Engineering Drawing
EE-215

Lecture 1

What is engineering drawing?

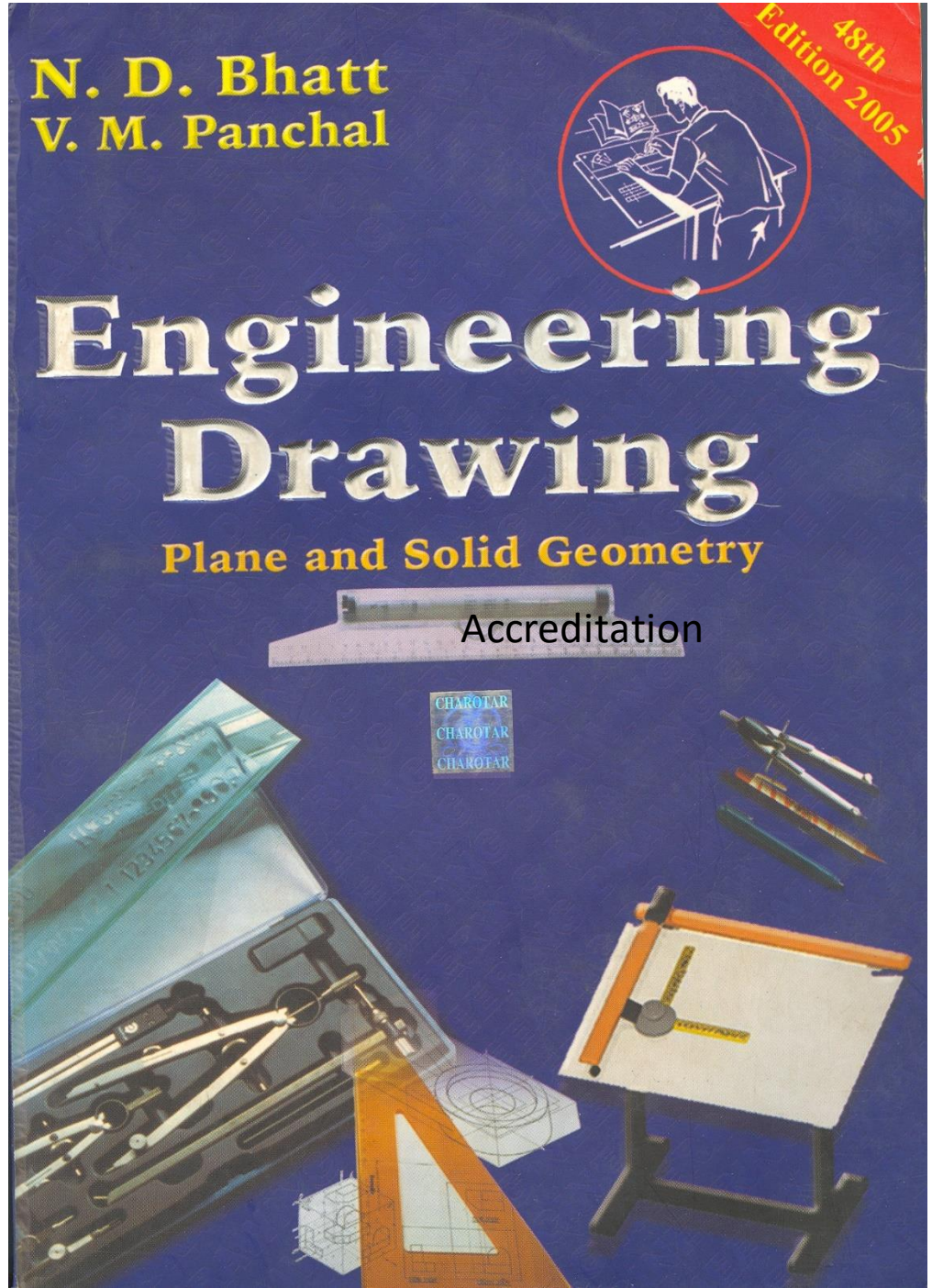
It is the art of representation of geometrical objects on a drawing sheet. An engineering drawing is used to fully and clearly define requirements for engineered items. It is a separate language for communicating between designer, manufacturer and inspection. It is prepared, based on certain principles, symbolic representations, standard convention and notation, etc.

Importance of engineering drawings

Engineering drawing is a two dimensional representation of a three-dimensional object. It is the graphic language and called the universal language of engineers. As an engineering drawing display a precise picture of the object to be produced. It conveys the same picture and information to every trained eye.

