

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	All			
Semester	I / II				Version	1.0.0.0			
Effective from Academic Year	2026-27				Effective from the batch admitted in	July 2026			
Course Code	2ESC1104				Course Name	Engineering Graphics and Design			
Course Category	Engineering Science Courses (ESC)								
Teaching Scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total				
	L	TU	P	TW			CE	SEE	Total
Credit	2	0	2	0	4	Theory	50	50	100
Hours	2	0	4	0	6	Practical	25	25	50
Pre-requisites:									
Not Applicable									
Course Outcomes									
COs	Description								
CO1	Explain the fundamentals of engineering graphics, including BIS standards, drawing instruments, geometric constructions, scales, and conic sections.								
CO2	Apply orthographic and isometric projection principles to represent points, lines, planes, solids, and sectional views.								
CO3	Analyze projections, sections, and surface developments of solids to interpret complex spatial relationships.								
CO4	Prepare accurate 2D engineering drawings and CAD models using standard dimensioning, annotations, layering, and modelling tools.								
Theory Syllabus									
Unit	Content								Hours
1	Introduction to Engineering Drawing: Importance and application of Engineering Drawing, Engineering Drawing Instruments and uses, B.I.S code Lines, Dimensioning, Scales, basic geometrical construction. Principles of Engineering Graphics and their significance, usage of drawing instruments, Conic sections including the Rectangular Hyperbola (General method only), Cycloid, Epicycloid, Hypocycloid, Spiral and Involute.								5
2	Projection of Point, Line and Plane: Projections of Points and lines inclined to both planes; Projections of planes inclined to planes - Auxiliary Planes.								5
3	Projection of Solids, Sections of Solids and Development of Solids: Classifications of Solids, Projections of solids like Cylinder, Cone, Pyramid and Prism with its inclination to one reference plane and with two reference planes. Section of solids and the true shape of the section. Methods of development of the lateral surface of right solids, Parallel line development, Radial line development.								6
4	Orthographic and Isometric Projections: Principles of Orthographic Projections using 1 st angle and 3 rd angle projection system, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions, Isometric Views of lines, Planes, Simple and compound Solids, Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.								6
5	CAD Fundamentals and Drawing Tools Listing the computer technologies that impact on graphical communication, demonstrating knowledge of the theory of CAD software, and understanding the Graphical User Interface of software. Line, line types, arc, circle, ellipse, rectangle, spline, etc, using different coordinate systems in software, different drawing aids i.e. grid, snap, object snap, editing tools - move, copy, trim, edit, chamfer, mirror, fillet, extend, stretch etc. commands, various types of array and modifying array, inserting and modify block, Hatch tools for sectional view representation, Orthographic constraints, Snap to objects manually and automatically.								4

6	Dimensioning, Printing, and Projection Techniques Covering applying dimensions and annotations to drawings using ISO and ANSI standards for coordinate dimensioning, Printing documents to paper using the print command, set up of the drawing page and the printer, including scale settings, setting up of units and drawing limits. Draw views of lines, Planes, Simple and compound Solids, sectional views of composite right regular geometric solids and project the true shape of the sectioned surface, Orthographic and Isometric projection of different objects.	4
Practical and Self Learning Content		
Practical, assignments, quiz, industrial visit, field survey and tutorials are based on the above syllabus. (Except for the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)		
Text Books		
1	P. J. Shah "Engineering Graphics" S. Chand & Company Ltd., New Delhi, 2014.	
2	Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House.	
Reference Books		
1	P. S. Gill "Engineering Drawing" S.K. Kataria & sons, Delhi, 13th Edition 2016	
2	Arunoday Kumar "Engineering Graphics – I and II", Tech – Max Publication, Pune, 3rd Edition 2010.	
3	K. Venugopal "Engineering Drawing and Graphics", New Age International Publication, 5 th Edition	
4	D. A. Jolhe "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2007.	
5	Shah, M.B. & Rana B.C. "Engineering Drawing and Computer Graphics", Pearson Education, 2008.	
ICT/MOOCs Reference		
1	https://www.youtube.com/watch?v=n5Ba6OtDpTU (Introduction of Engineering Graphics)	
2	https://www.youtube.com/watch?v=uZ-ZdZKZ55A (Orthographic Projections)	
3	https://www.youtube.com/watch?v=RR0QR_dVxTU (Projection of Solids and Sections of Solids)	
4	https://www.youtube.com/watch?v=R274xyEWqfg (Isometric Projections)	
5	https://youtu.be/t-N1QYwYuHk?si=Oyj_ykiRD2FNTxAz (Computer Graphics)	

Mapping of COs, POs, and PSOs														
COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	2	0	1	0	0	0	1	0	2	2	1	2
CO2	3	2	3	2	2	1	0	1	2	1	2	3	2	2
CO3	3	3	2	3	2	1	0	1	2	1	2	3	2	2
CO4	2	2	3	2	3	1	1	2	2	2	2	3	3	2

Bloom's Taxonomy Level				
Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Introduction to Engineering Drawing	CO1	5	U
2	Projection of Point, Line and Plane	CO2	5	A
3	Projection of Solids and Sections of Solids	CO2, CO3	6	A, N
4	Orthographic and Isometric Projections	CO2	6	A
5	CAD Fundamentals and Drawing Tools	CO1	4	U, A
6	Dimensioning, Printing, and Projection Techniques	CO4	4	A

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- Bloom's Taxonomy Level (BTL): R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create

