

Vidyalankar

S.E. Sem. IV [CMPN]
Computer Graphics

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Practical & Oral : 25 Marks

1. Basic concepts :

Introduction to computer graphics; Lines, line segments, vectors, pixels and frame buffers, vector generation; DDA and Bresenham line drawing algorithms; Mid point and Bresenham's circle drawing algorithms; Mid point ellipse drawing algorithm; Various styles of lines like thick lines; Character generation methods (i)Stroke principles, (ii) Bit map method; Display file structure Display file interpreter.

2. Polygons :

Introduction; Representation of polygon; Entering Polygons in display file; Inside-outside test; Polygon filling methods :Boundary fill, Flood fill, Scan line polygon fill, Patterns filling.

Transformations :

Homogeneous coordinates; Translation; Scaling; Rotation; Rotation about an arbitrary point; Inverse transforms; Shear transforms; Reflections.

3. Segments :

Introduction; Segment table; Operations segment : Creation, Closing, Deletion, Renaming, Visibility; Other display-file structures; Image transformations; Raster techniques.

Windowing and clipping :

Introduction; Viewing transforms; 2D line clipping : Cohen-sutherland line clipping, Midpoint subdivision algorithm, Liang-Barsky Line Clipping algorithm, Cyrus-Beck algorithm; Text clipping; Polygon clipping : Sutherland-Hodgman polygon clipping algorithm, Weiler-Arthorton polygon clipping, Liang barsky polygon clipping; Generalized clipping.

4. 3-D Transformations :

Introduction; 3-D geometry; 3-D display methods; 3-D object representation methods; 3-D transformations; Rotation about an arbitrary axis; Concept of parallel and perspective projections; 3-D clipping; 3-D viewing transformations.

5. Hidden Surfaces and Lines :

Introduction; Back-face removal algorithm; Z buffers; Scan-line; Painter's algorithm; Warnock's algorithm; Hidden line methods.

Light, Color and Shading :

Introduction; Diffuse illumination; Point-source illumination; Specular reflection; shading algorithms; transparency; reflections; shadows; ray tracing; Colour models; rendering pipeline.

6. Curves and fractals :

Introduction; Curve generation : B-Splines, Bezier curves; Surfaces : Bezier surfaces, B spline Surfaces; Fractals, fractal lines and surfaces.

Animation :

Devices for producing animation; Computer assisted animation; Real time animation; Frame-by-frame animation; Method for controlling animation (fully explicit control, procedural).

References :

1. “Computer Graphics” (*S. Harrington*) 2nd Edition, McGraw-Hil Publications, 1987
ISBN 0 – 07 – 100472 - 6.
2. “Computer Graphics Principles and Practice” (*J. Foley, Van Dam, S. Feiner, J. Hughes*) 2nd Edition,
Pearson Education, 2003, ISBN 81– 7808 – 038 – 9
3. “Computer Graphics for Java Programming” (*Leen Ammeraal, KangZRang*) 2nd edition, Wiley India.
4. “Procedural Elements for Computer Graphics (*D. Rogers*) 2nd Edition, TATA Mc-Graw-Hill
Publication, 2001, ISBN 0 – 07 – 047371 – 4
5. “Computer Graphics – C Version” (*D. Hearn, M. Baker*) 2nd Edition, Pearson Education, 2002, ISBN
81 – 7808 – 794 – 4.
6. “Computer Graphics : Using OpenGL” (*F. Hill*) 2nd Edition, Pearson Education, 2003 ISBN
81 – 297 – 0181 – 2.
7. “Computer Graphics” (*Xiang, Plastock*) 2nd Edition, TATA Mc-Graw-Hill Publication, 2002, ISBN
0 – 07 – 049958 – 6

