Dr. Vishwanath Karad
MIT WORLD PEACE UNIVERSITY | PUNE
TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

Introduction to Engineering Graphics

Engineering Graphics

Course objective:

Objective of the course is to make the students learn methods to construct engineering components using drafting techniques.

Course outcomes:

Students will be able to

- Understand the principles of engineering drawing.
- Draw orthographic projections of points, lines and solids
- Free hand sketching and knowledge of different types of symbols used in engineering drawing in industry.
- Basic idea of isometric and perspective projection for its use in visualization of an object.

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Engineering Graphics

EXAMINATION SCHEME:

(A) Class Continuous Assessment (CCA): 40 Marks

(B) Laboratory Continuous Assessment (LCA): 20 Marks

(C) End-Term Examination: 40 Marks

*Class Assessment Based on (CCA)

Assignment --- 10 Marks

Mid Term Test --- 20 Marks

Oral/ Activity/ Attendance --- 10 Marks

Theory Total Assessment = 40 Marks

***Practical/Laboratory/ Term Work Based on:**

(A) Regularity and punctuality (5 Marks)

(B) Interpretation of Problem (5 Marks)

(C) Approach to Problem Solution (5 Marks)

(D) Drawing Skills (5 Marks)

Practical Total Assessment = (20 Marks)

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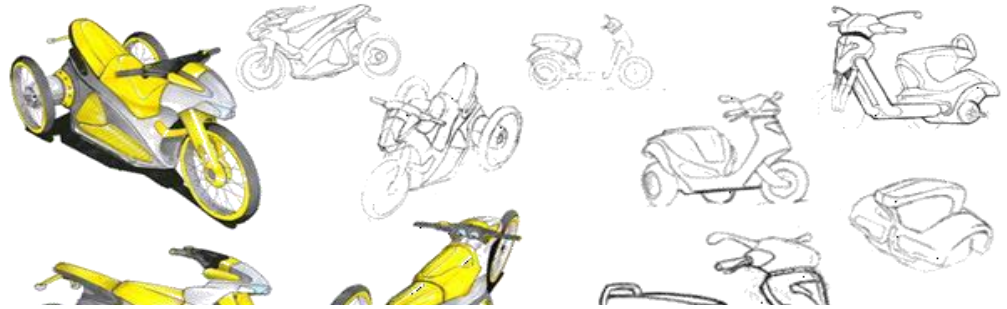
SYLLABUS

1. ***Projections of Point & Line***
2. ***Projections of Plane***
3. ***Orthographic Projections***
4. ***Projections of Solid***
5. ***Isometric Projections***
6. ***Engineering Curves***
7. ***Development of Solids/ surface.***

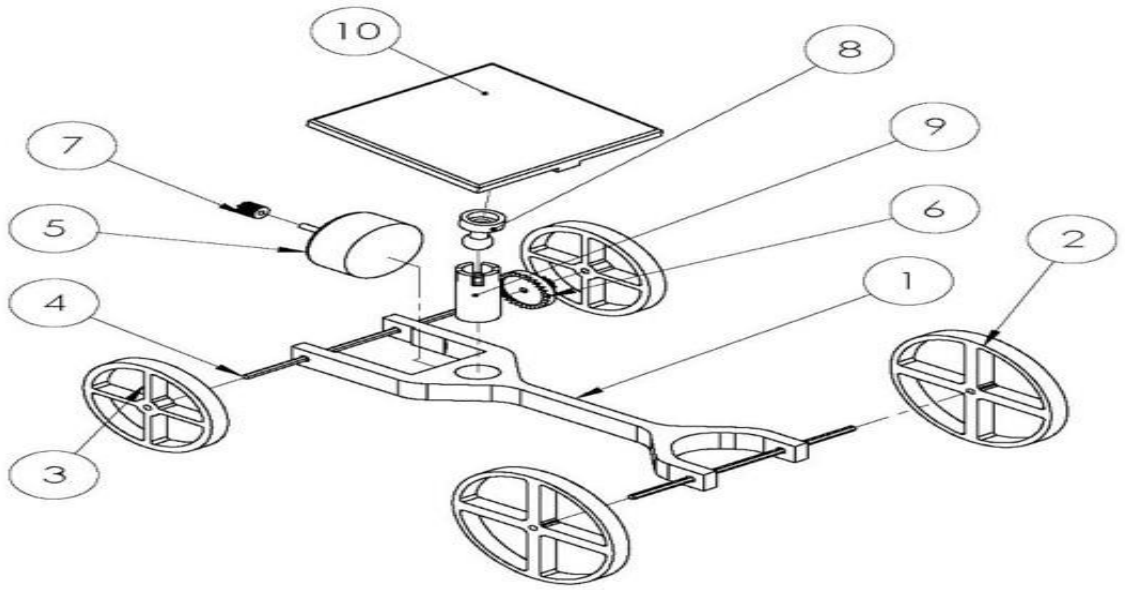
BOOKS :

