Computer Graphics

Theory L/T (Hours per week): 4/0, Credit: 4

MODULE-I
Introduction: Display of entities, geometric computation and representation, graphics environments; Working principles of display devices: Refreshing Raster scan devices, vector devices, cathode ray tube terminals, plotters; Display of colors: Look-up tables, display of gray shades, half toning; Display and drawing of graphics primitives: Point, line, polygon, circle, curves, and texts;

MODULE-II
Coordinate conventions: World coordinates, device coordinates, normalized device coordinates, view-port and window, zooming and panning by changing coordinate reference frames; Computations on polygons: Point inclusion problems, polygon filling, polygon intersections, clipping, polygonization of a point set, convex hull computation, triangularization of polygons;

MODULE-III
Transformations in 2D and 3D: Translation, Rotation, Scaling, Reflection; Projection: Perspective and parallel projections, isometric projection, Transformation matrices; Volume and surface representation: Polygonal meshes, parametric curves and surfaces, Cubic and Bi-cubic Splines, Voxels, Octree and Medial axis representation, Sweep representation, surfaces and volumes by rotation of curves and surfaces, Fractal modeling;

MODULE-IV
Hidden surface and Line Elimination: Elimination of back surfaces, Painters' algorithms, Binary space partitioning tree; Rendering and visualization: Shading model, constant, Goraud and Phong shading, Ray tracing algorithm, Radiosity computation; Computer animation: Fundamental concepts.

Books:

1. Foley, "Computer Graphics: Principles and practice", 2nd Edition.
2. Mel Slater, "Computer Graphics and Virtual Environments 1/e", Pearson Education.
3. D.F.Rogers, "Procedural elements for Computer Graphics", Mc. Graw Hill, 1985.
4. K. A. Plastock and Borden Kelly: Schaum's Outline of Computer Graphics, 1986.
5. Newman and Sproull : Principles of interactive Computer Graphics, Mc. Graw Hill, International Students Edition, Kogakusha, 1981.
6. S. Harrington : Computer Graphics A Programming Approach, Mc. Graw Hill, 1986.