

COURSE DESCRIPTION			
Program	Automobile Engineering, Civil Engineering, Chemical Engineering, Civil Engineering & Planning, Civil & Rural Engineering, Civil & Environmental Engineering, Electrical & Electronics Engineering, Electrical Engineering, Electrical Engineering & Electric Vehicles Technology, Fire Technology and Safety, Food Processing Technology, Mechanical Engineering (Automobile Engg.), Mechatronics, Mechanical Engineering, Polymer Technology, Printing Technology, Renewable Energy, Civil Engineering (Construction Technology), Tool & Die Engineering, Wood and Paper Technology		
Course Title	Engineering Graphics		
Course Code	1003	Semester	I
Type of Course	Drawing	Contact Hours	45
Teaching Scheme (L: T:P:R)	0:0:3:0	Credits	1.5
CIE Marks	40	ESE Marks	60

Introduction

Engineering graphics is the fundamental language of engineers used to visually communicate ideas, designs, and technical information without any language barriers. Its objectives include developing the ability to interpret and create accurate drawings, Understanding the shape, size, and relationship of components, and Applying standards for clear communication. It also enhances spatial visualization and supports the effective planning and manufacture of engineering products.

Course Objectives

1	To familiarize the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.
2	To familiarize drafting and sketching skills, to know the applications of drawing equipment's, and get familiarize with Indian Standards related to engineering drawings, dimensioning styles etc.
3	To provide skills to translate ideas into sketches and to draw and read various engineering curves, conic sections and the generation of 3D solid surfaces into plane areas.
4	To apply basic skills to develop projection of points and lines.
5	To familiarize the knowledge of orthographic views and sectional views of objects in engineering applications.

Course Pre-requisite

Topic	Course code	Course Title	Semester
Basic Geometry			Secondary Education

Course Outcome

CO	Course Outcome	Blooms Taxonomy Level
CO1	Illustrate the basic elements of drawing.	Understand
CO2	Construct geometrical figures and illustrate development of surfaces.	Apply
CO3	Interpret projections of points and lines.	Understand
CO4	Develop orthographic projections and sectional views of objects.	Apply

CO-PO mapping

COURSE ARTICULATION MATRIX											
Course Outcomes	PROGRAM OUTCOMES										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	-	-	2	-	-	-	1	-	-
CO2	3	2	2	-	2	-	-	-	1	-	-
CO3	3	3	2	1	2	-	-	-	1	-	-
CO4	3	3	3	2	2	-	-	-	1	-	-
Total	12	9	7	3	8	-	-	-	4	-	-
Correlation Level	3	2.25	2.33	1.5	2	-	-	-	1	-	-

Legends: 1 - Low; 2 - Medium; 3 - High; No Correlation - "-"

Teaching and Assessment Scheme

Teaching Scheme/Week				Self-learning (SS)/Week	Total Hours/Semester	Credits C	Examination Scheme						
							Theory			Practical			Total
L	T	P	S				CIE	ESE	Total	CIE	ESE	Total	
0	0	3	0	1.5	45	1.5	40	60	100	0	0	0	100

L: Lecture (One unit is of one-hour duration with one credit), T: Tutorial (One unit is of one-hour duration with one credit), P: Practical (One unit is of one-hour duration with 0.5 credit), S: Project (One unit is of one-hour duration with 0.5 credit) SS: Self-Learning, CIE: Continuous Internal Evaluation, ESE: End Semester Examination

Syllabus - Major Topics

Module	Title	Major Topics	Instructional Hours	
			L	T
Module I	Introduction	Basic Terminology - Dimensioning Methods - Regular Polygons	9	
Module II	Basic Figures	Conic Sections - Miscellaneous Curves - Development of Surfaces	12	
Module III	Basic Projections	Projections of Points - Projections of Lines	9	
Module IV	Projections- 3D	Orthographic Projections - Sectional Views of Objects	15	

