

**COURSE TITLE : ENGINEERING GRAPHICS
(First Semester)**
COURSE CODE :
COURSE CATEGORY : F
PERIODS/WEEK : 3
PERIODS/SEMESTER : 54
CREDITS : Examination in the Second Semester

RATIONALE:

Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and conveying the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects.

TIME SCHEDULE

Module	Topic	Periods
1	Importance of Engineering Graphics Drawing Instruments Drawing Standards Lettering and Numbering Dimensioning Geometric Construction.	30
2	Projection of Points, Lines and Planes.	24
	TOTAL	54

OBJECTIVES

MODULE - I

On completion of this study the student should be able to –

1.1 Importance of Engineering Graphics

- 1.1.0 Understand the importance of engineering graphics
- 1.1.1 Explain the importance of engineering communication medium
- 1.1.2 Describe the development of engineering graphics and computer aided drafting CAD
- 1.1.3 Indicate the link between engineering graphics and other subjects of study in diploma courses

1.2 Drawing Instruments

- 1.2.0 Use engineering drawing instruments
- 1.2.1 Select the proper instrument to draw horizontal, vertical and inclined lines
- 1.2.2 Select the proper instrument to draw large and small circles and arcs to its specifications
- 1.2.3 Select the proper pencil to draw different types of line according to its specifications
- 1.2.4 Identify the steps to keep the drawing clean and tidy

1.3 Drawing standards

- 1.3.0 Appreciate the standards of engineering drawing
- 1.3.1 Select the drawing sheet
- 1.3.2 Draw different types of lines
- 1.3.3 Prepare title block as per BIS
- 1.3.4 Fold drawing sheets as per standards

1.4 Lettering & Numbering

- 1.4.0 Apply lettering and numbering
- 1.4.1 Write drawing title using sloping and vertical lettering including numerals as per BIS
- 1.4.2 Select suitable size of letters of different layout and applications
- 1.4.3 Write engineering drawings notes using lettering

1.5 Dimensioning

- 1.5.0 Apply dimensioning as per standards
- 1.5.1 State the need of dimensioning as per BIS specification
- 1.5.2 Identify the notations used in a drawing as per BIS
- 1.5.3 Identify the system of placement of the dimensions as per BIS
- 1.5.4 Dimension of a given drawing according to BIS including features
- 1.5.5 Apply the rules for dimensioning of standard features, given a drawing comprising of standard features
- 1.5.6 Identify principles of dimensioning, given a dimensioned drawing
- 1.5.7 Identify the correctness of an engineering drawing dimensioned and dimension the same as per BIS

1.6 Geometric construction

- 1.6.0 Apply principles of geometrical construction
- 1.6.1 Construct polygon, given the length of the side
- 1.6.2 Insert a regular polygon in a circle.
- 1.6.3 Define Ellipse, involutes, helix, Parabola, Hyperbola and Cycloid,
- 1.6.4 Construct Ellipse by different methods (concentric circle, eccentricity, rectangular and parallelogram methods)
- 1.6.5 Construct an involute, helix, parabola from given data
- 1.6.6 Identify the application of these constructions in engineering practice.

MODULE - II

2.1 Projection of Points, Lines and Planes

- 2.1.0 Understand the projection of points, lines and planes
- 2.1.1 Project points in different quadrants

- 2.1.2 Project lines parallel to both planes
- 2.1.3 Project lines perpendicular to HP and || to VP
- 2.1.4 Project lines perpendicular to VP and || to HP
- 2.1.5 Project lines inclined to HP and || to VP
- 2.1.6 Project lines inclined to VP and || to HP
- 2.1.7 Project lines inclined to both planes-simple direct questions and answers
- 2.1.8 Find true length of lines
- 2.1.9 Project planes parallel to VP and perpendicular to HP
- 2.1.10 Project planes parallel to HP and perpendicular to VP
- 2.1.11 Project planes inclined to one plane and parallel to other

CONTENT DETAILS

MODULE - I

1.1 The Importance of Engineering Graphics

Explanation of the scope and objective of this subject – its importance as a graphic communication, Computer Aided Drafting (CAD) need for preparing drawing as per BIS standards.

1.2 Drawing Instruments.

Basic drawing instruments – T square – Set square – compass - dividers – drawing boards – Pencils – Drawing papers – Mini drafter – French curves – Stencils – Selection and mode of using them.

1.3 Drawing Standards

Size of drawing sheets – Layouts of drawing sheet – Title Blocks – Types of lines – Folding of drawing sheets

1.4 Free hand Lettering and Numbering

Need for legible lettering and numbering on drawings – selection of suitable size of lettering for different drawing writing of Engineering drawing titles and notes using both vertical and sloping styles.

1.5 Dimensioning

Function of dimensioning - need for dimensioning engineering drawing according to BIS – notation used in dimensions – dimension line – extension line – arrow heads and leader – system of dimensioning (method I and method II)

1.6 Geometric construction

Construction of regular polygon given the length of its side - methods of inserting a regular Polygon in a given circle – construction of ellipse by different methods (eccentricity, concentric circle, rectangular and parallelogram). Definition of involute, helix, parabola & hyperbola – Construction of cycloid, helix, involute and parabola.

MODULE - II

2.1 Projection of points, lines and planes

Projection of points in different quadrants,

Projection of straight lines(in first quadrant only)- parallel to one or both planes, parallel to one plane and perpendicular to other – inclined to one plane and parallel to other, inclined to both planes. Methods of finding true length and its inclination with the reference planes.