1) Engineering Graphics for Degree, K. C. John, PHI Learning Pvt. Ltd., New Delhi, India.
2) Engineering Drawing, Plane and Solid Geometry, N. D. Bhatt and V. M. Panchal, Charotor Publication House, Anand, Gujarat, India.
3) Engineering Drawing with an Introduction to AutoCAD, D. A. Jolhe, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, India.
4) Engineering Graphics, By Luzzadder.



2 1

B B



ITEM NO.	PART NAME	QTY.
1	Car Frame	1
2	Large Wheel	2
3	Small Wheel	2
4	Axle	2
5	Motor	1
6	Bevel Gear	1
7	Motor Gear	1
8	Joystick	1
9	Joystick Holder	1
10	Solar Panel	1

A A

NEXT ASSY | USED ON | APPLICATION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN mm
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
FINISH
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	Edwin Lai	12/4/17
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

TITLE: Solar Car Assembly

SIZE	DWG. NO.	REV
A	4	

SCALE: 1:2 | WEIGHT: | SHEET 1 OF 1

2 1

Composition of Graphic Language

- Graphic language in "engineering application" use lines to represent the surfaces, edges and contours of objects.

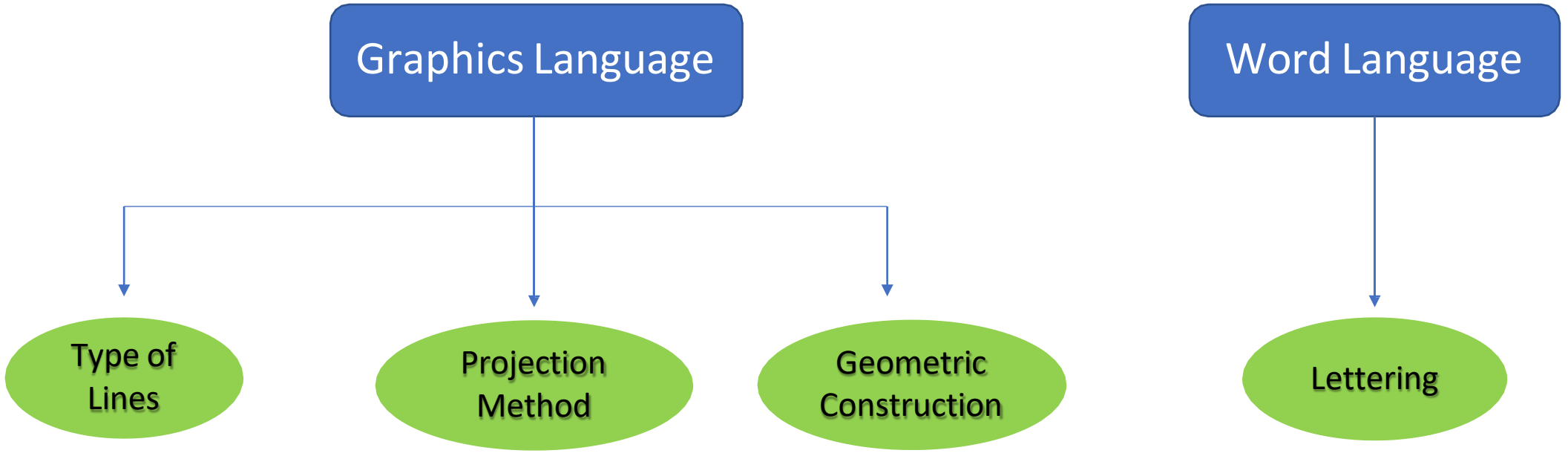
- The language is known as "***drawing***" or "***drafting***".

- A drawing can be done using ***free hand***, ***instruments*** Or ***computer*** methods.