Course Contents

- Types Of Lines And Usage
- Dimensioning
- Lettering
- Orthographic First Angle And Third Angle Projection
- Sheet Planning
- Introduction To Computer Aided Drawing
- Isometric Projection
- Sectional Drawing
- Assembly Drawing



Accreditation

Drawing

Describing any object/ information diagrammatically

Engineering Drawing

It is a **Universal graphical language for engineers.**

OR

Graphical means of expression of technical details without the barrier of a language.

Diagrams/sketches/pictures – communication skills

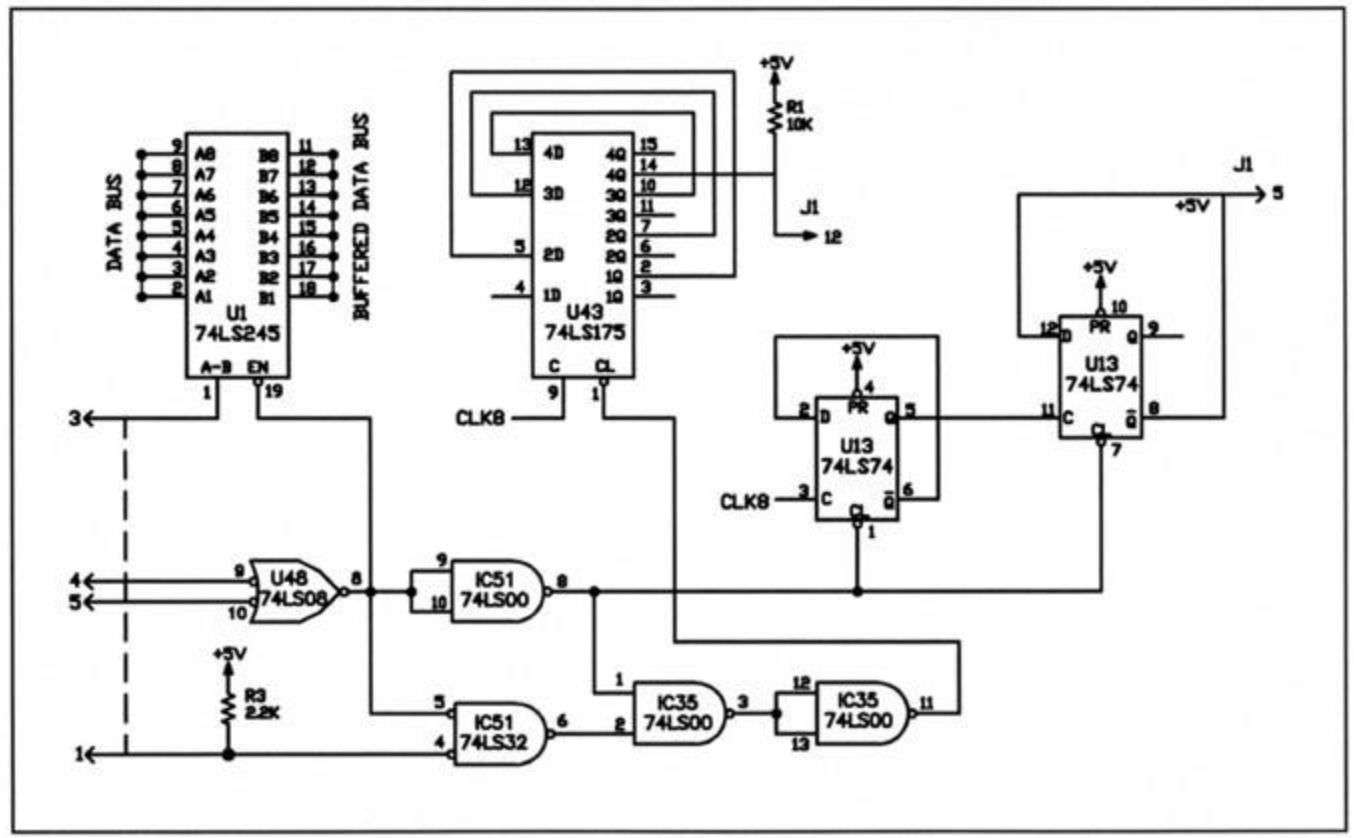
• We grasp information easily if it is illustrated with diagrams, sketches, pictures, etc.

LCA - the world's smallest, light weight, multi-role supersonic combat aircraft of the world

Source: http://img.stern.de/_content/53/96/539645/A380_500_artikel_500.jpg

AIRBUS A380

Details: largest passenger jet. 80m wingspan and a tail that stands as high as a seven-storey building, carries more than 550 passengers.



Electrical circuit

Drawing is important for all branches of engineering.

Graphical representation of an object – **Drawing**

- **Engineering drawing** – A drawing of an object that contains all information

-like **actual shape**, accurate size,**manufacturing methods**, etc., required for its construction.

