COMPUTER GRAPHICS
(Professional Elective-I)

Course Code : 15CT1116

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Course Outcomes:

At the end of the course, a student will be able to

CO 1 Acquire the knowledge about working principles of different Output devices.

CO 2 Different types of 2D and 3D graphics along with transformation techniques.

CO 3 Get the idea about projections of different views of objects along with elimination of invisible components (points, lines and surfaces).

CO 4 Motion oriented graphics will give the idea about implementing different animation sequences.

CO 5 Get knowledge on visible surface detection methods.

UNIT I

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster - scan systems, random scan systems, graphics monitors and work stations and input devices.

OUTPUT PRIMITIVES :

Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT II

2-D GEOMETRICAL TRANSFORMS:

Translation, scaling, rotation, reflection and shear transformations, matrix homogeneous coordinates, composite transforms. transformations between coordinate systems.

2-D VIEWING:

The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

UNIT III

3-D GEOMETRIC TRANSFORMATIONS:

Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D VIEWING:

Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping, Introduction to curves: spline and Bezier curve.

UNIT IV

VISIBLE SURFACE DETECTION METHODS:

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

WINDOWS PROGRAMMING:

Dos Programming Model, Windows Programming Model, Sample Window Program, Message Box, Creation and Display of Window, Interaction with Window, Reacting to Messages.

UNIT V

COMPUTER ANIMATION:

Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

TEXT BOOKS:

1. Donald Hearn and M.Pauline Baker, *Computer Graphics C version*, 2nd Edition, Pearson Education, 2011.
2. Yaswanth Kanetkar: *Let Us C*, 9th Edition, Infinity Science Press, 2009.

3. Foley, VanDam, Feiner and Hughes, *Computer Graphics Principles & Practice in C*, 2nd Edition, Pearson Education, 2002.

REFERENCES:

1. Donald Hearn and M.Pauline Baker, *"Computer Graphics"*, 2nd Edition, PHI/Pearson Education, 2008.
2. Zhigand xiang, Roy Plastock, *"Computer Graphics, Schaum's Outlines"*, 2nd Edition, