**R-20 ENGINEERING GRAPHICS**

(Common to ME, CE & Robotics)

**COURSE OUTCOMES: Students are able to**

CO1: Construct polygons, conics, cycloids, involutes. (K3)

CO2: Draw the orthographic projections of points, lines and planes in different positions. (K2)

CO3: Draw the orthographic projections of solids in different views. (K2)

CO4: Draw the orthographic projections of sectioned solids and development of surface of solids. (K2)

CO5: Prepare Isometric views of simple solids and conversion of Isometric to orthographic views and vice-versa. (K2)

**UNIT I**

**POLYGONS AND PLANE CURVES**

Basic Geometrical constructions, Curves used in engineering practices: Construction of regular polygons, Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

**UNIT II**

**PROJECTION OF POINTS, LINES AND PLANES**

Orthographic projection – Principles - Principal planes - First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes, determination of true lengths, angle of inclinations and traces.

**Projections of Planes**: Regular planes perpendicular and parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

**UNIT III**

**PROJECTION OF SOLIDS**

**Projections of Solids**: Prisms, Pyramids, Cone and Cylinder, Simple positions of solids and axis of the solid parallel to one plane and inclined to other plane.

**UNIT IV**

**PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES**

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinders and cones.

**UNIT V**

**ISOMETRIC PROJECTIONS**

Principles of Isometric projection – Isometric scale – Isometric projections of simple solids - Prisms, pyramids, cylinders, cones - combination of two solid objects in simple vertical positions and Conversion of Isometric views to Orthographic views; Conversion of Orthographic views to Isometric views.

**TEXT BOOKS**:

 1. Engineering Drawing by N.D. Butt, Chariot Publications 2016.

 2. Engineering Drawing + AutoCAD by K. Venugopal, V. Prabhu Raja, New Age 2010.

**REFERENCE BOOKS**:

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers 2016.

2. Engineering Graphics for Degree by K.C. John, PHI Publishers 2009.

3. Engineering Graphics by PI Varghese, McGrawHill Publishers 2013.