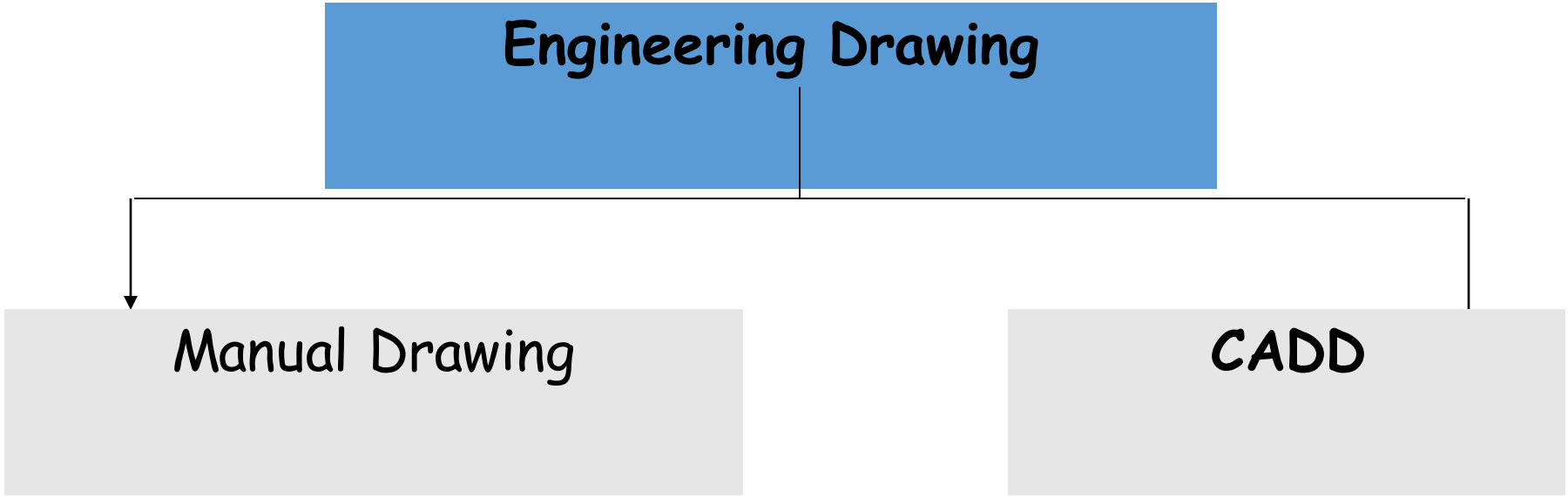
-No construction/manufacturing of any (man - made) engineering objects is possible without engineering drawing.

What will you learn in this course?

You will learn - How industry communicates technical information.

- Visualization – the ability to mentally control visual information.
- **Graphics theory** – geometry and projection techniques.
- Standards – set of rules that govern how parts are made and technical drawings are represented.
- **Conventions** – commonly accepted practices and methods used for technical drawings.
- **Tools** – devices used to create technical drawings and models.
- Applications – the various uses for technical drawings.

Engineering drawing is completely different from artistic drawing, which are used to express aesthetic, philosophical, and abstract ideas.



Computer has a major impact on the methods used to design and create technical drawings.

Design and drafting on computer are cheap and less time consuming.

Why we go for manual drawing?

Why we go for manual drawing?

Computer cannot replace the drafting board and equipment as a learning tool.

Once you have learned the basics of mathematics, now after class 12, you are allowed the use of calculator and computer.

If basic fundamentals are clear, better use can be made of the power of the software.

To be an expert in technical drawing, this first course on Engineering (manual) Drawing is the first step.

Items required for drawing Items required for drawing

Drawing board

Drawing sheet

Mini-drafter/drafting machine/ T- sqaure

Instrument box containing compass, divider, etc.