METHODS OF DRAWING & NEEDS

S.No.	Method	Needs
1	Free Hand Sketching	Drawing Sheet, less Instruments
2	Manual Drafting	Drawing Sheet, more Drawing Instruments
3	Computer Aided Drafting	Drawing Sheet, Computer, Software. Printer
4	Computer Aided Modelling	Computer, Software

Basic Knowledge for Drafting



Basic Line Types

Types of Lines	Appearance	Name according to application
Continuous thick line		Visible line
Continuous thin line		Dimension line Extension line Leader line
Dash thick line		Hidden line
Chain thin line		Center line

Meaning of Lines

- ***Visible lines:***

represent features that can be seen in the current view

- ***Hidden lines:***

represent features that **can not be seen** in the current view

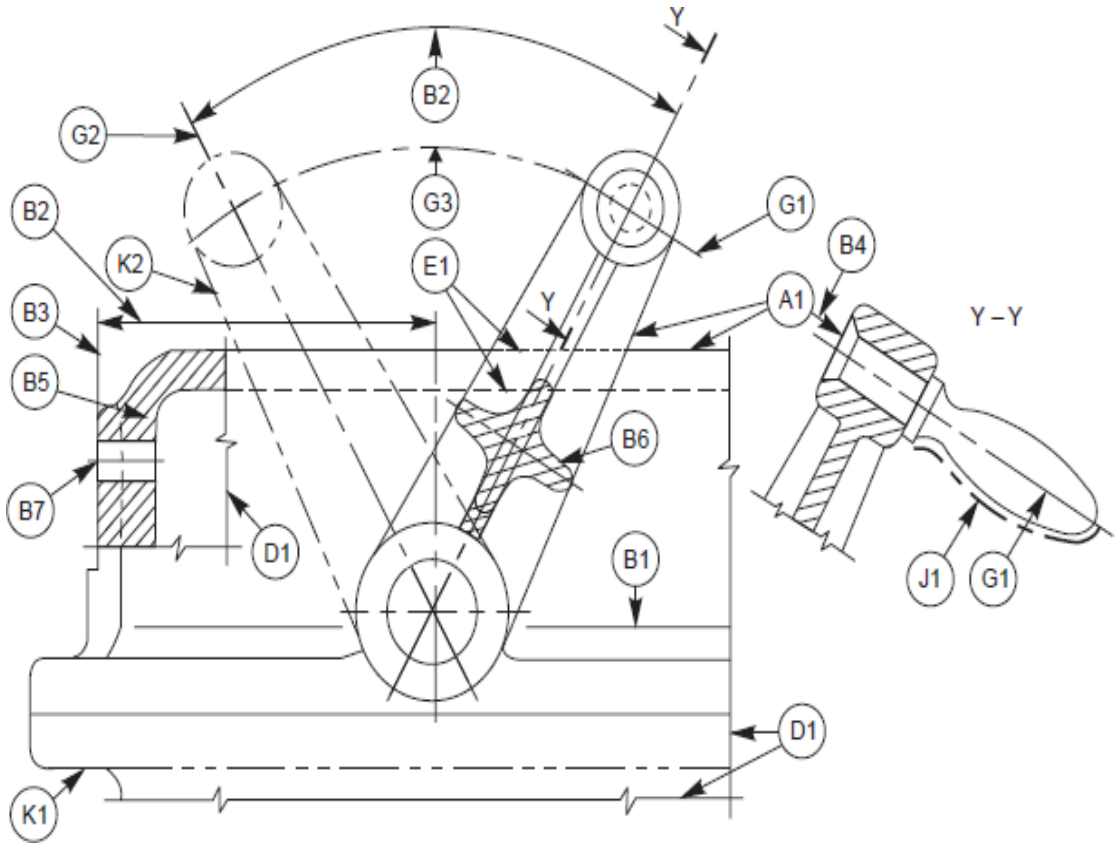
- ***Center line:***

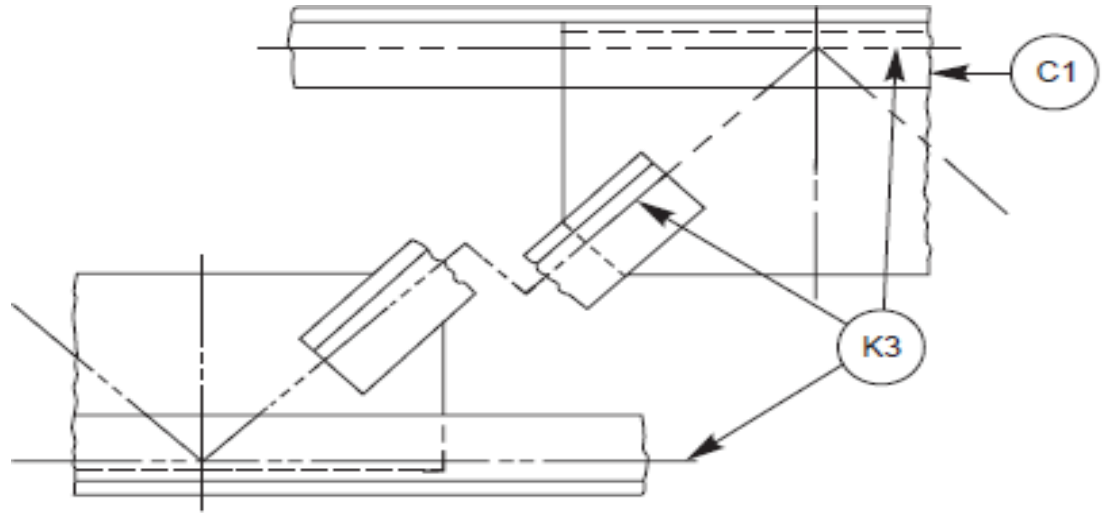
represents symmetry, path of motion, centers of circles, axis of axi-symmetrical parts

- ***Dimension and Extension lines:***

indicate the sizes and location of features on a drawing

Line	*Description*	*General Applications*
A ———	Continuous thick	A1 Visible outlines
B ———	Continuous thin (straight or curved)	B1 Imaginary lines of intersection B2 Dimension lines B3 Projection lines B4 Leader lines B5 Hatching lines B6 Outlines of revolved sections in place B7 Short centre lines
C ~~~	Continuous thin, free-hand	C1 Limits of partial or interrupted views and sections, if the limit is not a chain thin
D —/\/\/\—	Continuous thin (straight) with zigzags	D1 Line
E – – – –	Dashed thick	E1 Hidden outlines
G ——— – ——— – ———	Chain thin	G1 Centre lines G2 Lines of symmetry G3 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 requirement applies
K ——— – – ——— – – ———	Chain thin, double-dashed	K1 Outlines of adjacent parts K2 Alternative and extreme positions of movable parts K3 Centroidal lines