Projection of planes (in first quadrant only)–perpendicular to both planes, parallel to one plane and perpendicular to other plane, inclined to one plane and perpendicular to the other plane

REFERENCE BOOKS

- | | | | |
|----|----------------------|---|--|
| 1. | Engineering Drawing | - | N D Bhatt |
| 2. | Engineering Graphics | - | K. C Jon, PHI |
| 3. | Engineering Graphics | - | P. I. Varghese |
| 4. | Engineering Graphics | - | Sageer & Abu |
| 5. | Engineering Drawing | - | M. B. Shah and B.C.Rana,
Pearson Publications |

SUBJECT TITLE : ENGINEERING GRAPHICS
 (Common for all Engineering Branches)
SUBJECT CODE :
PERIODS/WEEK : 3
PERIODS/SEMESTER : 54
CREDITS : 5

TIME SCHEDULE

Module	Topic	Periods	Sheet No.
I	1.1 Orthographic Projection of Objects	17	Sheet 1
	Test 1	3	Sheet 2
II	2.1 Sectional views of objects	10	Sheet 3
	2.2 Auxiliary views		Sheet 4
	Test 2	3	Sheet 5
III	3.1 Pictorial Drawing	18	Sheet 6
	3.2 Visualization		Sheet 7
	3.3 Development of surfaces		Sheet 8
	Test 5	3	
Total			54

OBJECTIVES

UNIT - I

Orthographic Projection of Objects

- 1.1.0 Apply principles of orthographic projection
- 1.1.1 Explain the principle of orthographic projection with simple sketches
- 1.1.2 Prepare an engineering drawing of a given simple engineering part in first angle projection only.
- 1.1.3 Sketch (free hand) the orthographic views of simple objects
- 1.1.4 Draw the orthographic views of an object, given its pictorial drawing
- 1.1.5 Select the minimum number of views needed to represent a given object fully
- 1.1.6 Identify the engineering part correctly from a number of orthographic drawings

UNIT - II

Sectional views of objects

- 2.1.0 Recognize the need of sectional views
- 2.1.1 Explain the need to draw sectional views
- 2.1.2 Select the section place for a given component to reveal maximum information
- 2.1.3 Free hand sectional views of simple objects
- 2.1.4 Draw the sectional views of simple engineering components
- 2.1.5 Sketch simple sections (Full and half) for a range of simple engineering objects
- 2.1.6 Select the component from a given sectional view

- 2.1.7 Auxiliary views
- 2.1.8 Recognize the need of auxiliary views
- 2.1.9 State whether the auxiliary view is needed, given an engineering drawing
- 2.1.10 Draw the auxiliary views of a given engineering drawing

UNIT - III

Pictorial Drawing

- 3.1.1 Prepare pictorial drawing
- 3.1.2 Explain the need for and types of commonly used pictorial drawings
- 3.1.3 Prepare isometric drawing of simple objects using appropriate construction procedures, given their appropriate drawings
- 3.1.4 Sketch the isometric views of simple engineering objects given either orthographic drawing or actual components
- 3.1.5 Prepare oblique drawing – cavalier and cabinet - of simple engineering objects given either orthographic drawings or actual components

3.2.0 Visualization

- 3.2.1 Visualize and object in 3D, given its orthographic drawings
- 3.2.2 Compare an engineering part with its drawings
- 3.2.3 Identify surfaces with reference to orthographic drawing
- 3.2.4 Prepare a model of the part, given its orthographic drawing

3.3.0 Development of surfaces

- 3.3.1 Prepare development of surfaces
- 3.3.2 State the need for preparing the development drawings
- 3.3.3 Prepare development of surfaces of simple engineering component like tray, funnel, bucket and ducts (rectangular and square hopper)
- 3.3.4 Prepare development of surfaces of 90-degree elbow

CONTENT DETAILS

Unit I

1.1.0 Orthographic projection of objects

Explanation of the meaning of orthographic projection using a viewing box and a model- number views obtained need of only three views for displaying the object. Concept front view, top view and side view-sketching these views for a number of engineering objects- explanation of the meaning of first angle and third angle projection – symbol of projection

UNIT - II

2.1.0 Sectional views of objects

Need for sectional drawing of an engineering object- selection of the section plane to reveal the maximum information – sectional views (full and half section) of simple engineering objects.

2.1.1 Auxiliary views

Need of auxiliary views – auxiliary views given engineering drawings

UNIT – III

3.1.0 Pictorial drawings

Isometric projection, construction of isometric scales- isometric projection of simple Engineering objects

Oblique projection cavalier and cabinet of simple Engineering objects

3.1.1 Visualization

Preparation of pictorial views from a group of orthographic drawings

3.1.2 Development of surfaces

Development of surfaces of simple engineering components like tray, funnel, bucket, duct (rectangular and square hopper) and 90 degree Elbow

REFERENCE BOOKS:-

- | | |
|-------------------------|-------------------------|
| 1. Engineering Graphics | - N.D Bhatt |
| 2. Engineering Graphics | - P. I. Varghese |
| 3. Engineering Graphics | - Sageer & Abu |
| 4. Engineering Graphics | - K.C John |
| 5. Engineering Drawing | - M.B.Shah and B.C.Rana |