Ramgarhia Polytechnic College, Phagwara

Computer Science Engineering Department

Head of Department: S. Jasvir singh

Name of the Faculty: Er. Kapil Dev bawa, Er. Varun Shingari

Discipline: Electrical Engineering Department

Semester: 1st

Subject: Engineering Drawing-1

Lesson Plan Duration: 16 Weeks

RATIONALE

Drawing is the language of engineers and technicians. Reading and interpreting engineering drawing is their day to day responsibility. The subject is aimed at developing basic graphic skills in the students so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation. The emphasis, while imparting instructions, should be to develop conceptual skills in the students following BIS SP 46 – 1988.

Learning Outcomes

- Identify and use of different grades of pencils and other drafting instruments which are used in engineering field
- Draw free hand sketches of various kinds of objects.
- Utilize various types of lines used in engineering drawing.
- Read and apply different dimensioning methods on drawing of objects.
- Use different types of scales and their utilization in reading and reproducing drawings of objects and maps.
- Draw 2 - dimensional view of different objects viewed from different angles (orthographic views)
- Draw and interpret complete inner hidden details of an object which are otherwise not visible in normal view
- Generate isometric (3D) drawing from different 2D (orthographic) views/sketches
- Identify conventions for different engineering materials, symbols, sections of regular objects and general fittings used in Civil and Electrical household appliances
- Use basic commands of AutoCAD

PO ⇨ / CO ⇩	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1							
CO2							
CO3							
CO4							
CO5							
CO6							
CO7							

CO8	✓						
CO9		✓					
CO10		✓	✓				

Syllabus

PRACTICAL	Details
1.	Introduction to Engineering Drawing (03 sheets) 1.1 Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards. 1.2 Different types of lines in Engineering drawing as per BIS specifications 1.3 Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments. 1.4 Free hand and instrumental lettering (Alphabet and numerals) – upper case (Capital Letter), single stroke, vertical and inclined at 75 degree, series of 5,8,12 mm of free hand and instrumental lettering of height 25 to 35 mm in the ratio of 7:4
2.	Dimensioning Technique (01 sheet) 2.1 Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions) 2.2 Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches
3.	Scales (02 sheets) 3.1 Scales –their needs and importance (theoretical instructions), type of scales, definition of R.F. and length of scale 3.2 Drawing of plain and diagonal scales

4.	Orthographic Projections (06 sheets) 4.1 Theory of orthographic projections (Elaborate theoretical instructions) 4.2 Projection of Points in different quadrant 4.3 Projection of Straight Line (1st and 3rd angle) 4.3.1. Line parallel to both the planes 4.3.2. Line perpendicular to any one of the reference plane 4.3.3. Line inclined to any one of the reference plane. 4.4 Projection of Plane – Different lamina like square, rectangular, triangular and circle inclined to one plane, parallel and perpendicular to another plane in 1st angle only 4.5 Three views of orthographic projection of different objects. (At least one sheet in 3rd angle) 4.6 Identification of surfaces
5.	Sections (02 sheets) 5.1 Importance and salient features 5.2 Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections. 5.3 Convention sectional representation of various materials, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections 5.4 Orthographic sectional views of different objects.
6.	Isometric Views (02 sheets) 6.1 Fundamentals of isometric projections and isometric scale. 6.2 Isometric views of combination of regular solids like cylinder, cone, cube and prism.
7.	Common Symbols and Conventions used in Engineering (02 sheets) 7.1 Civil Engineering sanitary fitting symbols 7.2 Electrical fitting symbols for domestic interior installations
8	Introduction to AutoCAD (02 sheets) Basic introduction and operational instructions of various commands in AutoCAD. At least two sheets on AutoCAD of cube, cuboid, cone, pyramid, truncated cone and pyramid, sphere and combination of above solids.

