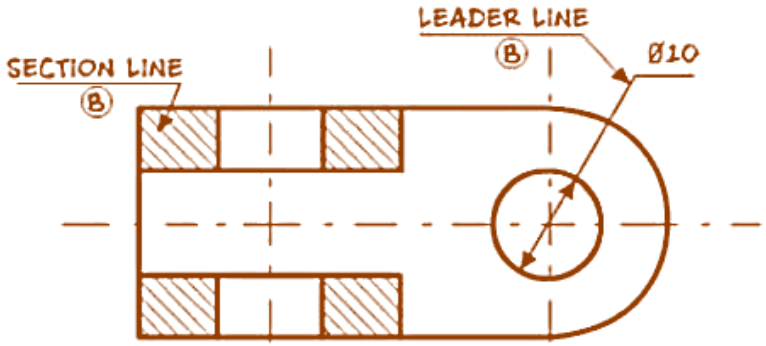
Types of Lines

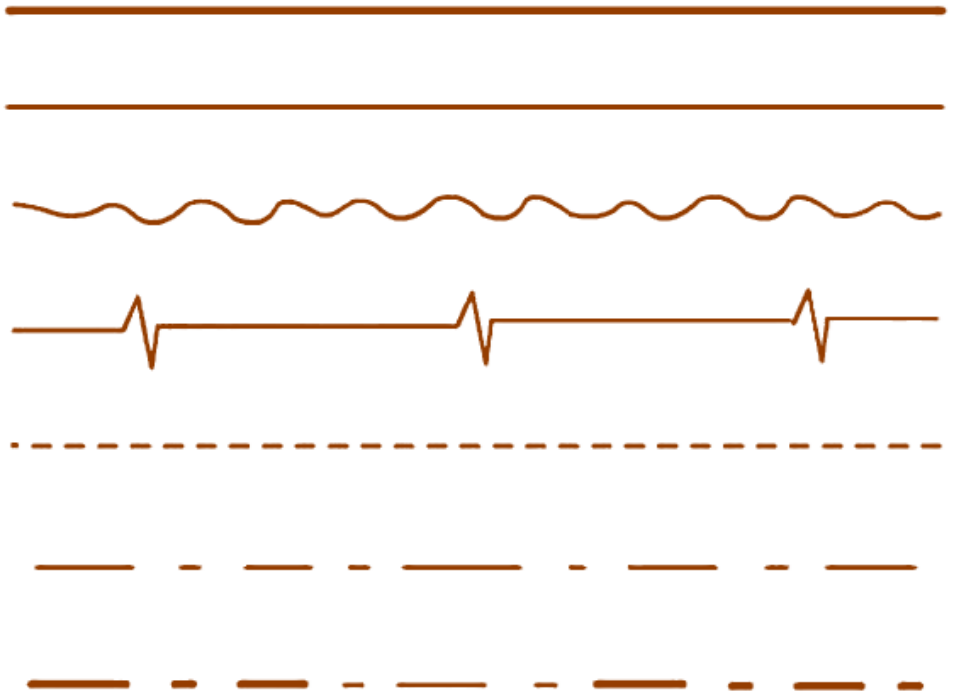
Lines		Description	General Applications	
A		Continuous thick	A1 A2	Visible outlines Visible edges
B		Continuous thin (straight / curve)	B1 B2 B3 B4 B5 B6 B7	Imaginary lines of intersection Dimension lines Projection lines Leader lines Hatching or section lines Outlines of revolved sections in plane Short centre lines
C		Continuous thin (free-hand)	C1 C2	Limits of partial or interrupted views and sections Short-break lines
D		Continuous thin (straight with zigzags)	D1	Long-break lines

