

ENGINEERING DRAWING STUDY NOTES

Instruments Used in Engineering Drawing

Engineering drawing requires precision and clarity. The following instruments are commonly used:

- **Drawing Board**: A flat surface for drawing, usually made of wood or a rigid material, providing a stable base.
- **T-Square**: A straight edge with a crossbar used to draw horizontal lines and to guide other tools.
- **Set Square**: A triangular tool used for drawing angles (typically 30°, 45°, and 60°). It can be combined with the T-square for more precision.
- **Compass**: Used to draw arcs and circles. It has two legs: one with a pencil and the other with a pointed end.
- **Protractor**: A semi-circular tool used to measure and draw angles.

- **Scale**: A ruler marked with specific measurements (e.g., metric or imperial) for scaling drawings accurately.
- **Drafting Pencils**: Pencils of varying hardness for drawing different line weights and details.
- **Erasers and Correction Fluid**: Tools for correcting mistakes and cleaning up drawings.
- **Templates**: Pre-formed shapes (e.g., circles, ellipses) that assist in drawing consistent shapes and symbols.

Applications of Freehand Sketching, Lettering and Dimensioning

Freehand Sketching:

- **Applications**: Used for quick representations, brainstorming ideas, and initial concepts and Helps in visualizing designs before formal drawings.
- **Benefits**: Enhances creativity, speed, and allows for flexibility in design without needing precise instruments.

- Lettering:

- **Applications:** Essential for labeling drawings, dimensions, and notes. Ensures clarity and professionalism in engineering documentation.

- **Techniques:** Consistent height and style (e.g., uppercase letters, sans-serif fonts) to enhance readability.

- Dimensioning:

- **Applications:** Provides accurate measurements for the size and location of features on a drawing and Essential for fabrication and assembly.

- **Standards:** Follows specific guidelines (e.g., ISO or ANSI) to ensure uniformity and clarity.

Layout and Title Block

- **Layout:** Refers to the arrangement of views, dimensions, and notes on a drawing sheet. A well-organized layout enhances clarity and facilitates understanding.

- **Title Block**: Located at the right bottom corner of a drawing sheet, it contains essential information about the drawing, including Drawing title, Designer's name, Scale, Date, Sheet number, Class, Roll number, Grade, Valued by and Symbol of projection.

Various Dimensions

Dimensioning is crucial in engineering drawings to communicate sizes and specifications.

- **Chain Dimensioning**: Measures from one feature to another in a sequential manner and all dimension lines are in same datum.
- **Parallel Dimensioning**: In this multiple dimensions are placed parallel to each other, with each dimension referring to a common baseline or reference point.
- **Combined Dimensioning**: It is the combination of both chain dimensioning and parallel dimensioning.
- **Super Imposed Running Dimensioning**: in this the origin should be indicated appropriately, and one end of the dimension line should be

terminated at the origin while the other end should carry an arrow head.

- **Co-ordinate Dimensioning:** Uses a coordinate system to define the position of points relative to a datum.

Concept of Quadrants in Engineering Drawing

- **Quadrants:** The coordinate plane is divided into four quadrants, defined by the X and Y axes:
 - **First Quadrant:** Both X and Y values are positive (top right).
 - **Second Quadrant:** X is negative, Y is positive (top left).
 - **Third Quadrant:** Both X and Y values are negative (bottom left).
 - **Fourth Quadrant:** X is positive, Y is negative (bottom right).

Understanding quadrants helps in plotting points and interpreting coordinates accurately in technical drawings.

Differentiating First Angle and Third Angle Projection

- First Angle Projection:

The object is placed in the first quadrant, and views are projected onto the planes opposite to the viewer (e.g., top view is below, right side view is to the left).

- Commonly used in Europe and many other countries.

- Third Angle Projection:

The object is placed in the third quadrant, and views are projected onto the planes adjacent to the viewer (e.g., top view is above, right side view is to the right).

- Widely used in the United States and other regions.

Shop Floor Drawing and Its Importance

- Shop Floor Drawing:

A detailed technical drawing used in manufacturing that includes specifications, dimensions, materials, and assembly instructions for production.

- Importance:

- Guides machinists and operators in the fabrication and assembly processes.
- Ensures accuracy and consistency in manufacturing.
- Helps in communicating technical information clearly to the shop floor personnel.
- Serves as a reference for quality control and inspection.