436-105 Engineering Communications
GL6: Engineering Drawing Standards

- Line conventions and hierarchy
- Dimensioning
- Screw threads
- Sectioning
- Welds
- Surface texture

- Common elements
  - bearings
  - springs
  - shafts, tubes
  - gears
  - fasteners

- Drawing types
  - detail
  - assembly
Slides

• Following is a selection of some of the transparencies discussed in this lecture
Fig. 7.1 Features found on engineering drawings
Example: draw multiviews of bracket
GL6:5

Functional datum

Bilateral tolerance

Poor practice? : redundant dimensions

Place dimensions in appropriate view

Process, surface finish

General notes

3rd angle projection

Dimension a group of features
Basic dimensioning practice

Arrowheads are drawn open or solid about 3 mm long and 1 mm wide

Dimension lines are thin lines

2 mm past dimension line

1 mm gap

Arrowheads should touch projection lines at extremities of the dimension

Dimension line is drawn parallel to direction of measurement and placed outside the view where possible

Figures should be approximately 2.5 mm high

Projection lines are thin lines and may cross over when necessary

Spacing between dimension lines and outline should be equal and about 12 to 15 mm

Arrowheads are placed on the outside of projection lines for smaller dimensions

Figure is normally placed above the line in the direction of the arrowheads and readable from bottom or right-hand side

Fig. 1.19 Use of projection and dimensioning lines
Fig. 1.23 Use of overall dimensions
Fig. 1.22 Use of staggered dimensions
Auxiliary or reference dimensions
Dimensioning rounds

- R5
- R3
- R10
- R20
Dimensioning large radii
## Dimensioning curved surfaces

<table>
<thead>
<tr>
<th>Curved surface or arc length</th>
<th>25</th>
<th>22</th>
<th>20</th>
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<tbody>
<tr>
<td>Circumferential</td>
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### Spherical Diameter

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### Spherical Radius

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(a) external thread: side and end view

(b) external thread: section

Representing external threads
Representing internal threads

(e) internal thread: outside view

(d) internal thread: sectional view

(e) internal thread: end view
Representing threads in assembly

(a) threads in assembly

(c) square thread
Representing bolted assembly

(b) assembly of a stud in a blind hole
Dimensioning external threads

(a) dimensioning length of full thread

(b) dimensioning to end of full thread

(c) dimensioning length of full thread and runout
Dimensioning internal threads

M12 20 MIN LG
FULL THD

M18 x 1.5 - 6H
22 MIN LG
FULL THD
Dimensioning internal threads

M12 x 1.25 – 6H
20 MIN LG FULL
THD 25 MAX INCL
RUNOUT

(c)

(d)
Dimensioning countersinks

\( \phi 6 \sqrt{\phi 12} \times 90° \)
Dimensioning counterbores

(a)
Dimensioning counterbores

(a) 

(b) 

(c)
Specifying surface texture

- Basic surface texture symbol
- Mandatory machining
- Natural surface: no machining permitted
Follow up

- Read Bertoline:
  - Chapters 3, 14, 15, §§ 17.6, 17.8, chapter 19
- Do problems from Bertoline:
  - Probs 14.1(1)(6),
    14.2 (Figs 14.57, 14.61, 14.86)
    15.1(1)(3)(5), 15.5, 15.15