Detailed Syllabus

Subtopic	Student Learning Outcome	Mode of delivery (L/T)	Mapped CO	Taxonomy Level	Instructional Hours	Action
Subtopic	Student Learning Outcome	Mode of delivery (L/T)	Mapped CO	Taxonomy Level	Instructional Hours	
Module I						
Basic Terminology	Basic terms of engineering graphics and standards adopted	L	CO1	Remember	3	
Principles of Dimensioning	1. Use of correct Dimensioning standards 2. Scales (Study Purpose only)	L	CO1	Remember	3	
Regular Polygons	Construction of Regular Polygon- 1. Pentagon 2. Hexagon 3. Heptagon 4. Octagon (Any suitable method for each type when side length is given)	L	CO1	Understand	3	
Module II						
Conic Sections	Ellipse – Rectangular Method & Concentric Circle Method only, Parabola- Tangent method only	L	CO2	Understand	4	
Miscellaneous Curves	Involute of a circle and rectangle	L	CO2	Understand	4	
Development of Surfaces	1. Rectangular Prism 2. Cylinder 3. 90° Elbow (Two piece symmetric type with standard side outlets - same cross- sectional areas)	L	CO2	Apply	4	
Module III						
Basic Projections	Outline the theory of projection (First angle and Third angle projections)	L	CO3	Understand	3	
Projections of points	Demonstrate and develop the projections of points in all 4 quadrants	L	CO3	Understand	3	
Projections of lines	Demonstrate and develop the projections of lines in First quadrant only (Questions may be limited to projection of lines inclined to any one plane only)	L	CO3	Understand	3	
Module IV						
Projections of objects	Orthographic and isometric projections.	L	CO4	Understand	3	
Orthographic projections	Summarize the orthographic projections of various simple engineering objects.	L	CO4	Apply	6	

Sectional views of objects	Demonstrate and develop the sectional views of various simple engineering objects	L	CO4	Apply	6
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Suggested Student Activities for Self-Learning

Week	Self-Learning description	Hours
Module I		
1	Concepts of Drawing, Drawing Materials- Instruments, Drawing Sheet sizes, Board Types, Layout of Drawing Sheet – Title Block, Types of lines	1.5
2	Use of correct Dimensioning standards : Redraw the given figure and incorporate dimensioning as per BIS standards. Introduction to Scales- Plain/Diagonal/Vernier (Study Purpose only)	1.5
3	Regular Polygon definition and terminology. Construction of a Regular Polygon (Pentagon, Hexagon, Heptagon, Octagon) with given side length	1.5
Module II		
4	Conic Sections - Methodology and terminology. Construct an Ellipse – Rectangular Method and Concentric Circle Method. Construct a Parabola- Tangent method	1.5
5	Introduction of Miscellaneous Curves. Construct an Involute of a circle and rectangle.	1.5
6	Development of Surfaces – Procedure familiarisation for engineering applications. Develop the surface of a Rectangular Prism (all sides closed),Cylinder (all sides closed), 900 Elbow (Two piece symmetric type with both standard side outlets)	1.5
7	Series Exam Preparation	1.5
Module III		
8	Outline the theory of projection, First angle and Third angle projections	1.5
9	Projection of Points in First , Second , Third and Fourth Quadrants	1.5
10	Projection of Lines (First quadrant only) , Line parallel to both planes , Lines parallel to one plane and perpendicular to other, Lines parallel to one plane and inclined to other.	1.5
Module IV		
11	Orthographic, Isometric projection. Practice simple pictorial isometric drawings.	1.5
12	Familiarisation of Front, Top, Side Views. Construct the orthographic projections of various simple engineering objects from pictorial views (First angle projection method only)	1.5
13	Familiarisation of Sectional View. Draw the sectional views of various simple engineering objects (Full sectional views only)	1.5
14	Series Exam Preparation	1.5
15	Revision of all topics	1.5
Total Self-Learning hours		22.5

Learning Resources

TEXT BOOK			
Sl. No.	Title	Author	Publication
1	Engineering Graphics	P I Varghese	VIP Publishers
2	Engineering Graphics	K. C John	PHI Learning Private Limited
3	Engineering Graphics unique methods easy solutions	K N Anilkumar	Adhyuth Narayan Publishers