Scales

Protractor

French curves

Drawing pencils

Eraser

Drawing clip/pin/adhesive tape

Sharpener

Duster

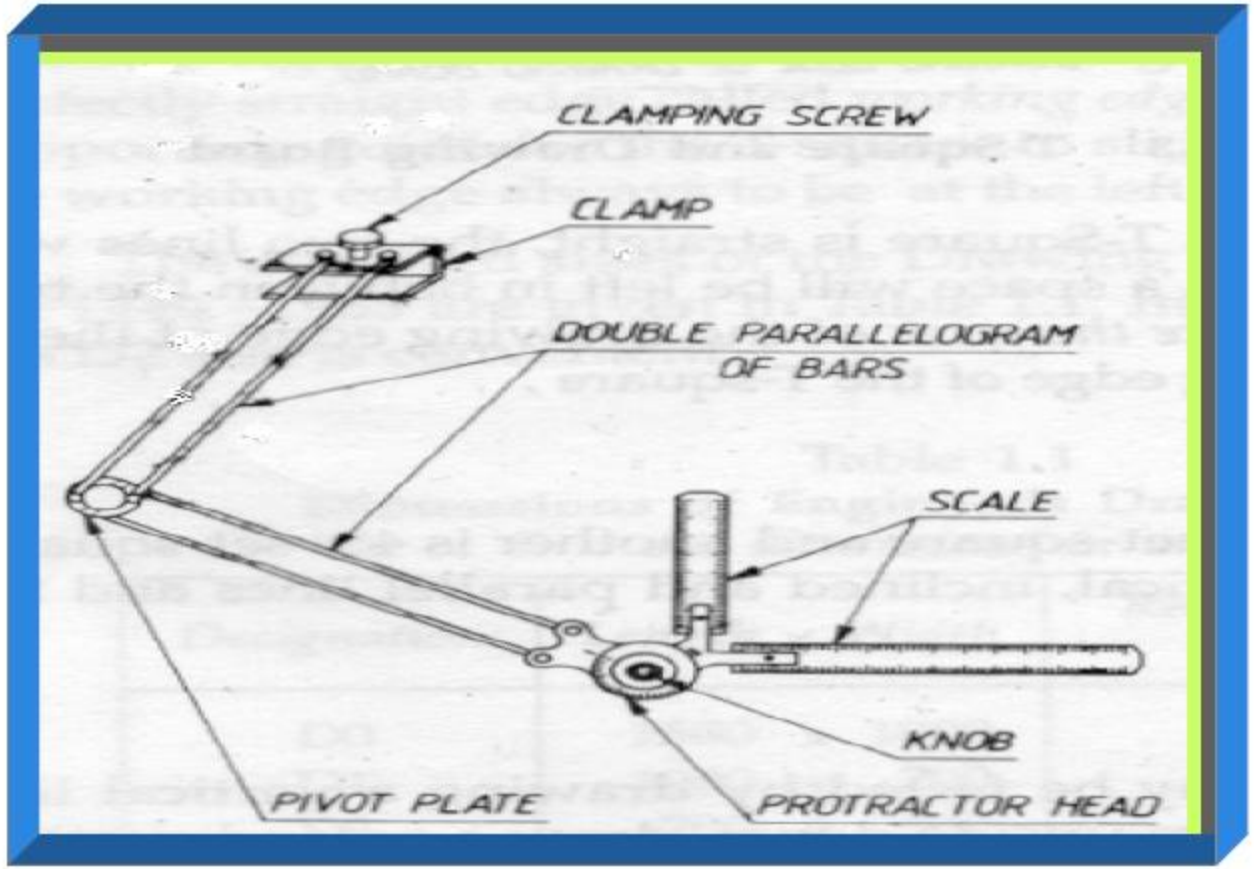
Working edge

Drawing board must be placed on the table with working edge always to be at the left side.

