COMPUTER GRAPHICS

Paper Code	**CEN-601**
Course Credits	**4**
Lectures / week	**3**
Tutorial / week	**1**
Course Description	**UNIT – I**

Introduction Computer Graphics and Primitive Algorithms:

Introduction to Image and Objects, Image Representation, Basic Graphics Pipeline, Bitmap and Vector-Based Graphics, Applications of Computer Graphics, Display Devices, Cathode Ray Tubes, Raster Scan Display, Random-Scan Display, Flat Panel Display, Input Technology, Coordinate System Overview, Scan-Conversion of graphics primitives: Scan-Conversion of a Lines (Digital Differential Analyzer Algorithm, Bresenham's Line Drawing Algorithm, Scan Conversion of Circle and Ellipse , Bresenham's Method of Circle Drawing, Midpoint Circle Algorithm, Drawing Ellipses and other Conics.

UNIT- II

Basic raster graphical algorithm for 2D primitives, Transformation: Translation, Rotation, Scaling, Mirror Images, Coordinate system, 3DTransformation, Rotation about an arbitrary axis, Orthogonal Projections, Multiple Views, Isometric Projection, Perspective Projections (one ,two and three vanishing points), Wire Frame Perspective, 3D transformation.

UNIT- III

Window, View port, clipping algorithms, Curves and Surfaces: Circle drawing algorithm, Ellipse drawing algorithm, Bezier curve, B-spline curve, surfaces, Solid modelling. Parallel projection, Perspective projection, Computation of vanishing point, Visible

surface determination: Z-buffer algorithm, Scan line algorithm, Area subdivision algorithm, Ray tracing algorithm, Painter's Algorithm.

UNIT- IV

Illumination mode, Specular reflection model, Shading models for curve surfaces, Rendering, Recursive ray tracing, Texture mapping Advanced Modelling Techniques Procedural Models, Fractal Models, Grammar based models, particle systems.

UNIT – V

Object Rendering, Introduction Object-Rendering, Light Modeling Techniques, illumination Model, Shading, Flat Shading, Polygon Mesh Shading, Gouraud Shading Model, Phong Shading, Transparency Effect, Shadows, Texture and Object Representation, Ray Tracing, Ray Casting, Color Models. Introduction to animation, Key-Frame Animation.

References / Text Books:

- Hearn & Baker - Computer Graphics C version, 2nd ed. Pearson Education.
- Roger and Adams - Mathematical Element for Computer Graphics, 2nd ed., Tata McGraw Hill.
- W.K. Gilloi, Interactive Computer Graphics, PHI.
- Foley - Computer Graphics Principles & Practice, 2nd ed. Pearson Education.
- David F. Rogers, "Procedural Element for computer graphics", McGraw Hill.

Computer Usage / Software Requires:

OpenGL, Turbo C.