

<b>Course Name: ENGINEERING GRAPHICS &amp; DESIGN</b>					
<b>Course Code: MECH 1052</b>					
<b>Contact Hours per week:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Total</b>	<b>Credit Points</b>
	<b>1</b>	<b>0</b>	<b>4</b>	<b>5</b>	<b>3</b>

### **Course Outcomes:**

After going through the course, the students will be able

1. To understand the meaning of engineering drawing.
2. To have acquaintance with the various standards (like lines, dimensions, scale etc.) and symbols followed in engineering drawing.
3. To represent a 3-D object into 2-D drawing with the help of orthographic and isometric projections.
4. To read and understand projection drawings.
5. To draw the section view and true shape of a surface when a regular object is cut by a section plane.
6. To use engineering drawing software (CAD).

### **Lecture Plan (13 L)**

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|--------------------------------------------------------------------------------------|-------|
| 1. Importance and principles of engineering drawing                                  | (1 L) |
| 2. Concepts of Conic sections and Scale                                              | (1 L) |
| 3. Introduction to concept of projection (Projections of points, lines and surfaces) | (4 L) |
| 4. Definitions of different solids and their projections                             | (1 L) |
| 5. Section of solids and sectional view                                              | (1 L) |
| 6. Isometric projection                                                              | (2 L) |
| 7. Introduction to CAD                                                               | (2 L) |
| 8. Viva Voce                                                                         | (1 L) |

### **Detailed contents of Lab hours (52 hrs)**

#### **Module 1: Introduction to Engineering Drawing** covering,

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lines, lettering & dimensioning, Conic section like Ellipse (General method only); Involute; Scales – Plain, Diagonal.

(4 hrs + 4 hrs)

#### **Module 2: Orthographic Projections** covering,

Principles of Orthographic Projections - Conventions - Projections of Points and lines inclined to both planes; Projections on Auxiliary Planes. Projection of lamina.

(4 hrs+4 hrs + 4 hrs)

#### **Module 3: Projections of Regular Solids** covering,

those inclined to both the Planes- Auxiliary Views.

(4 hrs + 4 hrs)

#### **Module 4: Sections and Sectional Views of Right Angular Solids** covering,

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.

(4 hrs)

**Module 5: Isometric Projections** covering,

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.

(4 hrs + 4 hrs)

**Module 6: Overview of Computer Graphics** covering,

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.

(4 hrs)

**Module 7: Customisation & 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;

(2 hrs)

**Module 8: Annotations, layering & other functions covering**

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.

(2 hrs)

**Module 9: Demonstration of a simple team design project that illustrates**

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame.

(4 hrs)

**References:**

1. Bhatt, N.D., Panchal V.M. & Ingle P.R., (2014) “Elementary Engineering Drawing” ; Charotan Publishing House
2. Narayana, K.L. and Kannaaiah P “Engineering Graphics”; TMH
3. Lakshminarayanan, V. and Vaish Wanar, R.S “Engineering Graphics” Jain Brothers.
4. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.
5. Agarwal B. & Agarwal C. M. (2012), Engineering graphics, TMH Publications.