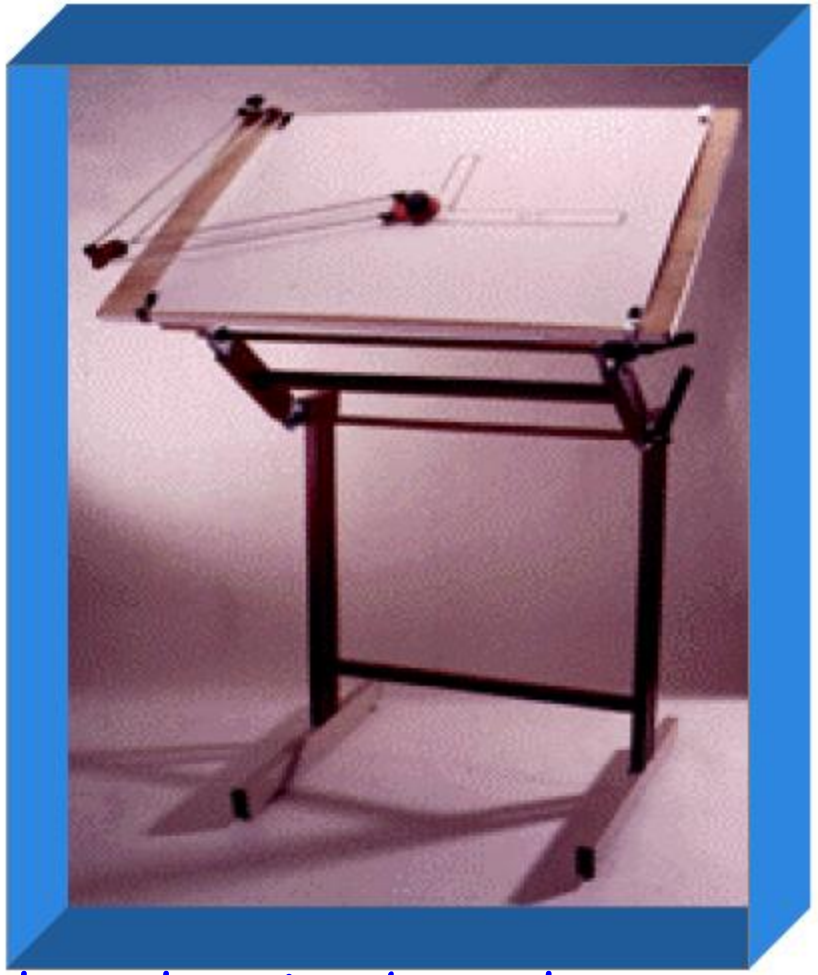
TABLE 1-1
SIZES OF DRAWING BOARDS

Designation	Size (mm)
B0	1000 × 1500
B1	700 × 1000
B2	500 × 700
B3	350 × 500

Last two sizes are normally used for student drawing



Mini-drafter – a miniature version of the drafting machine



Mini-drafter fixed on drawing board

Standard sizes of drawing sheets

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

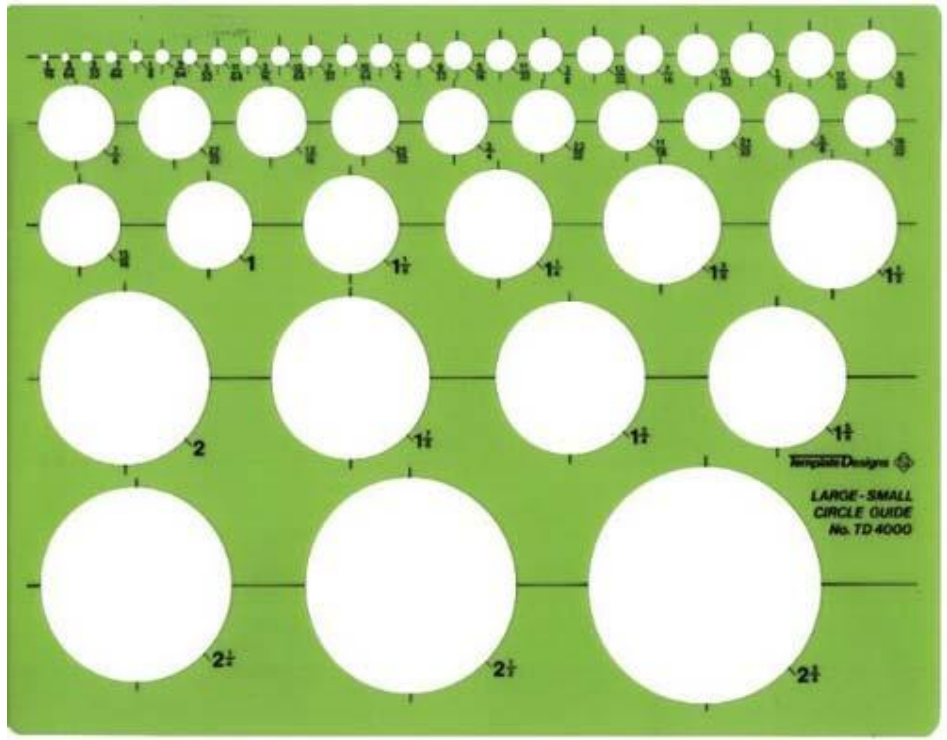
A2 size

ADJUSTABLE TRIANGLE

Used to draw angles from 0 to 90 degrees

