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ME 1110 – Engineering Practice 1

Engineering Drawing and Design - Lecture 2

Introduction to Engineering Drawing

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www.staff.city.ac.uk/~ra600/intro.htm

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Objectives for today

- Communication modes in engineering design
- Types of drawings
- Technical (engineering) drawing standards
- Orthographic projections
- 3rd and 1st Angle Projection

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Introduction to Drawing

- Communicating
  - » engineer to engineer
  - » engineer to non-engineer
  - » non-engineer to engineer
  - » more than words

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Types of engineering communication

- » Drawings and sketches
  - – Traditional techniques
  - – CAD
- » Graphical communication
  - – Technical illustrations, diagrams …
- » Written communication
- » Oral communication

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Engineering Graphics

- Model
  - » Physical or computer generated
- Technical illustration
  - » Representation of part for non-technical person
- Technical sketch
  - » Expression of ideas and preliminary designs

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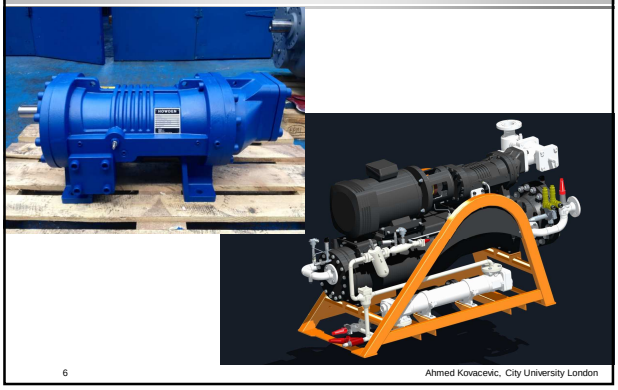
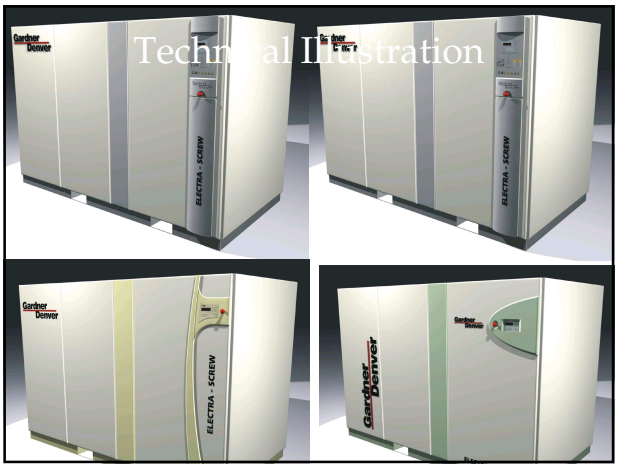
3D Model





Technical Illustration

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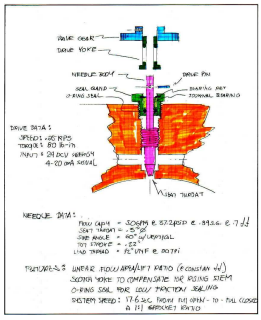
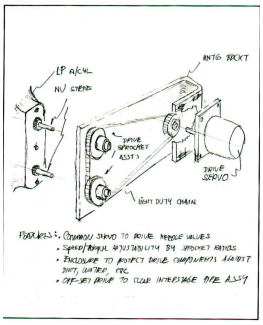
Design week

Technical Sketching





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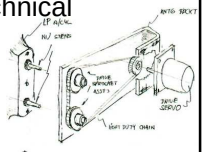
Design week

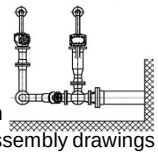
Technical Drawing

There are various types of technical drawing

- Design Sketches
  - » Initial Ideas and Requirements
  - » Calculations and Concepts



- Layout Drawings
  - » development of initial design
  - » used to create detailed or assembly drawings



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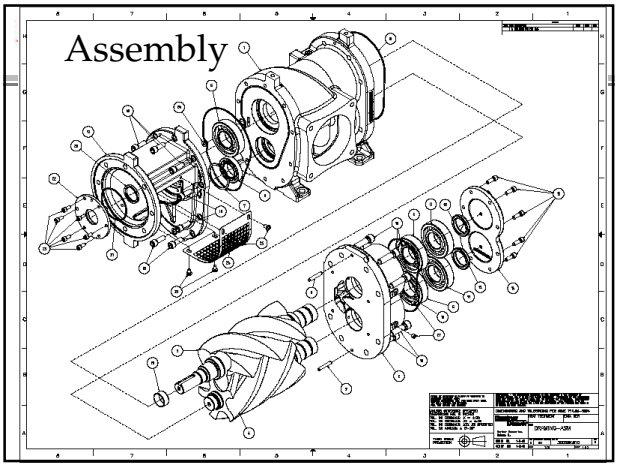
Design week

