

## **Course Handout: Engineering Graphics & Design Practical**

**Course Coordinator:** Dr. Vikas Gupta

**Course code** ESC/2-P

**Course title** Engineering Graphics & Design

**Contact Hours** 04

**Credits** 3.0 Course

**Assessment** \_Internal: 30 Marks; External: 70 Marks

**Course Contents** **Module 1:** Introduction to Engineering Drawing Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid, and Involute; Scales – Plain, Diagonal and Vernier Scales.

**Module 2:** Orthographic Projections Principles of Orthographic Projections- Conventions- Projections of Points and lines inclined to both planes; Projections of planes inclined Planes-Auxiliary Planes.

**Module 3:** Projections of Regular Solids Solids inclined to both the Planes-Auxiliary Views; Draw simple annotation, Dimensioning and Scale.

**Module 4:** Sections and Sectional Views of Right Angular Solids Prism, Cylinder, Pyramid, Cone–Auxiliary Views; Development of Surfaces of Right Regular Solids Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, Objects from industry and dwellings (foundation to slab only).

**Module 5:** Isometric Projections 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.

**Module 6:** Overview of Computer Graphics Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids].

**Module 7:** Customization & CAD Drawing Consisting of set up of the drawing page and the printer including scale settings, setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles.

**Module 8:** Annotations, layering & other functions Applying dimensions to objects, Applying annotations to drawings; Setting up and use of Layers, Layers to create drawings, Create, Edit and Use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; Orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and Project the true shape of the sectioned surface; Drawing annotation, Computer-aided design(CAD) software modelling of parts and assemblies. Parametric and non-parametric solid, Surface and Wire frame models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of Perspective, Isometric, Multiview, Auxiliary and Section views. Spatial visualization exercises. Dimensioning guidelines, Tolerancing techniques; Dimensioning and Scale multi views of dwelling.

**Module 9:** Demonstration of a simple team design project Geometry and topology of engineered components: Creation of engineering models and their presentation in standard 2D blue print form; Geometric dimensioning and Tolerancing; Use of solid-` B.Tech. 1st year Curriculum, CDLU, Sirsa (w.e.f. session 2022-2023) modelling software for creating associative models at the component and assembly levels; Floor plans that include: Windows, Doors and Fixture such as Wash Cabin (WC), Bath, Sink, Shower etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).

**Suggested Text/Reference Books:** 1. Bhatt N.D., Panchal V.M.& Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House 2. Gill P.S., (2018), Engineering Graphics & Design, S.K. Kataria & Sons