**Computer Graphics**

**UNIT I** Introduction to Computer Graphics Overview of Computer Graphics, Computer Graphics Application and Software, Graphics Areas, Graphics Pipeline, Graphics API’s, Numerical issues, Efficiency Display and Hardcopy Technologies, Display Technologies – Raster scan Display System, Video Controller – Vector scan display system, Random Scan Display Processor, Input Devices for Operator Interaction, Image Scanners

**UNIT II** Basic Raster Graphics Algorithms for Drawing 2D primitives, aliasing and ant aliasing, Polygon filling methods: Scan Conversion Algorithms: Simple Ordered edge list, Edge Fill, Fence fill and Edge Flag Algorithm. ,Seed fill Algorithms: Simple and Scan Line Seed Fill Algorithm, Halftoning techniques

**UNIT III** Graphics Programming using OPENGL: Why OpenGL, Features in OpenGL, OpenGL operations, Abstractions in OpenGL – GL, GLU & GLUT, 3D viewing pipeline, viewing matrix specifications, a few examples and demos of OpenGL programs, Amimations in openGL

**UNIT IV** 2D Clipping algorithms for regular and irregular windows: Sutherland Cohen Outcode, Sutherland Cohen Subdivision, Mid-Point subdivision, Cyrus Beck and Sutherland Hodgman, Cohen-Sutherland Polygon clipping Algorithm. Clipping about Concave regions. 2D Transformations, Translation, Rotation, Reflection, Scaling, Shearing Combined Transformation, Rotation and Reflection about an Arbitrary Line

**UNIT V** Normalized Device Coordinates and Viewing Transformations, 3D System Basics and 3D Transformations, 3D graphics projections, parallel, perspective, viewing transformations. 3D graphics hidden surfaces and line removal, painter’s algorithm, Z -buffers, Warnock’s algorithm.

**UNIT VI** Basic Ray tracing Algorithm, Perspective, Computing Viewing Rays, Ray-Object Intersection Shading, A Ray tracing Program, Shadows, Ideal Specular Reflection. Curves and Surfaces: Polygon Mesh, Parametric Cubic Curves, Parametric Bicubic Surfaces, Quadratic Surface, Bezier Curves and B-spline curves.

**Text Books:** 1. Fundamentals of Computer Graphics, Peter Shirley and Steve Marschner, Third Edition.(A.K.Peters Publication house)

2. Procedural Elements of Computer Graphics III Edition, Rogers, McGraw Hill.

3. Computer Graphics - Principles and Practice, J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Second Edition in C, Pearson Education.

4. Computer Graphics with OpenGL, Donald D. Hearn, M. Pauline Baker, Warren Carithers, Fourth Edition, Pearson Education.

5. Computer Graphics, Hearn and Baker, PHI, India