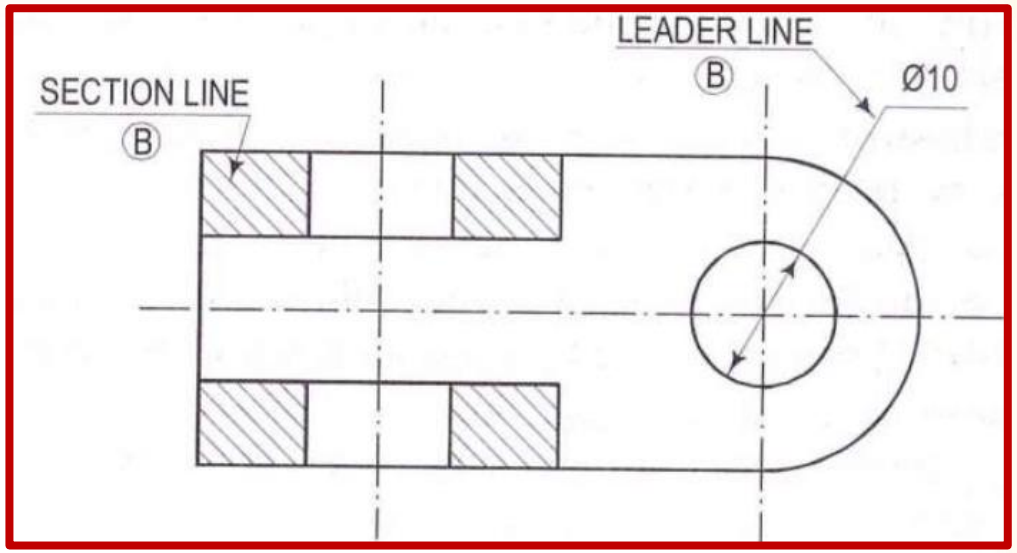
Cont..... Types of Lines

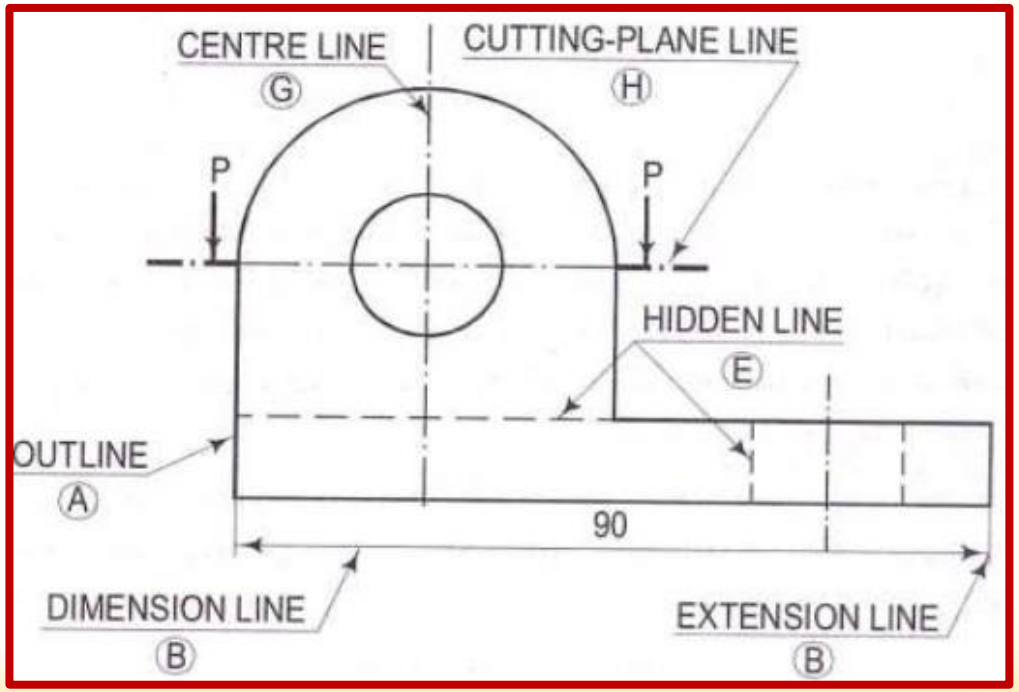
Lines		Description	General Applications	
E		Dashed thick	E1 E2	Hidden outlines Hidden edges
F		Dashed thin	F1 F2	Hidden outlines Hidden edges
G		Chain thin	G1 G2 G3	Centre lines Lines of symmetry Trajectories
H		Chain thin, thick at ends and changes of direction	H1	Cutting planes
J		Chain thick	J1	Indication of lines or surfaces to which a special treatment applies
K		Chain thin double-dashed	K1 K2 K3	Outlines of adjacent parts Alternative and extreme positions of movable parts Centroidal lines