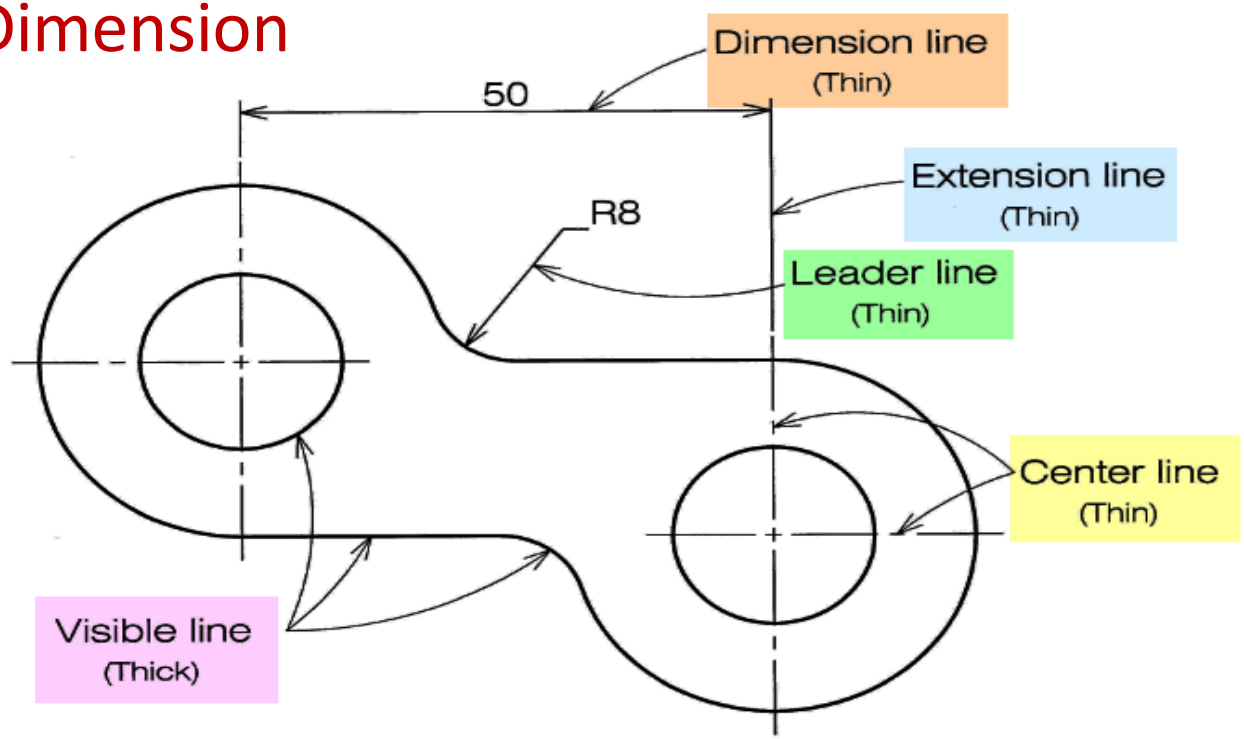


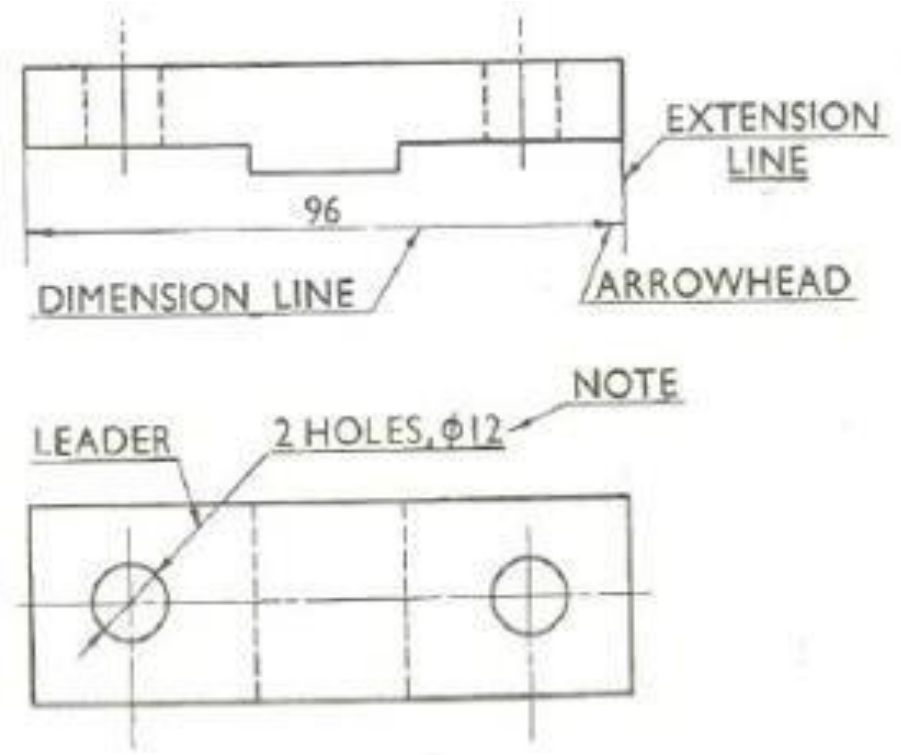


TYPE	DESCRIPTION	APPLICATION	PENCIL
	Continuous Thick	Object Lines or Visible Edges, Margins	HB
	Continuous Thin	Dimension Lines, Leader Lines, Projection Lines Guidelines	2H
	Short Dashed	Hidden Lines or Invisible Edges	H
	Long Chain Thin	Centre Lines or Lines of Symmetry	2H
	Long Chain Thick at Ends & Thin elsewhere	Cutting Plane Section Lines	2H

DIMENSIONING

- Projection Line (Extension Line)
- Dimension Line
- Leader Line
- Dimension Line Termination (Arrow Head)
- Dimension





Drawing Instruments

Drawing sheet

Scales (Roller scale)