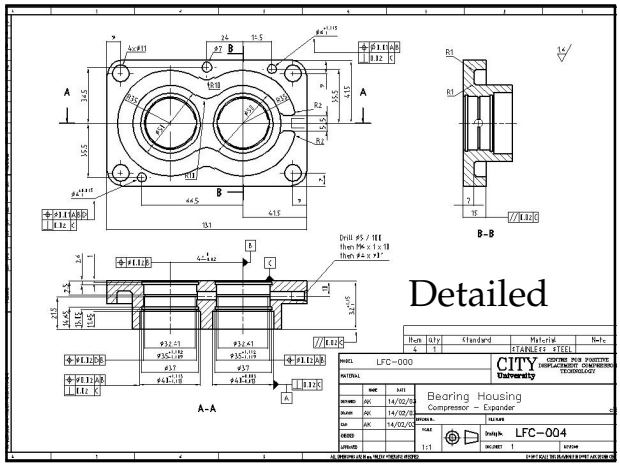
Technical Drawing - cont

- Assembly Drawings
  - » parts +/or sub-assemblies = component / machine

- Detail Drawings
  - » information to make or purchase
  - » Include shape, dimensions, tolerances, surface finish...



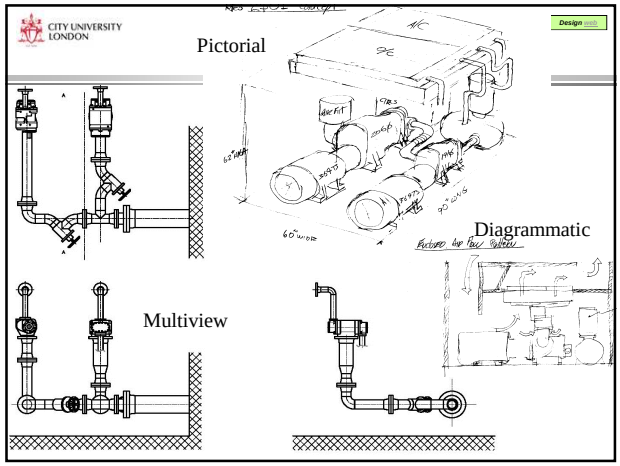
Assembly

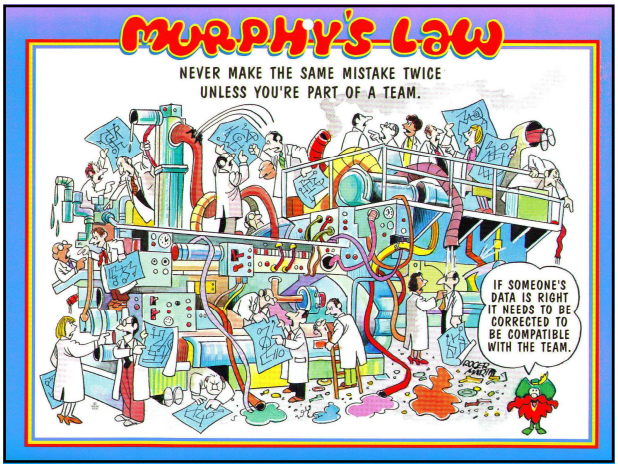


Detailed

Sketching

- Communication among engineers
- Three types of sketches
  - » Pictorial
    - – Technical Illustration
  - » Multiview
    - – Engineering Drawing
  - » Diagrammatic
    - – System Illustration

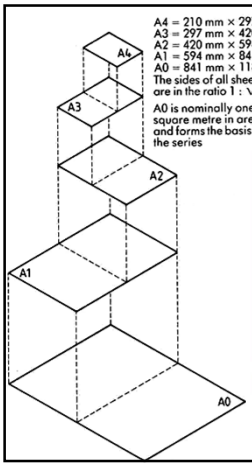




Standard Code

Country	Code	Full name
Thailand	มอก.	สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
USA	ANSI	**A**merican **N**ational **S**tandard **I**nstitute
Japan	JIS	**J**apanese **I**ndustrial **S**tandard
UK	BS	**B**ritish **S**tandard
Australia	AS	**A**ustralian **S**tandard
Germany	DIN	**D**eutsches **I**nstitut für **N**ormung
	ISO	International **S**tandards **O**rganization

