AMIT-20 COMPUTER GRAPHICS

UNIT-1 INTRODUCTION TO COMPUTER GRAPHICS

1.1 Overview of Computer Graphics-Raster refresh graphics displays-CRT- Flat Panel Displays-

1.2 Hard copy output devices-Logical interactive Devices-

1.3 Physical interactive devices-Data generation devices-Graphical user interfaces

1.4 Raster Scan Graphics: Line Drawing algorithms-Digital Differential Analyser-

1.5 Bresenham's algorithm: - Integer Bresenham's algorithm, General Bresenham's algorithm,

1.6 Faster line rasterisation algorithm-Circle generation-Ellipse generation-

1.7 General function rasterisation Scan conversions-Displaying line character and polygons-

1.8 Polygon filling:-Scan converting polygons, Edge fill algorithm,

1.9 Seed fill algorithms-Antialiasing- Halftoning

UNIT-2 TWO DIMENSIONAL TRANSFORMATIONS

2.1 Representation of points-Transformations and matrices transformation of points-

2.2 Transformations of lines- Rotation- Reflection- Scaling-

2.3 Combined transformations-Homogeneous coordinates

2.4 Windowing and clipping: Viewing transformations- Point clipping-

2.5 Cohen Sutherland line clipping-

2.6 Lian Brsky 2D Line clipping- Sutherland Hodge man Polygon clipping-

2.7 Weiner Atherton algorithm- Curve clipping- Text clipping

2.8 Plane and Space curves: Curve representation- Nonparametric curves-

2.9 Parametric curves Representation of space curves-Spline curves-

2.10   Geometric and parametric continuity - Cubic Splines-Brazier curves-B-spline curves

UNIT-3 THREE DIMENSIONAL TRANSFORMATIONS AND PROJECTIONS:

3.1 Three dimensional scaling, shearing, rotation, reflection, translations - .

3.2 Rotation about arbitrary axis Parallel to coordinate axis-

3.3 Rotation about arbitrary axis in space- Affine and perspective geometry Otho graphic projections- Taxonomic projections- Oblique projections-

3.4 Vanishing points Stereographic projections

3.5 Surface Description and Generation: Surface of revolution-

3.6 Parametric representation of surfaces- Sweep surfaces-

3.7 Quadratic surfaces- Bazier surfaces- B-spline surfaces

3.8 Visible Lines and surfaces: Back Face detection method-

3.9 Depth buffer method(z-Buffer algorithm)-

3.10   A- Buffer method-Screen subdivision method-

3.11   Painter's algorithm-Scan line algorithms

UNIT-4 RENDERING AND COLOR MODELS

4.1 Illumination model-Determining surface normal and reflection vector-

4.2 Gouraud shading-Phong Shading-Texture mapping-Ray tracing- Color- Chromacity-

4.3 Tristimulus theory of color-RGB color system -CMYK color system –

4.4 HSV color system -HLS color system-Ostwald color System

4.5 Modelling techniques and fractals: Surfaces and hierachical modelling-

4.6 Hierarchical modelling with structures- Fractals

4.7 Animation: Devices for producing animation-Computer asisted animation-

4.8 Video formats Real-Time animation techniques

References Books:

1. David F.Rogers, Procedural Elements for Computer Graphics, Second Edition,Tata McGraw-hill,2001,ISBN-13:978-0-07-047371-3, ISBN-10:0-07-047371-4

2. David F.Rogers, Mathematical Elements for Computer Graphics, Second Edition, Tata McGraw- Hill, 2001, ISBN-13:978-0-07-048677-5, ISBN-10:0-07-048677-8 (Transformations and curves in Module 2 and 3)

3. Amarendra N Sinha, Aurn D Udai , Computer Graphics , Tata McGraw-hill,2011, ISBN-13:978-0-07-063437-4, ISBN-10:0-0706347-8