Protractor

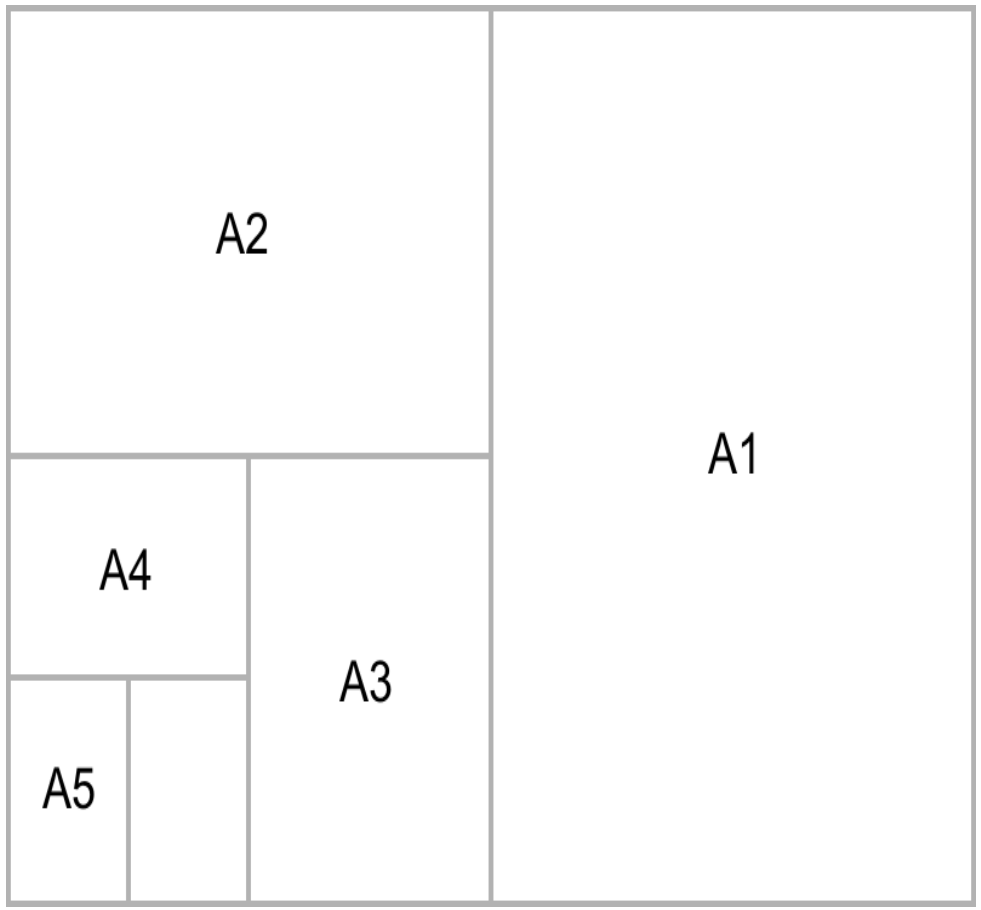
French curves

Drawing pencils

Eraser

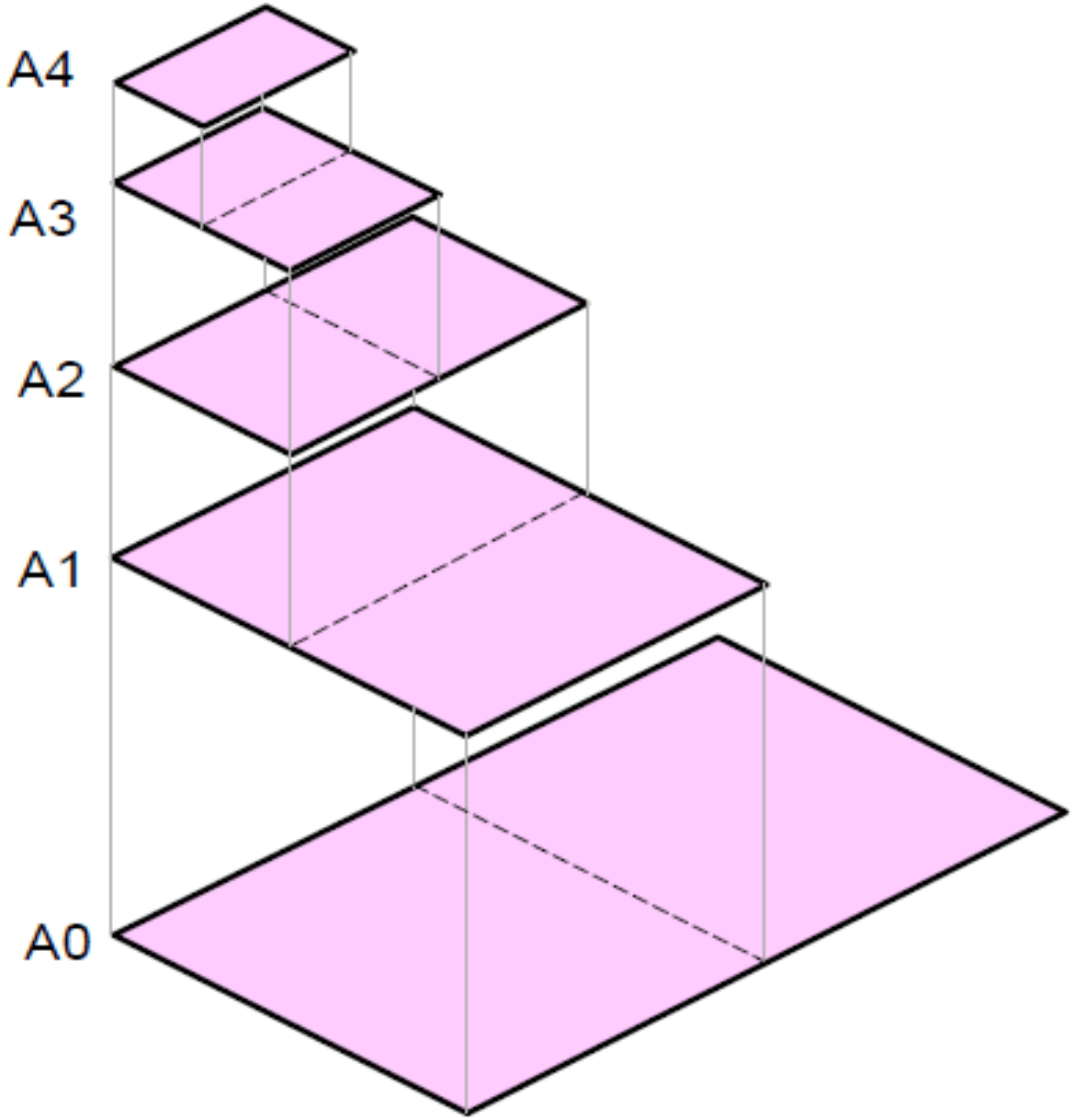
Sharpener

Drawing Sheet:



Paper	Size in mm	Use
A0	841 x 1149	Cinema Posters
A1	594 x 841	Flip Charts, Newspapers
A2	420 x 594	Engineering Drawings, Flip Charts
A3	297 x 420	Local Posters, Engineering Drawings
A4	210 x 297	Letters, Printouts, Common Purposes etc.
A5	148 x 210	Note Pads
A6	105 x 148	Bills
A7	74 x 105	Index Cards
A8	52 x 74	Playing Cards

- For class work use of A3 size drawing sheet is preferred.