CIRCLE TEMPLATE

Template used to draw circles and arcs



COMPASS

Used to draw circles and arcs

DIVIDERS

Used to divide lines into equal spaces

Used to transfer distances

Used to compare sizes of drawing elements

DRAFTING TABLE

Smooth, firm surface used to draw on

DRAFTING TAPE

Used to hold paper in place while drawing

DRAWING PENCILS

High quality pencils with varying sizes of lead

DRAFTING BRUSH

Brush eraser crumbs and debris from the drafting table

ELECTRIC ERASER

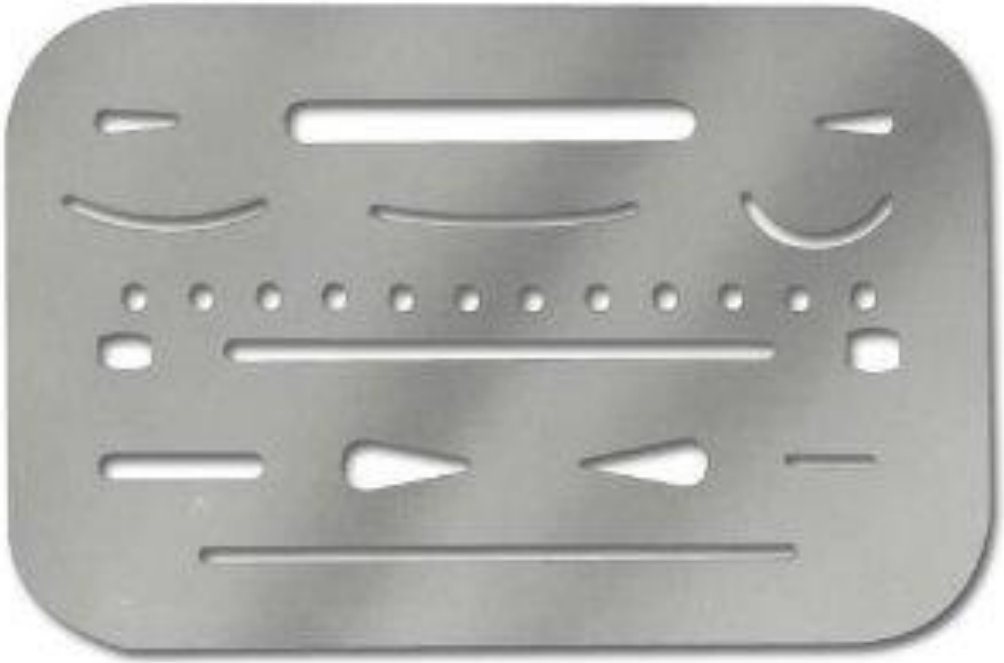
Used to erase quickly

ERASER

Used to erase mistakes

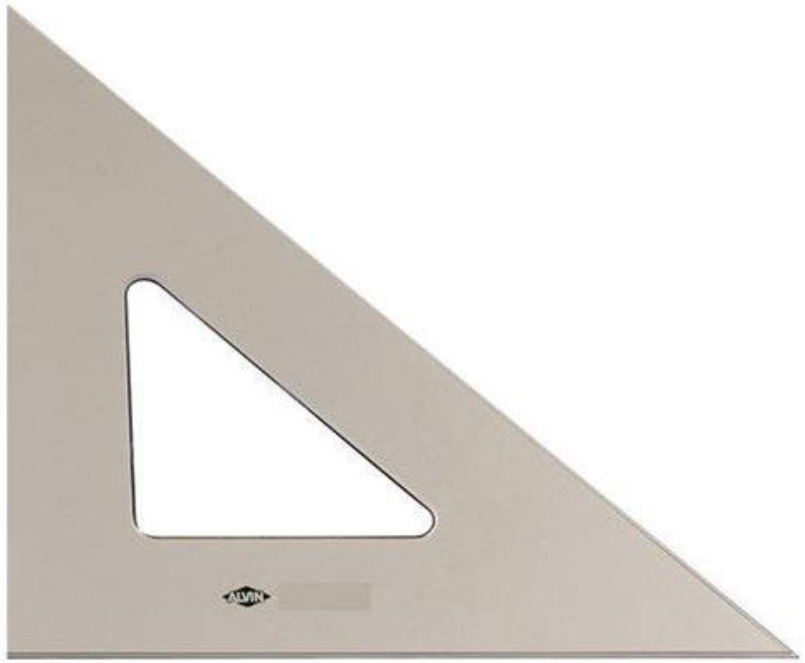
ERASING SHIELD

Used to protect lines you don’t want to erase



45 ° TRIANGLE

Used to draw 45 and 90 angles



30° - 60° TRIANGLE

Used to draw
30 and 60
degree angles

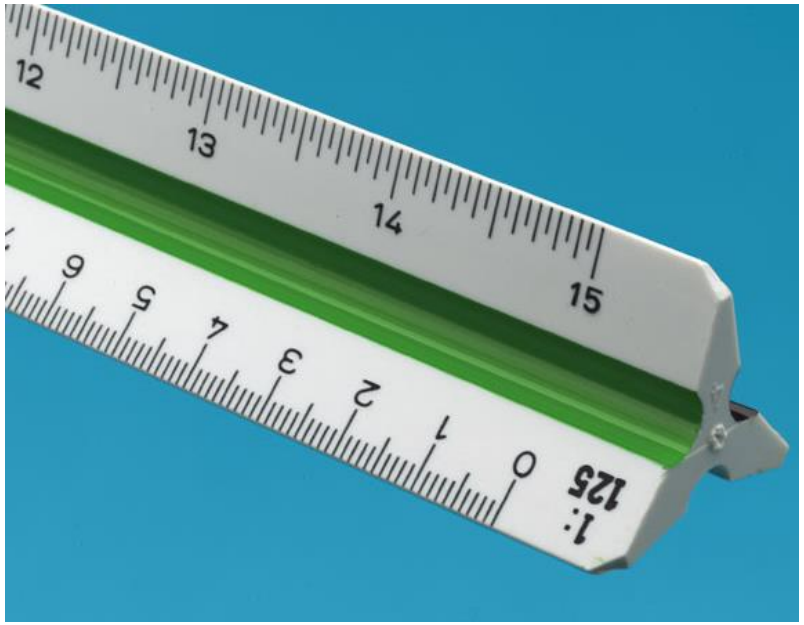
IRREGULAR CURVE

Used to draw non-circular curves

SCALE

Identified based on Ratios (1:20)

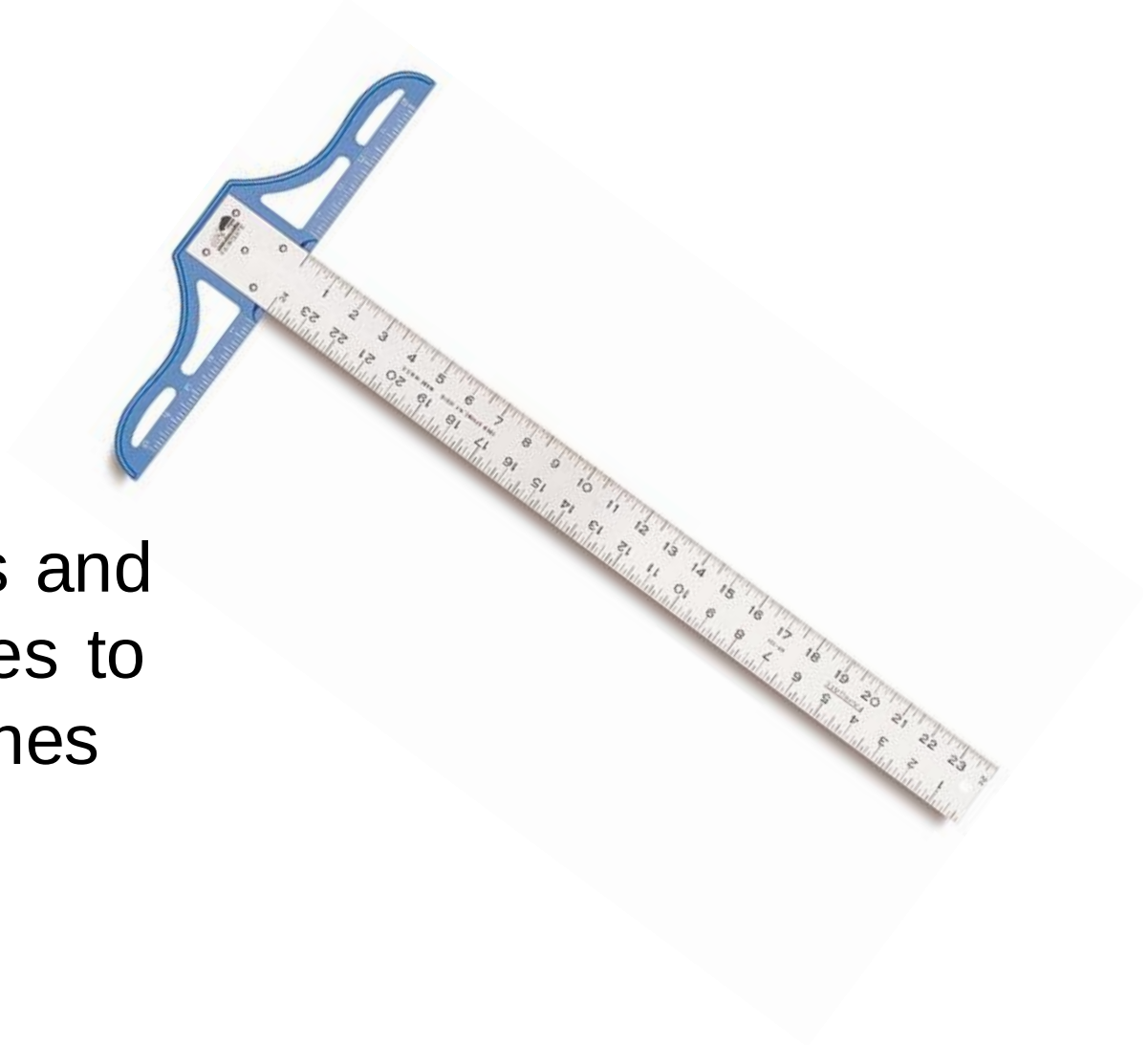
Any drawing requiring metric measurements