REFERENCE			
Sl. No.	Title	Author	Publication
1	Engineering Drawing	N. D. Bhatt	Charotar Publishing House, Anand, Gujarat
2	Engineering Graphics with AutoCAD	D.M. Kulkarni, A.P. Rastogi, A.K. Sarkar	PHI Learning Private Limited
3	Engineering Drawing	M. B. Shah and B.C.Rana	Pearson Publications

WEB RESOURCES		
Sl. No.	URL	Modules Covered
1	https://youtube.com/playlist?list=PL0GNZSidsWdVsGAfX3xHlvkbSvIm_6JSM&si=_ZGC3FA6JUx40OU0	All
2	https://drive.google.com/drive/folders/1-p6TelKApOVRg3dqiK98YLaWB8vCYUOE	All
3	https://drive.google.com/drive/folders/1ECRoqHYUeOs66ksK8vZlo36RlBywI3yW	All
4	https://drive.google.com/drive/folders/1guvFtoaBoHvDVaaf_RJz5zeziH7BJQ91	All
5	https://t.me/+WlapqvUQXwoyOGM1	All

Assessment Methodology - Theory

Mode	Attendance	CA1	CA2	CA3	CA4	CA5	CA6	ESE
		Self-learning activities (Module 1)	Self-learning activities (Module 2)	Self-learning activities (Module 3)	Self-learning activities (Module 4)	Series Exam (2 modules)	Series Exam (2 modules)	Written Exam (theory)
Duration						2 hours	2 hours	2.5 hours
Exam mark		15	15	15	15	40	40	60
Converted to						20	20	
Marks	5	15				20		60
Total	40							60
Tentative schedule	End of semester	By 4th week	By 7th week	By 11th week	By 14th week	8th week	15th week	End of semester

First Internal Examination Pattern of Question Paper - Drawing

Duration	Modules	TYPE OF QUESTIONS				Total Mark
		PART A		PART B		
		No. of Questions	Marks (1 mark each)	No. of Questions	Marks (7 marks each)	
2 hrs	Module 1	5	5	2	14	19
	Module 2	0	0	3	21	21
	Total		5		35	40

Second Internal Examination Pattern of Question Paper - Drawing

Duration	Modules	TYPE OF QUESTIONS				
		PART A		PART B		Total Mark
		No. of Questions	Marks (7 marks each)	No. of Questions	Marks (13 marks each)	
2 hrs	Module 3	2	14	0	0	14
	Module 4	0	0	2	26	26
	Total		14		26	40

End Semester Examination Pattern of Question Paper for Drawing

Duration	Module	TYPE OF QUESTIONS						Total Marks
		PART A (1 out of 2 questions from each Module)		PART B		PART C		
		No. of Questions	Marks (1 mark each)	No. of Questions	Marks (8 marks each)	No. of Questions	Marks (15 marks each)	
2.5 hrs	1	5	5	1/2*	8	0	0	13
	2	0	0	2/3*	16	0	0	16
	3	0	0	2/3*	16	0	0	16
	4	0	0	0	0	1/2*	15	15
	Total	5	5	5	40	1	15	60
x/y* Represents x number of questions to be answered from the given y number of questions.								

x/y* Represents x number of questions to be answered from the given y number of questions.

Note to Faculties/Examiners handling Engineering Graphics subject:

All drawing exercises prescribed in the syllabus shall be carried out in classrooms/drawing halls using long notebooks suitable for drawing, along with the necessary drawing instruments. The use of conventional A2 drawing sheets and mini drafters for regular drawing activities shall be avoided. Further, for examination purposes, students shall draw the required figures and present their graphical answers directly in the OMR-based answer booklet currently prescribed for theory examinations. The use of conventional drawing sheets during examinations shall also be avoided. This approach is intended to streamline the teaching-learning and evaluation processes while ensuring uniformity in the mode of instruction and assessment.