

AME-107 ENGINEERING DRAWING AND CAD BASICS

CourseTitle :	Engineering Drawing and CAD basics	Course Code	AME-107
Semester	I-SEMESTER	Course Group	Practical
TeachingSchemein Periods(L:T:P)	30:0:60	Credits	2
Methodology	Lecture+ Practice	Total Contact Periods:	45
CIE	60 Marks	SEE	40 Marks

COURSE OUTCOMES (CO)

Sl. No	Course Outcome
CO1	Explain scope of engineering drawing, use instruments correctly, apply BIS standards, and prepare neat sheets with simple figures.
CO2	Demonstrate proper lettering, apply BIS dimensioning codes, use aligned/unidirectional systems, and produce clear annotated drawings.
CO3	Learn projection of points, lines, planes and Orthographic views.
CO4	Able to know the Isometric drawing
CO5	Development of surfaces of simple and truncated surfaces.
CO6	Able learn basics of CAD software and practicing simple figures with CAD software

EXAM PATTERN

C0	Exam	Drawing
CO-1 & 2	Mid-1	Manual drawing
CO- 3 & 4	Mid-2	Manual drawing
CO -5 & 6	SEE	Manual & CAD based drawing

COURSE CONTENT

Unit 1: Importance of Engineering Drawing & Instruments (06 Periods)

- Scope & Objectives: Engineering drawing as universal communication tool; role in design & manufacturing; need for BIS standards (SP-46).
- Pencils (grades), erasers, scales, set squares, compass, divider, protractor, French curves; mini drafter for parallel/inclined lines; care & maintenance.
- Sheet Sizes & Layout: Standard sizes A0–A5; borders & margins; title block contents (name, roll no., subject, scale, date); neatness & preservation.
- Line Types: Visible, hidden, center, dimension lines; BIS conventions.
- Practice: Practice: Prepare neat A4/A3 sheet with border & title block, draw borders/margins/lettering, use drafter for parallel/inclined lines, circles with compass, construct plain/diagonal scales, practice line types, and draw simple figures (square, rectangle, triangle, and circle with inscribed polygon).

2. Lettering & Dimensioning (09 Periods)

- Freehand lettering and numbering: types of lettering, guidelines, practicing letters and numbers of sizes (10mm, 14mm), use of stencils.
- Dimensioning practice: purpose, BIS code, dimension lines, extension lines, leader lines, arrows, notes, rules.
- Placing dimensions: aligned and unidirectional systems, chain, parallel, progressive, coordinate methods.
- Dimensioning features: circles, arcs, angles, tapers, chamfers, narrow spaces.
- **Practice:** lettering and dimensioning exercises manually with drafter.

3. Projection of Points, Lines, Planes & Orthographic Projections (09 Periods)

- Principle of projections and essential views, orthographic projection and exercises.
- Plan, Elevation, Side views in first angle projections, simple exercises.

4. Pictorial Drawing (06 Periods)

- Brief description of different types of pictorial drawing
- Isometric view and Isometric projection and Isometric scale
- Need of Isometric scale difference between Isometric view and Isometric projection.
- Isometric drawing of simple figures.

5.0 Development of Surfaces (06 Periods)

- Parallel line and radial line methods developments, Development of simple and truncated surfaces (Cubes, Prisms, Pyramids, and Cylinders & Cones)

6. Basics of CAD Environment : (09 Periods)

- Starting CAD software, user interface, coordinate system.
- Drawing environment setup (units, limits, layers).
- Basic geometric commands: line, circle, arc, polygon, ellipse.
- Modify commands: erase, copy, move, rotate, scale, trim, extend, mirror.
- Display control: zoom, pan, regen.
- Object snaps (e.g., endpoint, midpoint, centre, tangent, intersection, etc.) and construction aids (grid, polar tracking, ortho mode, dynamic input, construction lines).