Drawing Layout



A4 = 210 mm × 297 mm
A3 = 297 mm × 420 mm
A2 = 420 mm × 594 mm
A1 = 594 mm × 841 mm
A0 = 841 mm × 1189 mm
The sides of all sheets are in the ratio 1 : √2

A0 is nominally one square metre in area and forms the basis of the series

BS8888
British standard for Engineering drawings

Paper size: 420x297 mm (A3)
Border size: 400x287 mm

Distance between border and end of page:
- Left 15mm
- Bottom 5mm
- Right 5mm
- Top 5mm

Always use A3 pages for your exercises if not specified differently in the tutorial sheet. Use as many A3 pages as you need for your exercise.

All fields on each page in the title block must be filled. Use BS8888 to standardize all elements of the drawing. Minimum text height is 3mm.

100	100	20	30	50	20
Group and Tutor Name	Exercise Code and Title	Page No	SCALE DATE	Name	

Elements of the Title Block

ABCDEFGHIJKLMNOPQRST
UVWXYZ
1234567890

ABCDEFGHIJKLMNOP
QRSTUVWXYZ
1234567890

Text should not be smaller than 3mm.

Projection	Symbol
First angle	
Third angle	

On drawings smaller than full size (reduction scales):

1:2	1:5	1:10
1:20	1:50	1:100
1:200	1:500	1:1000

On drawings larger than full size (enlargement scales):

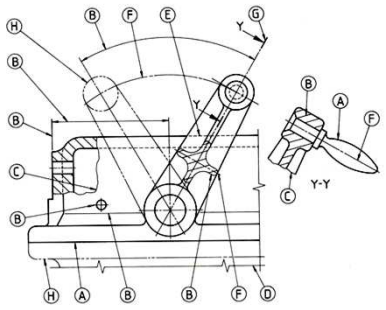
2:1	5:1	10:1
20:1	50:1	

Title block text 4-6 mm

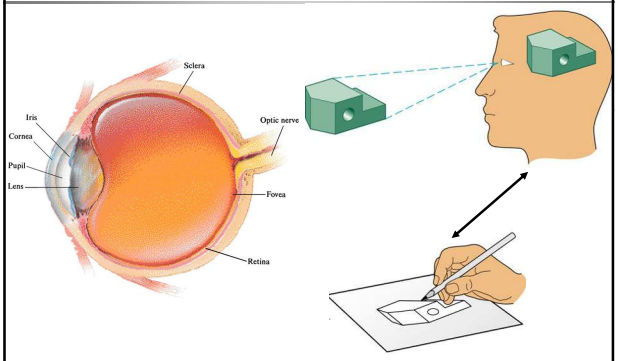
100	100	20	30	50	20
Group and Tutor Name	Exercise Code and Title	Page No	SCALE DATE	NAME	

Lines

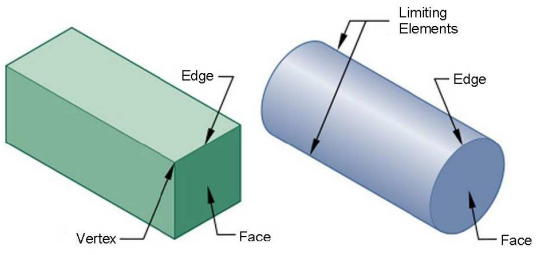
Line	Description	Application
A	Continuous thick	Visible outlines and edges
B	Continuous thin	Dimension, projection and leader lines, hatching, outlines of revolved sections, short centre lines, imaginary intersections
C	Continuous thin irregular	Limits of partial or interrupted views and sections, if the limit is not an axis
D	Continuous thin straight with zigzags	
E	Dashed thin	Hidden outlines and edges
F	Chain thin	Centre lines, lines of symmetry, trajectories and loci, pitch lines and pitch circles
G	Chain thin, thick at ends and changes of direction	Cutting planes
H	Chain thin double dashed	Outlines and edges of adjacent parts, outlines and edges of alternative and extreme positions of movable parts, initial outlines prior to forming, bend lines on developed blanks or patterns



