

ES 101CE

Engineering Graphics-I

[Common to all Branches]

Course Objectives:

- To learn the engineering graphics through AutoCAD
- To evaluate the language of the drawing for-geometric constructions and to understand the engineering perspective of drawings.
- To understand projection of points and lines using 2-Dimensional drawing tools
- To learn the section of solids or object from various views / angles etc.,

UNIT-I

Introduction to Engineering drawing: Size of Drawing Sheet, Drawing sheet format, Types of lines, lettering, types of dimensioning, Title Block, Engineering Scales. Free hand sketches: Sketch straight line, circles, arcs, and fillet.

Introduction to AutoCAD: Initial setup commands, utility commands, function keys, entity draw commands, display commands, edit commands, setting limits of sheet size, dimensioning and dimension style, Title Block.

UNIT-II

Engineering curves: Conic sections, Cycloids, Involutés.

Projections: Elements of projections, multi view projections, principal plane of projections, Methods of projections, first angle and third angle projection methods.

Orthographic projections: Concept of quadrant, projection of point, projection of a line inclined to one plane and parallel to other plane, line inclined to both the planes, lines parallel to profile plane, Traces of line.

UNIT-III

Projection of Planes: Introduction, Types of planes, Traces of a planes, Projection of a planes parallel to one reference planes, projections of planes inclined to one reference planes and perpendicular to the other, projections of oblique planes.

Auxiliary projections: Types of auxiliary projection planes, Single and double auxiliary views.

UNIT-IV

Projection of Solids: Introduction, Types of solids, Projection of solids in simple positions, Projections of solids axes inclined to one of the reference planes and parallel to the other, Axis inclined to the V.P. and parallel to the H.P. , Axis inclined to the H.P. and parallel to the H.P. and parallel to the V.P., Transfer of point from one view to other.

UNIT-V

Sections of Solids: Introduction- Section planes, Sections, True shape of a section, Sections of Prisms, Sections of Pyramids, Sections of Cylinders, Sections of Cones and Sections of Spheres.

Suggested Reading:

1. Kulkarni, D.M., Rastogi, A.P. and Sarkar, A.K. (2013). "Engineering Graphics with AutoCAD." *PHI publications*, New Delhi.
2. Butt, N.D. (2011). "Engineering Drawing." 5th Edition, *Charotar publishing house Pvt. Ltd.*
3. Sham Tickoo, and Saravanan, D. (2010). "AutoCAD 2010 for engineers and designers." *Dreamtech Press.*
4. Sham Tickoo. (2011). "AutoCAD 2011: A Problem solving approach" *Autodesk Press*, USA
5. Venugopal, K. (1998). "Engineering Drawing and Graphics + Autocad", *New Age International [P] Ltd.*, New Delhi.

ES 102 CE

ENGINEERING MECHANICS - I
[Common to all Branches]

Course Objectives:

- To understand the resolution of forces, equilibrium and compatibility conditions of static loads
- To determine the various forces in the members, and analyze the sections using various methods
- To obtain friction, centroid, and moment of Inertia for various regular and irregular bodies

UNIT-I

Force Systems: Resultant of collinear, parallel, coplanar and non-coplanar concurrent and non-concurrent force systems. Resolving a planar or non-coplanar force system into different directions. Moment of force and its applications, Couples and Wrench of a force system.

UNIT -II

Equilibrium of Force Systems: Free body diagram, Equations of equilibrium, Equilibrium of planar and spatial system.

UNIT -III

Analysis of structures: Analysis of trusses by method of joints and method of sections, Analysis of frames by method of members.

UNIT -IV

Friction: Laws of friction. Application to simple systems, connected systems and belt friction. Wedge friction.

UNIT -V

Centroid and Moment of Inertia: Centroids of lines, areas and volumes, Areas and volumes of revolution, Pappu's theorems and their applications, Area moment of inertia, Product moment of Inertia, Composite areas, radius of gyration.

Suggested Readings:

1. Ferdinand L. Singer (1975). "Engineering Mechanic" *Collins, Singapore.*
2. Timoshenko, S.P. and D.H. Young. (1983). "Engineering Mechanics." *McGraw-Hill International Edition.*
3. Rajeshkharam, S. and Sankarasubrahmanyam, G. (2002). Mechanics." *Vikas Publications.*
4. Junarkar, S.B. and H.J. Shah. (2001). "Applied Mechanics, Publishers.
5. Shames, J.H (1987). "Engineering Mechanics", *Prentice Hall.*
6. Bhattacharyya, B. (2015). "Engineering Mechanics." *Oxford Higher Education.*