



DIPLOMA WING
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SEMESTER I – GROUP 'A'

COURSE TITLE	:	ENGINEERING GRAPHICS
PAPER CODE	:	--
SUBJECT CODE	:	--
THEORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Objectives:

- To understand the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.
- To develop drafting and sketching skills, to know the applications of drawing equipments, and get familiarize with Indian Standards related to engineering drawings.
- To develop skills to visualize actual object or a part of it, on the basis of drawings.
- To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.
- To understand the basic commands and develop basic skills related to computer aided drafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.

Course Content

Unit – I Basic elements of Drawing

Drawing Instruments and supporting materials: method to use them with applications.

Convention of lines and their applications.

Representative Fractions – reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.

Geometrical and Tangency constructions. (Redraw the figure)

Unit – II Orthographic projections

Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination).

Introduction to orthographic projection, First angle and Third angle method, their symbols.

Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)

Unit – III Isometric Projections

Introduction to isometric projections.

Isometric scale and Natural scale.

Isometric view and isometric projection.

Illustrative problems related to objects containing lines, circles and arcs shape only.

Conversion of orthographic views into isometric view/projection.

Unit – IV Free Hand Sketches of engineering elements

Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washer, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)

Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

Unit – V Computer aided drafting interface

Computer Aided Drafting: concept.

Hardware and various CAD software available.

System requirements and Understanding the interface.

Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon.

File features: New file, Saving the file, Opening an existing drawing file, Creating templates, Quit.

Setting up new drawing: Units, Limits, Grid, Snap.

Undoing and redoing action.

Unit – VI Computer aided drafting

Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, PolyLine.

Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates.

Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers.

Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions.

Dim scale variable.

Editing dimensions.

Text: Single line Text, Multiline text.

Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.

S. No.	Practical Exercises	Unit No.	Ap-prox. Hrs
1	Draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketch book)	I	02
2	Write alphabets and numerical (Vertical only) (do this exercise in sketch book)	I	02
3	Draw regular geometric constructions and redraw the given figure (do this exercise in sketch book) Part I	II	02
4	Draw regular geometric construction and redraw the given figure (do this exercise in sketch book) Part II	II	02
5	Draw a problem on orthographic projections using first angle method of projection having plain surfaces and slanting. Part I	III	02
6	Draw another problem on orthographic projections using first angle method of projection having slanting surfaces with slots. Part II	III	02

7	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces, ribs. Part I	III	02
8	Draw two problems on Isometric view of simple objects having plain and slanting surface by using natural scale. Part I	IV	02
9	Draw some problems on Isometric projection of simple objects having cylindrical surface by using isometric scale. Part I	IV	02
10	Draw free hand sketches/ conventional representation of machine elements in sketch book such as thread profiles, nuts, bolts, studs, set screws, washers, Locking arrangements. Part I	V	02
11	Problem based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views in sketch book. Part I	III, II, V	02
12	Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD (Print out should be a part of progressive assessment). Part I	V	02
13	Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment). Part II	V	02
14	Draw basic 2D entities like: Circular and rectangular array using AutoCAD (Printout should be a part of progressive assessment). Part III	V	02

15	Draw blocks of 2D entities comprises of Rectangle, Rhombus, Polygon, Circles, Arcs, circular and rectangular array, blocks using AutoCAD (Print out should be a part of progressive assessment). Part IV	V	02
16	Draw basic branch specific components in 2D using AutoCAD (Print out should be a part of term work). Part I	VI	02
17	Draw complex branch specific components in 2D using AutoCAD (Print should be a part of progressive assessment). Part I	VI	02
Total			34

SUGGESTED LEARNING RESOURCES

1. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges IS: Sp-46*. BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.
2. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93-80358-17-8.
3. Jain & Gautam, *Engineering Graphics & Design*, Khanna Publishing House, New Delhi (ISBN: 978-93-86173-478)
4. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07-064837-1
5. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.
6. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7. Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. *Engineering Graphics with AutoCAD*. PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
8. Jeyapoovan, T. *Essentials of Engineering Drawing and Graphics using AutoCAD*. Vikas Publishing House Pvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
9. Autodesk. *AutoCAD User Guide*. Autodesk Press, USA, 2015.
10. Sham, Tickoo. *AutoCAD 2016 for Engineers and Designers*. Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

Software/Learning Websites

1. <https://www.youtube.com/watch?v=TJ4jGyD-WCw>
2. https://www.youtube.com/watch?v=dmt6_n7Sgcg
3. <https://www.youtube.com/watch?v=MQScnLXL0M>
4. <https://www.youtube.com/watch?v=3WXPanCq9LI>
5. <https://www.youtube.com/watch?v=fvjk7PlxAuo>
6. <http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf>
7. <https://www.machinedesignonline.com>

Course Outcomes

Following outcomes will be achieved:

- 1) Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing
 - 2) Draw views of given object and components
 - 3) Sketch orthographic projections into isometric projections and vice versa.
 - 3) Apply computer aided drafting tools to create 2D engineering drawings
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