A4
A3
A2
A1
A0

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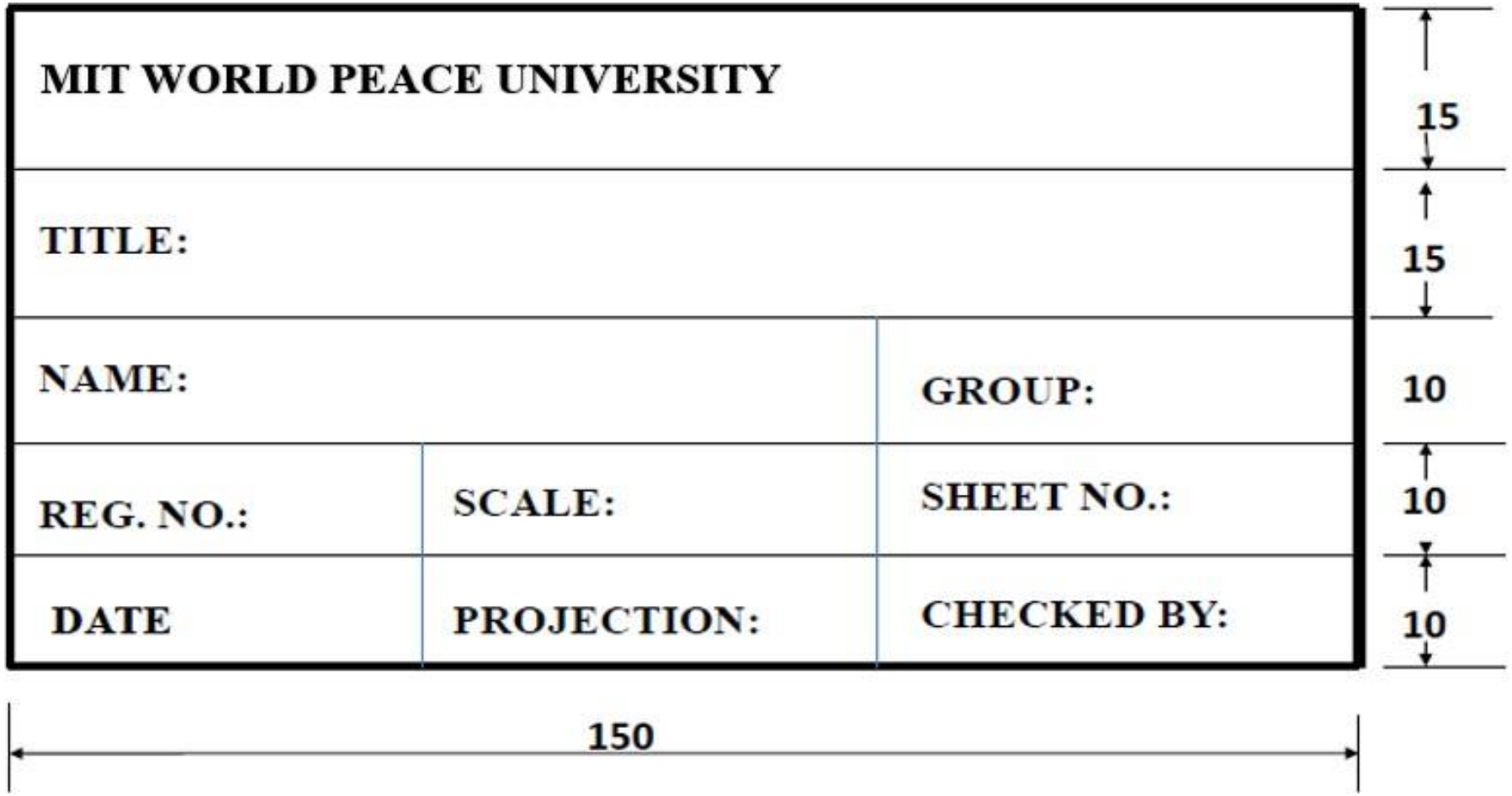
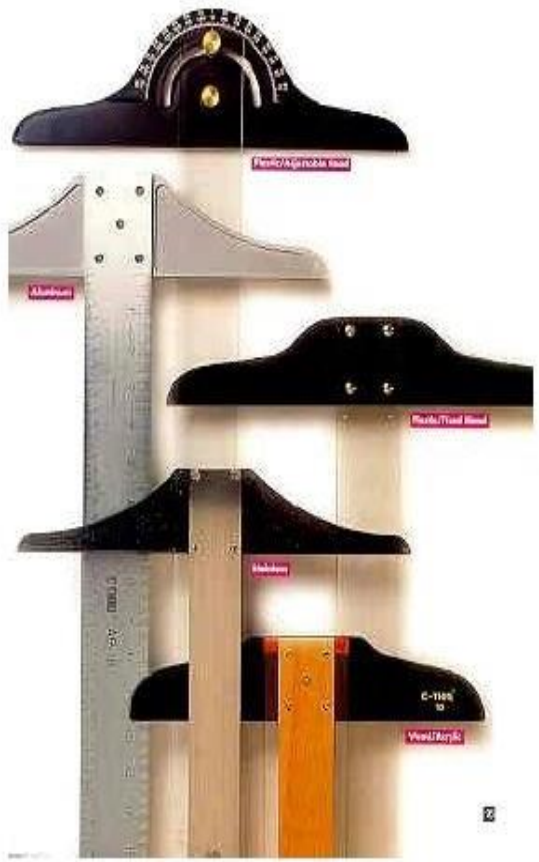
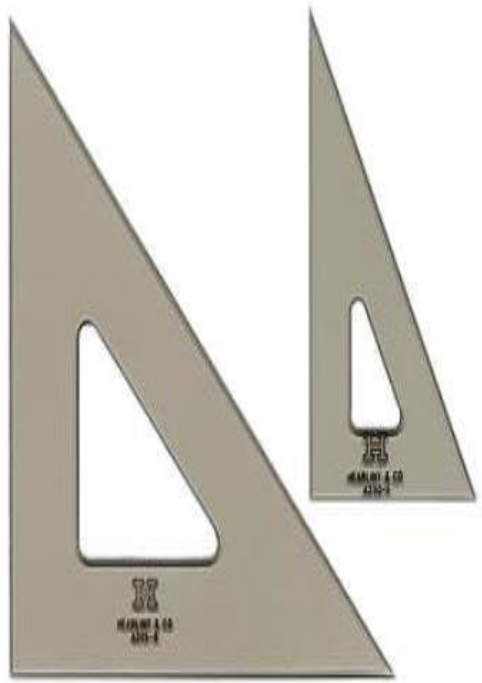
Layout of title box adopted in this course



Instrument Box



T - Square



Triangle

Pencils

2H or HB for thick line

4H for thin line