COURSE STRUCTURE

Course Code	**MEC1PM02A**			
Course Category	**ES**			
Course Title	**Engineering Graphics**			
Teaching Scheme and Credits Weekly load in Hrs	**L**	**T**	**Laboratory**	**Credits**
	2	**--**	**2**	**2+0+1=3**
Pre-requisites: Geometry, Elementary Drawing				

Course Objectives:

1) To impart basic knowledge required to construct engineering objects using drafting techniques. 2) To elaborate construction of curves used in engineering practices.

3) To visualize and draw the projection of point, line, planes and solids.

4) To imagine and draw different views of physical engineering objects.

5) To explore basic knowledge about modern tool required to plot the engineering objects.

Course Outcomes:

Upon learning the course, the student will be able to:

1) Draw engineering objects through graphics language. (CL III)

2) Construct the conic sections using the drafting techniques. (CL III)

3) Interpret and construct objects like line, planes, solids etc. (CL III)

4) Apply the visualization skill to draw 2D and 3D engineering objects. (CL II) 5) Create physical objects by using computer aided drafting tools (CL III)

Course Contents:

UNIT I - Fundamentals of Engineering Graphics and Projection of Lines: Introduction to Drawing instruments and their uses, Types of lines and their applications, Method of Dimensioning. Projections of Point and Lines**:** Projection of point, Projection of line - Line inclined to Horizontal plane, Vertical plane and both the reference planes. **[5 Hrs.] UNIT II - Projections of Plane Surfaces:** Introduction to Plane-Triangle, Quadrilateral, Pentagon, Hexagon and Circle. Plane inclined to Horizontal plane, Vertical plane and both the planes.

[05 Hrs.] UNIT III- Projections of Solids: Introduction to Solids-Prism, Pyramid, Cylinder and Cone, Solids inclined to Horizontal plane, Vertical plane and both the planes. **[05Hrs.]**

UNIT IV- Engineering Curves and Development of Surfaces of Solids:

Engineering Curves - Conic Sections-Ellipse, Parabola and Hyperbola by Directrix Focus and Rectangle method. Involutes of circle and Square, Cycloid- Epicycloid and Hypocycloid, Archimedean Spiral.

Development of Solids - Development of Prism, Pyramid, Cylinder and Cone. **[05 Hrs.] UNIT V- Orthographic Projections**: Theory of Projections, Draw the orthographic views (2D) from the given pictorial view (3D).

Sectional Orthographic Projections - Type of Sections, and Sectional views. **[05 Hrs.] UNIT VI - Isometric Views:** Introduction, Isometric Scale, Draw the isometric views (3D) from the given orthographic views (2D). **[05 Hrs.]**

Laboratory Work

All sheets should be drawn by using CAD Software tools.
1) Introduction to AUTO CAD: Basic operations of CAD software, use of various operations for plotting the drawings. **[03 Hrs.]** 2) Projections of Lines **[03 Hrs.]** 3) Projections of Plane Surfaces **[04 Hrs.]** 4) Projections of Solids **[04 Hrs.]** 5) Engineering Curves **[04 Hrs.]** 6) Development of Solids **[02 Hrs.]** 7) Orthographic Projections **[05 Hrs.]** 8) Isometric Projections **[05 Hrs.]**

Learning Resources: Engineering objects & machine component

Reference Books:

1) Engineering Graphics for Degree, K. C. John, PHI Learning Pvt. Ltd., New Delhi, India. 2) Engineering Drawing, Plane and Solid Geometry, N. D. Bhatt and V. M. Panchal, Chartor Publication

3) Engineering Drawing with an Introduction to AutoCAD, D. A. Jolhe, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, India.

4) Engineering Graphics, By Luzzadder.

5) Engineering Drawing, A.J. Dhananjay, TMH, 2008.

6) Mastering AutoCAD 2019, Brian and George Omura, Willey Publication.

Supplementary Reading: Understanding of computer aided drafting packages.

i) http://www.autocadtutorials.net/

ii) https://academy.autodesk.com/software/autocad

iii) https://www.youtube.com/watch?v=a4jW2J8wnzI

iv) https://www.youtube.com/watch?v=-k-_4sOpMDk

Web Resources:

i) https://nptel.ac.in/courses/112103019/

ii) https://www.youtube.com/watch?v=z4xZmBpXIzQ

iii) https://www.youtube.com/watch?v=uojN7SOHPBw

iv) https://www.youtube.com/watch?v=T8SAAGuo174

v) https://www.youtube.com/watch?v=G3DJ4pu1qF4&list=PL9RcWoqXmzaJTfliqTSwUjWU4zCX_H2A

vi) https://www.youtube.com/watch?v=tuNw2R_6oz4

Weblinks:

1. Introduction to Engineering Drawing.

https://www.youtube.com/watch?v=7vcQHqTp1Vo

2. Theory of Projections.

http://nptel.ac.in/courses/112103019/14

3. Projection of Points.

http://nptel.ac.in/courses/112103019/17

4. Projection of Lines

http://nptel.ac.in/courses/112103019/19

5. Projection of Planes

http://nptel.ac.in/courses/112103019/24

6. Projections of Solids.

http://nptel.ac.in/courses/112103019/28

7. AUTO CAD Software

https://www.youtube.com/user/AutoCADExchange/videos

MOOCs: Online courses for self-learning:

i) https://www.classcentral.com/tag/engineering-drawings

ii) https://www.mooc-list.com/tags/engineering-drawing

iii) https://www.mooc-list.com/tags/technical-drawing

iv) https://www.mooc-list.com/tags/drawing

Pedagogy:

i) Videos and Power point presentations on smart boards available in each class room ii) Actual models of solids like cone, prism, pyramid etc.

iii) Teaching by online platform.

iv) Use of CAD Software

Assessment Scheme (Tentative):

Class Continuous Assessment (CCA): 40 Marks (including 20 marks Midterm exam) Laboratory Continuous Assessment (LCA): 20 Marks

Term End Examination: 40 Marks

Total marks =100