Reference Books:

1. A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi

2. Engineering Drawing by PS Gill; SK Kataria & Sons, New Delhi

3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar Publishing House Pvt. Ltd., Anand

4. Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar

5. Engineering Drawing I by DK Goel, GBD Publication.

Delivery/Instructional Methodologies

Sr.No.	Description
1.	Chalk and Talk
2.	PowerPoint Presentation

Assessment Methodologies

Sr. No.	Description	Type
1.	Student Assignment	Direct
2.	Test	Direct
3.	Board Examination	Direct
4.	Student Feedback	Direct

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING

	N/A	N/A	N/A

Topics beyond syllabus/advanced topics

Units	Details	Hours
N/A	N/A	N/A

Web Source References

Sr. No.	URL
1.	https://nptel.ac.in/

Lesson Plan

Week	Practical Day	
1st	1.	Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards
	2.	Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards
2nd	3.	Different types of lines in Engineering drawing as per BIS specifications
	4.	

		Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments.
3rd	5.	Free hand and instrumental lettering (Alphabet and numerals) – upper case (Capital Letter), single stroke, vertical and inclined at 75 degree, series of 5,8,12 mm of free hand and instrumental lettering of height 25 to 35 mm in the ratio of 7:4
	6.	Free hand and instrumental lettering (Alphabet and numerals) – upper case (Capital Letter), single stroke, vertical and inclined at 75 degree, series of 5,8,12 mm of free hand and instrumental lettering of height 25 to 35 mm in the ratio of 7:4
4th	7.	Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions)
	8.	Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches
5th	9.	Scales –their needs and importance (theoretical instructions), type of scales, definition of R.F. and length of scale
	10.	Drawing of plain and diagonal scales

6th	11.	Drawing of plain and diagonal scales
	12.	Drawing of plain and diagonal scales
7th	13.	Drawing of plain and diagonal scales
	14.	Theory of orthographic projections (Elaborate theoretical instructions)
8th	15.	Projection of Points in different quadrant
	16.	Projection of Straight Line (1st and 3rd angle) Line parallel to both the planes Line perpendicular to any one of the reference plane Line inclined to any one of the reference plane.
9th	17.	Projection of Plane – Different lamina like square, rectangular, triangular and circle inclined to one plane, parallel and perpendicular to another plane in 1st angle only
	18.	Three views of orthographic projection of different objects. (At least one sheet in 3rd angle)
10th	19.	Three views of orthographic projection of different objects. (At least one sheet in 3rd angle)

	20.	Identification of surfaces
11th	21.	Identification of surfaces
	22.	sections Importance and salient features
12th	23.	Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.
	24.	Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.
13th	25.	Convention sectional representation of various materials, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections
	26.	Convention sectional representation of various materials, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections
14th	27.	Orthographic sectional views of different objects.
	28.	Fundamentals of isometric projections and isometric scale
15th	29.	Isometric views of combination of regular solids like cylinder, cone, cube and prism.
	30.	Isometric views of combination of regular solids like cylinder, cone, cube and prism.

16th	31.	Civil Engineering sanitary fitting symbols Electrical fitting symbols for domestic interior installations
	32.	Basic introduction and operational instructions of various commands in AutoCAD. At least two sheets on AutoCAD of cube, cuboid, cone, pyramid, truncated cone and pyramid, sphere and combination of above solids.

NBA has defined the following seven POs for an Engineering diploma graduate:

i) **Basic and Discipline specific knowledge**: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

ii) **Problem analysis:** Identify and analyze well-defined engineering problems using codified standard methods.

iii**)** **Design/ development of solutions**: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

iv) **Engineering Tools, Experimentation and Testing**: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

v) **Engineering practices for society, sustainability and environment**: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

vi) **Project Management**: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

vii) **Life-long learning**: Ability to analyze individual needs and engage in updating in the context of technological changes.

Program Specific Outcomes (PSOs)

PSOs are a statement that describes what students are expected to know and be able to do in a specialized area of discipline upon graduation from a program. Program may specify 2-4 program specific outcomes, if required.

These are the statements, which are specific to the particular 11 program. They are beyond POs. Program Curriculum and other activities during the program must help in the achievement of PSOs along with POs.