Human vision

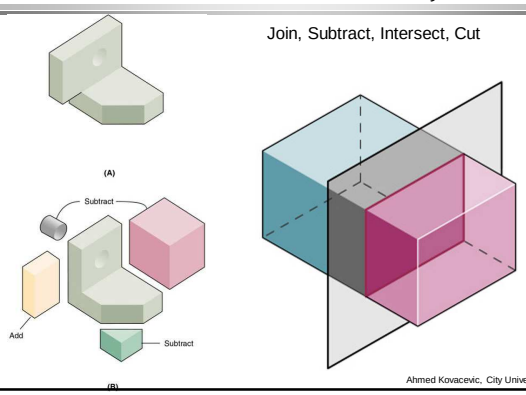


Features of Solid Objects

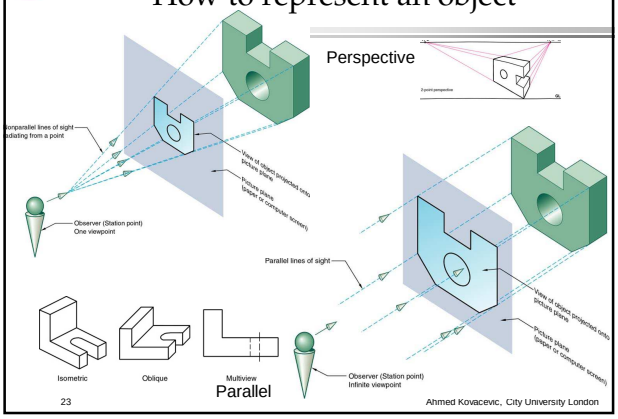


How to create an Object

Join, Subtract, Intersect, Cut



How to represent an object



Multiview - Orthogonal

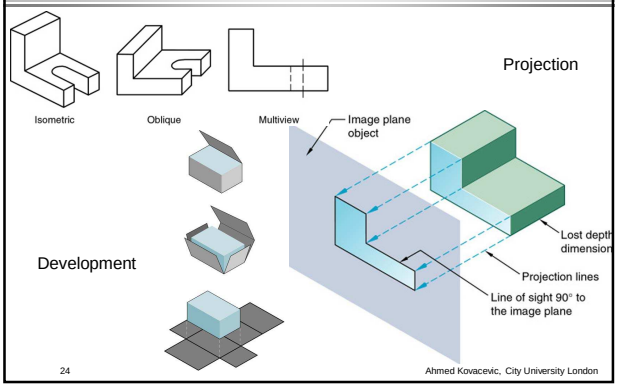
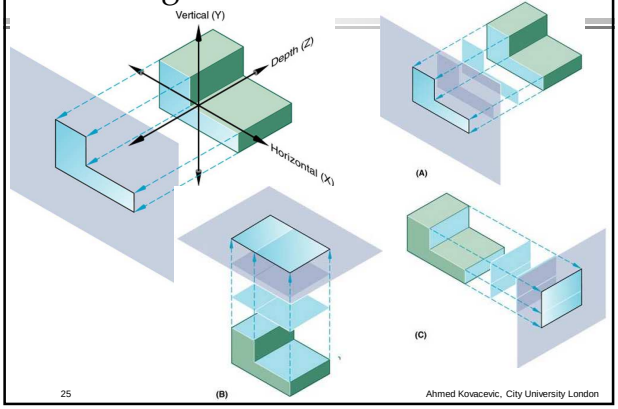
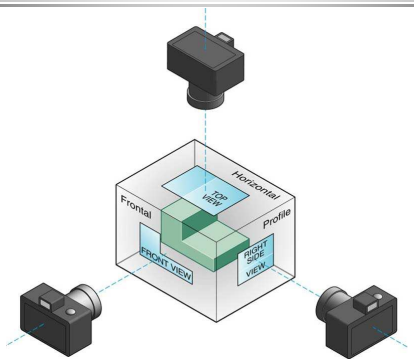