CENTER LINE
G
CUTTING-PLANE LINE
H
P
P
HIDDEN LINE
E
OUTLINE
A
90
DIMENSION LINE
B
EXTENSION LINE
B

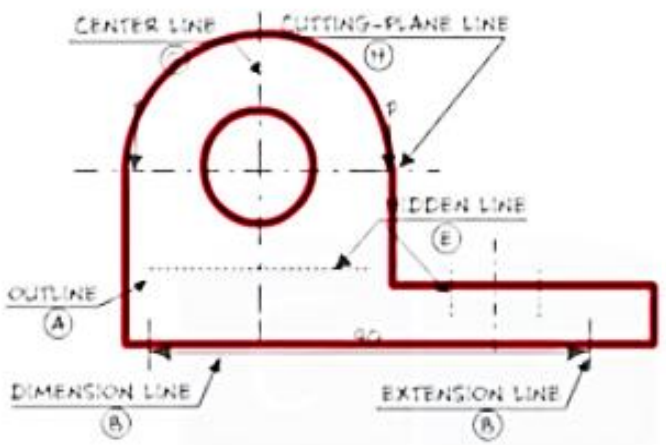

LEADER LINE
B
Ø10
SECTION LINE
B

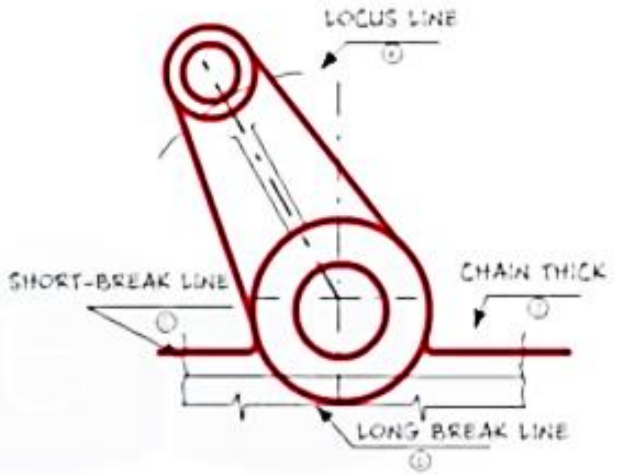


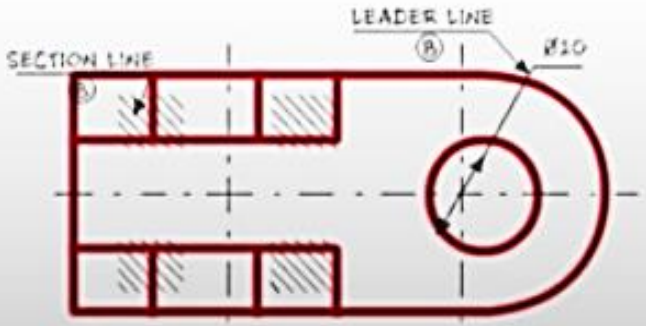

LEADER LINE
B
Ø10
SECTION LINE
B


CENTRE LINE
G
CUTTING-PLANE LINE
H
P
P
HIDDEN LINE
E
OUTLINE
A
90
DIMENSION LINE
B
EXTENSION LINE
B

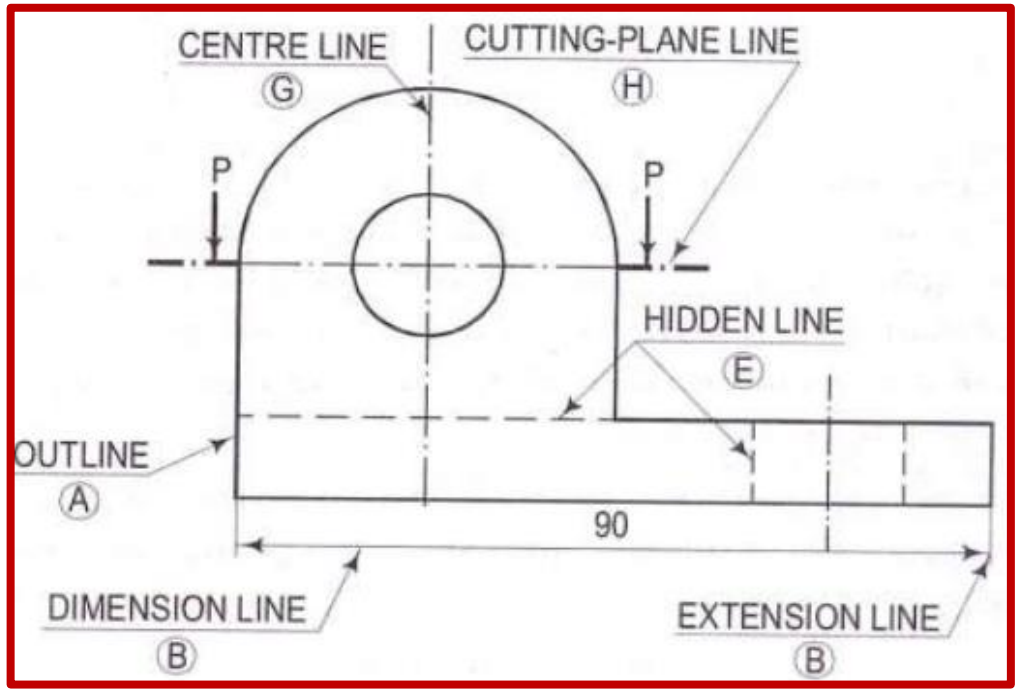
Thick Lines


CENTER LINE
CUTTING-PLANE LINE
(H)
HIDDEN LINE
(E)
OUTLINE
(A)
DIMENSION LINE
(B)
EXTENSION LINE
(B)


LOCUS LINE
SHORT-BREAK LINE
CHAIN THICK
LONG BREAK LINE


LEADER LINE
(B)
SECTION LINE

Thin Lines


CENTRE LINE
G
CUTTING-PLANE LINE
H
P
P
HIDDEN LINE
E
OUTLINE
A
90
DIMENSION LINE
B
EXTENSION LINE
B