Program : **Diploma in Engineering and Technology**	
Course Code : **1005**	Course Title: **Engineering Graphics**
Semester : **1**	Credits: **1.5**
Course Category: **Engineering Science**	
Periods per week: **3 (L: 0 T: 0 P: 3)**	Periods per semester: **45**

Course Objectives:

- To familiarize the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.

- To familiarize drafting and sketching skills, to know the applications of drawing equipment's, and get familiarize with Indian Standards related to engineering drawings

- To apply skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.

- To apply basic skills to develop projection of points and lines.

- To familiarize the knowledge orthographic and sectional views of objects

- To apply skills to visualize actual object or a part of it, on the basis of drawings.

- To experiment with the simple commands used for construction of two-dimensional plane figures in CADD

Course Prerequisites:

Topic	Program / Course
Basic Geometry of Secondary school level	Secondary school

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Illustrate basic elements of Drawing	14	Understanding
CO2	Construct Projections of points and lines	12	Applying

CO3	Build Orthographic projections and Sectional views of object	9	Applying
CO4	Develop Isometric Projections	8	Applying
	Series Test	2	

CO – PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2						
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped,   1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Illustrate basic elements of Drawing**		
M1.01	Outline the importance of engineering graphics	1	Understanding
M1.02	Recognize the use of drawing instruments, standards, symbols etc.	3	Understanding
M1.03	Appreciate dimensioning	2	Understanding
M1.04	Demonstrate and develop simple geometries of polygon, conic sections and Engineering curves.	7	Understanding
M1.05	Outline the importance of scales used in engineering practice	1	Understanding

Contents:

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

Convention of lines and their applications.

Dimensioning: Elements of dimensioning, Dimensioning techniques as per BIS

Dimensioning methods: Chain, parallel and coordinate dimensioning.

Geometrical constructions: Construction of regular polygon given the length of its side.

Conic sections: Basic concepts-construction of ellipse (Eccentricity, concentric circle-rectangular methods), Parabola (Eccentricity, tangent methods)

Miscellaneous Curves: Construction of helix and involute.

Scales: Introduction to different types of scales – Plain scale, Diagonal scale and Vernier scale (No constructions)

CO2	Construct Projections of points and lines		
M2.01	Outline the theory of projection	3	Understanding
M2.02	Demonstrate and develop the projections of points	3	Understanding
M2.03	Demonstrate and develop the projections of lines	6	Applying
	Series Test – I	1	

Contents:
Projection of points and lines: 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.

CO3	Build Orthographic projections and Sectional views of object		
M3.01	Summarize the orthographic projections of various objects	5	Understanding
M3.02	Demonstrate and develop the sectional views of objects	4	Applying

Contents:

Introduction of projections: Orthographic, isometric and oblique (concept and applications only).

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)

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.

CO4	Develop Isometric Projections		
M4.01	Develop the isometric views of simple engineering objects given either orthographic drawing or actual components	3	Applying
M4.02	Conversion of orthographic views into isometric views/projection	2	Applying

M4.03	Prepare free hand sketches of real objects into isometric view from orthographic view and vice versa.	1	Applying
M 4.04	Identify the different commands used for construction of two-dimensional plane figures in CADD	2	Applying
	Series Test – 2	1	

Contents:

Introduction to isometric projections: Isometric scale, Isometric view and Isometric projection.

Conversion of orthographic views into isometric views/projection. Free hand sketching of real objects, conversion of orthographic view into isometric view and vice versa.

Introduction to CADD: Software familiarizations- AutoCAD, Electrical CAD, STAAD, Mechanical Desk Top (Introduction only) – Introduction to commands (Lab experience)

Text / Reference

T/R	Book Title / Author
T1	P I Varghese, Engineering Graphics - VIP Publishers
T2	K. C John, Engineering Graphics - PHI Learning Private Limited
T3	K N Anilkumar, Engineering Graphics unique methods, easy solutions – Adhyuth Narayan Publishers Kottayam
R1	N. D. Bhatt, Engineering Drawing - Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8.
R2	D.M. Kulkarni, A.P. Rastogi, A.K. Sarkar, Engineering Graphics with AutoCAD - PHI Learning Private Limited-New Delhi (2010); ISBN: 978-8120337831.
R3	M. B. Shah and B.C.Rana - Engineering Drawing - Pearson Publications
R4	T.Jayapoovan - Engineering Drawing & Graphics using Autocad – Vikas publications

Online Resources

Sl.No	Website Link
1	https://nptel.ac.in/courses/112/103/112103019/
2	https://www.youtube.com/watch?v=FtugLo9DMw8&list=PLIhUrsYr8yHz_FkG5tGWXaNbIxVcibQvV
3	https://www.youtube.com/watch?v=mcxUTNkSyp4
4	https://www.youtube.com/watch?v=XRjvcbdko8c&t=449s
5	https://www.youtube.com/watch?v=d9G5CouwSTo&list=PLgv7uoATAcuUnR-4wn4-d_W42GLhIrGjb
6	https://www.youtube.com/watch?v=3lGFp-LA0l8
7	https://www.youtube.com/channel/UCOx7DNDSe3vIwlAVSQgy0IQ

QUESTION PAPER-FORMAT

ENGINEERING GRAPHICS

[Maximum Marks: 75]   [Time: 3 Hours]

(Missing data if any suitably assumed
Sketches are accompanied
All drawing should be in first angle projection)

PART - A
(Maximum Marks: 5)

I. Answer all the following questions in one word or sentence or sketch. Each question carries 1 mark

   1. Q1
   2. Q2
   3. Q3
   4. Q4
   5. Q5   [5 x 1 = 5 Marks]

PART - B
(Maximum Marks: 40)

II. Answer any five of the following questions. Each question carries 8 marks

   1. Q1
   2. Q2
   3. Q3
   4. Q4
   5. Q5
   6. Q6
   7. Q7   [5 x 8 = 40 Marks]

PART - C
(Maximum Marks: 30)

III. Answer any two of the following questions. Each question carries 15 marks

   1. Q1
   2. Q2
   3. Q3   [2 x 15 = 30 Marks]