CSE3221: Computer Graphics

75 Marks [70% Exam, 20% Quizzes/Class Tests, 10% Attendance]

3 Credits, 33 Contact hours, Exam. Time: 4 hours

Introduction to Computer Graphics and Graphics systems: Overview of computer graphics, representing pictures, preparing, presenting and interacting with pictures for presentations; Visualization and 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 and Passive graphics devices; Computer graphics software.

Scan conversion: 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.

2D transformation and viewing: Basic transformations: translation, rotation, scaling; Matrix representations and 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.

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

Curves: Curve representation, surfaces, designs, Bezier curves, B-spline curves, end conditions for periodic Bspline curves, rational B-spline curves.

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

Color and shading models: Light & color model; interpolative shading model; Texture;

Books Recommended:

1. Donald Hearn and M. Pauline Baker : **Computer Graphics**, *Prentice Hall*
2. Steven Harrington : Computer Graphics: A Programming Approach, *McGraw-Hill College*.
3. F. S. Hill : **Fundamentals of Computer Graphics,** *Prentice Hall*
4. Plastock and Kalley : **Computer Graphics,** *Mcgraw-hill*.
5. Zhigang Xiang & Roy Plastock : **Computer Graphics**, *Mcgraw-hill.*