Learning Outcomes

Unit 1: Importance of Engineering Drawing & Instruments (06Periods)

- Understand scope and objectives of engineering drawing as a communication tool.
- Identify and correctly use basic drawing instruments and maintain them.
- Apply BIS standards for sheet sizes, borders, title blocks, and line conventions.
- Construct and interpret reduced/enlarged scales and representative fraction.
- Prepare neat drawing sheets with proper layout and simple geometric figures.

Unit 2: Lettering & Dimensioning (09 Periods)

- Demonstrate freehand lettering and numbering with correct proportions and sizes.
- Apply BIS codes for dimensioning using proper lines, arrows, and notes.
- Use aligned and unidirectional dimensioning systems effectively.
- Dimension circles, arcs, angles, tapers, chamfers, and narrow spaces accurately.
- Produce neat lettering and dimensioning exercises manually.

Unit 3: Projection of Points, Lines, Planes& Orthographic Projections (09Periods)

- Principleofprojectionsandessentialviews,Projection of points, lines, planes(First angle) orthographicprojectionandexercises.
- Plan,Elevation,Sideviewsinfirstangleprojections,simpleexercises.

Unit 4: Pictorial Drawings (06 Periods)

- Types of Pictorial projections, Isometric projections.
- Methods of constructing isometric drawing
- Circles in isometric drawing
- Isometric drawing of simple figures of rectangular and circular shapes

Unit 5: Development of Surfaces (6 Periods)

- Develop surfaces of solids (cube, prism, cylinder, cone and pyramid) digitally using parallel line and radial line methods.

Unit 6: CAD Basics: (09 periods)

- Starting CAD software, user interface, coordinate system.
- Drawing environment setup (units, limits, layers).
- Basic geometric commands: line, circle, arc, polygon, ellipse.
- Modify commands: erase, copy, move, rotate, scale, trim, extend, mirror.
- Display control: zoom, pan, regen.
- Object snaps (e.g., endpoint, midpoint, centre, tangent, intersection, etc.) and construction aids (grid, polar tracking, ortho mode, dynamic input, construction lines).

CO-POMATRIX

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	-	3	3	1
CO2	2	2	2	3	1	2	2
CO3	3	2	2	3	-	1	2
CO4	3	3	3	3	1	2	1
CO5	2	3	3	3	1	2	1
CO6	2	2	3	3	-	3	2

MIDSEM-1EXAM

SN	Unitname	R,U(QNo's)	A(QNo's)	Remarks
1	Unit-1	1,2	5	Manual drawing
2	Unit-2	3,4	6	

MIDSEM-2EXAM

SN	Unitname	R,U(QNo's)	A(QNo's)	Remarks
1	Unit-3	1,2	5	Manual drawing
2	Unit-4	3,4	6	

SEE

SN	Unitname	Questionsto beset forSEE		Remarks
		R,U(QNo's)	A(QNo's)	
1	Unit-1,2	1,2		Manual and CAD based
2	Unit-3,4	3,4		
3	Unit-5,6		5,6	

REFERENCE BOOKS

1. *Engineering Drawing* by Kapil Dev – Asian Publisher
2. *Engineering Drawing* by Basant Agarwal & C.M. Agarwal – McGraw-Hill
3. *Engineering Drawing* by N.D. Bhatt – Charotar Publishing House Pvt. Ltd.
4. *A Textbook on Engineering Drawing* by P. Kannaiah, K. L. Narayana, K. Venkata Reddy
5. *Engineering Drawing + AutoCAD* by K. Venugopal – New Age International, New Delhi

ONLINE RESOURCES

1. [NPTEL Courses](#)
2. [NPTEL Engineering Drawing Course](#)
3. Engineering Drawing – Slideshare ([slideshare.net in Bing](#))
4. Engineering Drawing – PowerPoint Presentation ([powershow.com in Bing](#))
5. Basic Engineering Drawing – Solved Questions (PowerPoint) ([powershow.com in Bing](#))