PROTRACTOR

Used to measure and lay out angles

T-SQUARE



Used to draw horizontal lines and support triangles to draw vertical lines

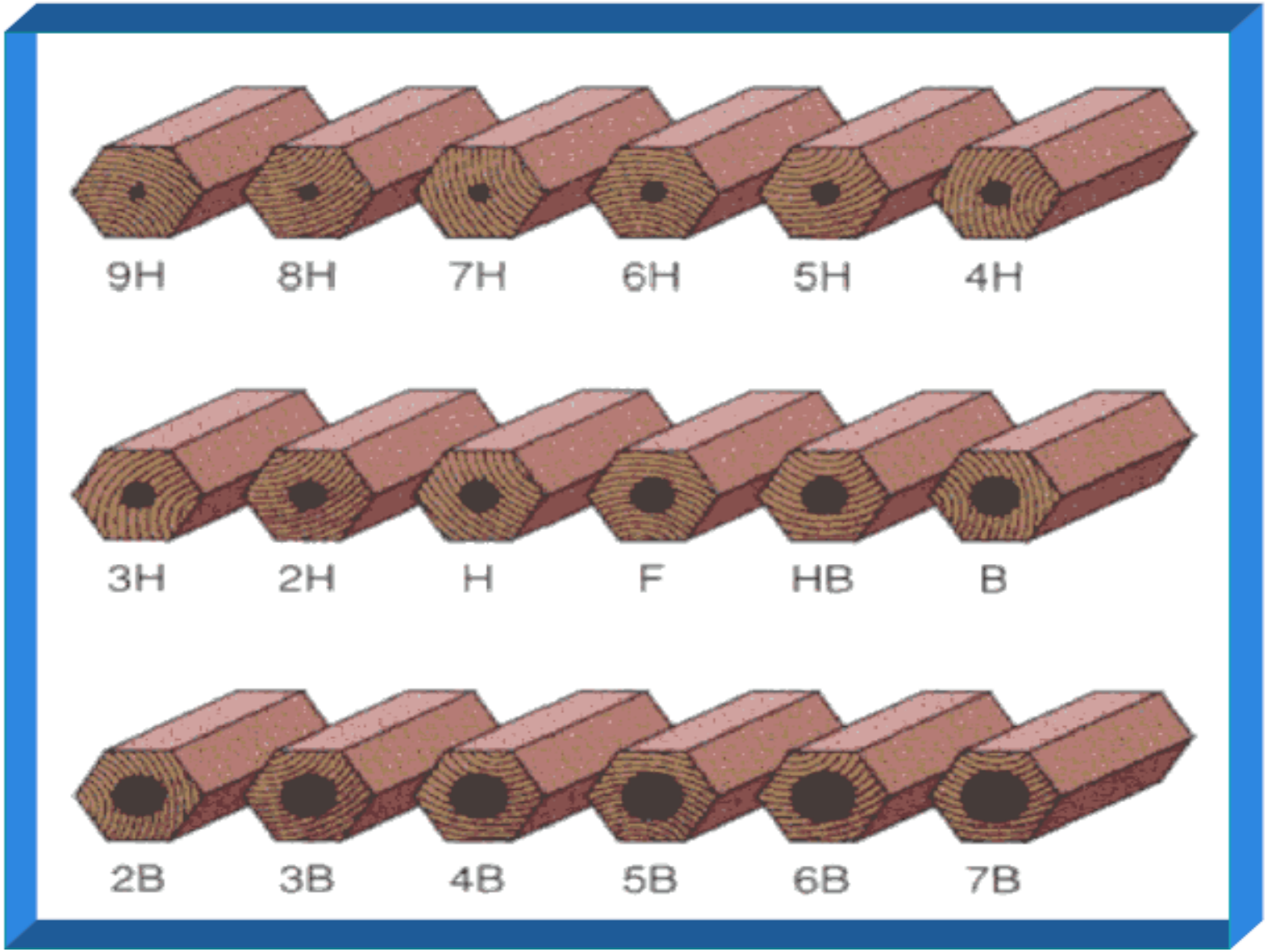
Drawing Pencils

Wooden pencils – are graded and designated by numbers and letters

Mechanical clutch pencils – **Not allowed**

- 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.



Grades and designation of wooden pencils