

B.Tech. (Common) Batch 2018 Onwards

1st/2nd Semester	ESC-103 ENGINEERING GRAPHICS AND DESIGN	L	T	P	C
Internal Marks: 40		1	0	4	3
External Marks: 60					
Total Marks: 100					

Course Outcomes:

At the end of the course, the student shall be able to

1. Understand various terms used in engineering drawing and Interpret the drawing in terms of engineering requirement.
2. Conceptualize, and deliver the fundamentals of engineering drawing for any given application.
3. Apply rules and conventions as per International Standards for engineering drawing.
4. Learn and apply orthographic as well as isometric projections as per engineering requirement.
5. Integrate ideas for offering efficient and effective solutions to the engineering problems.
6. Use computer to draw engineering drawings (2D) and basic 3D models.

PART – I [THEORY]

1. **Introduction:** Drawing equipment/ instruments and their use; Rules and conventional/ symbolic representation related to engineering practices as per international/ national standards SP46:2003 and IS 962-1989. **(02 Hours)**
2. **Theory of Projections:** Concept of projections and its types (orthographic, Isometric, Auxiliary and perspective); System of orthographic projection with reference to quadrants and octants for points, lines, lamina and solids. **(04 Hours)**
3. **Section of Solids:** Definition of sectioning and its purpose; Types of sectional planes and their applications (orthographic) **(02 Hours)**
4. **Development of Surfaces:** Purpose of development; Use of parallel line and radial line methods. **(01 Hours)**
5. **Isometric Views/Projections:** Concept of isometric view/projection; Difference between isometric projection and isometric drawing; Isometric projection of lamina and solids. **(01Hours)**
6. **Computer Graphics and Design:** User graphic interface; Menu system; Toolbar options; Basic initial setting; User coordinate system (UCS) & world coordinate system (WCS) and viewing of the drafting software interfaces; Draw basic entities in 2D, modification, dimensioning and tolerancing of these entities, constraints & parametric dimensioning, methods of zoom and panning; Short cut keys to execute commands and options; Create, edit and use customized layers; Print scale setting; ISO and ANSI standards for coordinate dimensioning and tolerance; Solid primitive's constructions, working with regions, Creating solid model by extrusions, revolutions; Use of extrude and revolve commands as construction tools; Changing properties; Aligning objects in 3D, 3D rotating, 3D mirroring, creating 3D arrays; filleting solid objects, chamfering solid objects, constructing details and features on solid models, and removing details and features; displaying 3D views. **(03 Hours)**

PART-II [PRACTICE (DRAWING)]

1. Planning of drawing sheet layout; Use of scales (IS:10713-1 1983); Technical lettering; Conventional representation of lines as per SP46:2003; Principles of dimensioning. **(04 Hours)**


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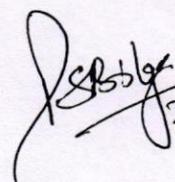
2. **Orthographic Projections of Points:** Practice through problems in quadrants and octants. (04 Hours)
3. **Orthographic Projections of Lines:** Determine/find out true length of line, true angle of inclination of line with HP, true angle of inclination of line with VP, Horizontal Trace of line, Vertical Trace of line for different cases: (i) Line is parallel to both HP and VP (ii) Line is contained by profile plane (iii) Line is parallel to one plane and inclined to other plane (iv) Line is inclined to both HP and VP by Rotation and Trapezoid methods only. (08 Hours)
4. **Orthographic Projections of Lamina:** Practice through various positions: (i) Lamina is parallel to one plane and perpendicular to other (ii) Lamina is perpendicular to one plane and inclined to other (iv) Lamina is inclined to both reference planes. (04 Hours)
5. **Orthographic Projections of Solids:** Practice through various cases (i) Axis is parallel to one plane and perpendicular to other plane (ii) Axis is parallel to one plane and inclined to other plane (iii) Axis is parallel to both HP and VP (iv) Axis is inclined to both HP and VP. (08 Hours)
6. **Section of Solids:** Practice through various cases (i) Parallel to HP (ii) Parallel to VP (iii) Inclined to one plane and perpendicular to other (iv) perpendicular to both HP and VP. (04 Hours)
7. **Development of Surfaces:** Practice through examples using parallel line and radial line methods. (04 Hours)
8. **Isometric Projections:** Illustration through examples for lamina and solids both. (04 Hours)
9. Reading, understanding and interpretation of engineering drawings (Industrial/Commercial/Transportation/Domestic sector) (02 Hours)
10. **Computer Graphics and Design:** Illustration of the contents of theory part through examples using 2D and 3D commands; Generation of basic 3D of some simple industrial part/component, its 3D assembly, generation of associated 2D with inclusion of part bill of material. (10 Hours)

Suggested Readings / Books

1. Agrawal B. and Agrawal C. M., "Engineering Graphics", Tata McGraw Hill Publishing Company Limited, 1st Edition, 2008, New Delhi.
2. Gill P. S., "Engineering Graphics and Drafting", S.K. Kataria and Sons, 1st Edition, 2000, New Delhi.
3. Bhatt N. D. and Panchal V. M., "Elementary Engineering Drawing - Plane and Solid Geometry", Charotar Publishing House, 37th Edition, 1996, Anand.
4. Parthasarathy N. S. and Murali V., "Engineering Drawing", Oxford University Press, 1st Edition, 2016, New Delhi.
5. Bertoline G. R., Wiebe E. N., Miler G. L. L. and Mother J. L., "Technical Graphics Communication", Irwin McGraw Hill, 6th Edition, 2010, New York.
6. George O. and Brian C. B., "Mastering AutoCAD 2018 and AutoCAD LT 2018" by AUTODESK.


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