

**Paper Name: Computer Graphics**

**Paper Code: IT 505 C**

**Contacts:3L+1T**

**Credit:4**

**Module I:[14L]**

**Introduction to computer graphics & graphics systems [6L]:** Overview of computer graphics, representing pictures, preparing, presenting & interacting with pictures for presentations; Visualization & image processing; RGB color model, direct coding, lookup table; storage tube graphics display, Raster scan display, 3D viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Computer graphics software.

**Scan conversion [8L]:** Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; Ellipse generating algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm.

**Module II:[20L]**

**2D transformation & viewing [15L]:** Basic transformations: translation, rotation, scaling; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines, parallel lines, intersecting lines. Viewing pipeline, Window to view port co-ordinate transformation, clipping operations, point clipping, line clipping, clipping circles, polygons & ellipse. Cohen and Sutherland line clipping, Sutherland-Hodgeman Polygon clipping, Cyrus-beck clipping method

**3D transformation & viewing [5L]:** 3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, view port clipping, 3D viewing.

**Module III: [11L]**

**Curves [3L]:** Curve representation, surfaces, designs, Bezier curves, B-spline curves, end conditions for periodic B-spline curves, rational B-spline curves.

**Hidden surfaces [3L]:** Depth comparison, Z-buffer algorithm, Back face detection, BSP tree method, the Painter's algorithm, scan-line algorithm; Hidden line elimination, wire frame methods , fractal - geometry.

**Color & shading models [2L]:** Light & color model; interpolative shading model; Texture.

**Introduction to Ray-tracing: [3L]:** Human vision and color, Lighting, Reflection and transmission models.

**Suggested Text / Reference Books:**

1. Hearn & Baker – “Computer Graphics (C version 2nd Ed.)” – Pearson education
2. Z. Xiang, R. Plastock – “Schaum's outlines Computer Graphics (2nd Ed.)” – TMH
3. D. F. Rogers, J. A. Adams – “Mathematical Elements for Computer Graphics (2nd Ed.)” – TMH

	Family tree, Factorial
7	<b>Input &amp; Output</b> Read and Write
8	<b>Operators and Arithmetic</b>
9	<b>Graph Traversal</b> Depth First Search, Breadth First Search

**Paper Name: Operation Research & Optimization Techniques Lab**

**Paper Code: IT595B**

**Contacts : 3P**

**Credits: 2**

**Software based Lab using C /C++**

1. Assignment on Transportation problem.
2. Assignment on Assignment problem
3. Assignment on Duality
4. Assignment on Simplex method (Including Charns' Big-M Method)
5. Assignment on Shortest Path by using Dijkstra's or Floyd's Algorithm
6. Assignment on Maximal Flow Problem (Ford-Fulkerson Method).
7. Assignment on PERT/CPM
8. Familiarization with O.R package: TORA

**Paper Name: Computer Graphics Lab**

**Paper Code: IT595C**

**Contacts : 3P**

**Credits: 2**

1. Implementation of Bresenham's Algorithm – Line, Circle, Ellipse.
2. Implementation of Line, Circle and ellipse Attributes.
3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
4. Composite 2D Transformations.
5. Cohen Sutherland 2D line clipping and Windowing
6. Sutherland – Hodgeman Polygon clipping Algorithm.
7. Three dimensional transformations - Translation, Rotation, Scaling.
8. Composite 3D transformations.
9. Drawing three dimensional objects and Scenes.
10. Generating Fractal images.