Image orientation – normal faces

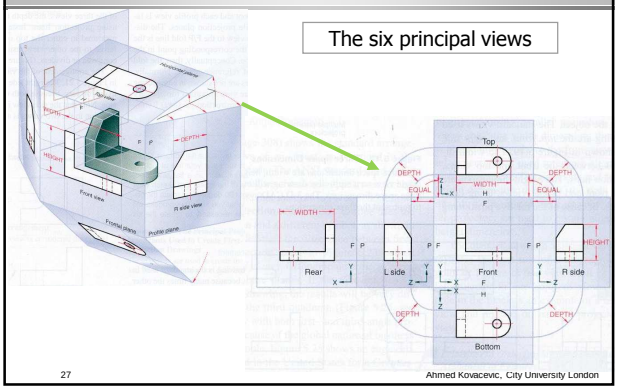


Camera metaphor

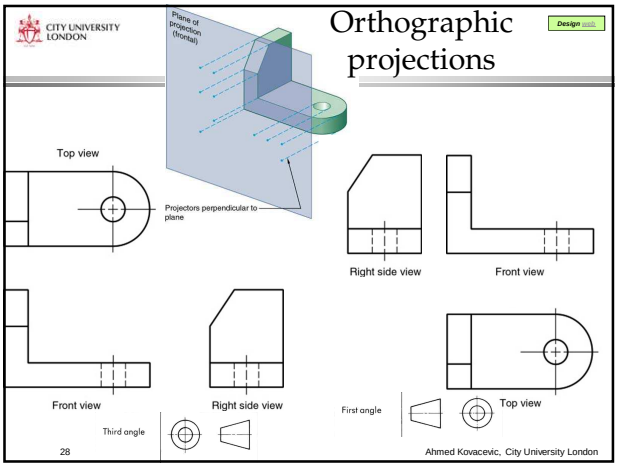


Orthographic projections

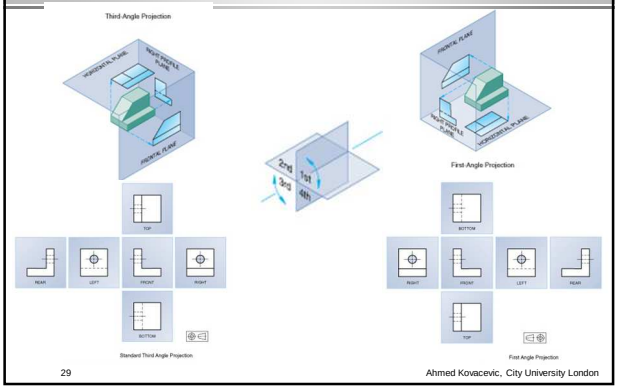
The six principal views



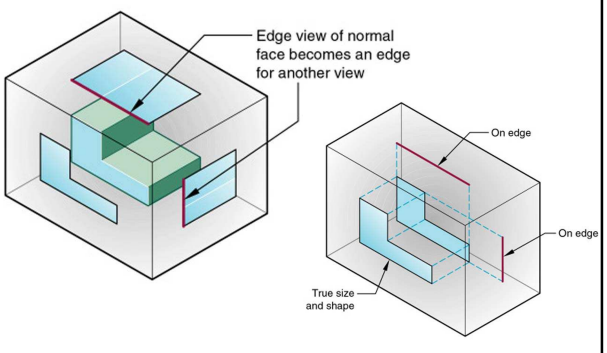
Orthographic projections



3rd and 1st angle projection



Normal views and face projection



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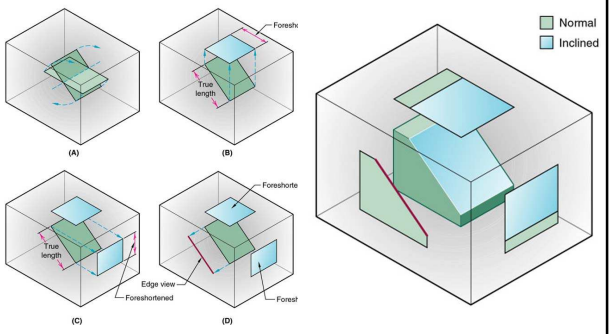
Normal and inclined face projections



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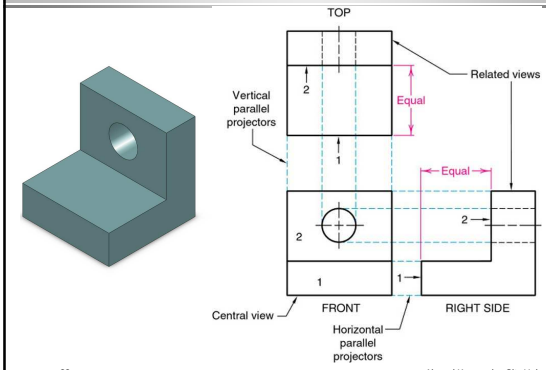
View alignment and features



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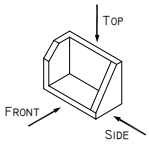
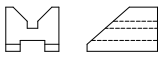
Design week

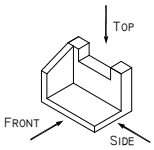
Exercise DrE-1b



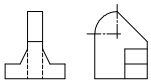
Draw the views shown in 3rd Angle Projection



State whether the views shown are in 1st or 3rd angle.
Draw the top view in an appropriate position.



Draw the views shown in 1st Angle Projection



State whether the views shown are in 1st or 3rd angle.
Draw the top view in an appropriate position.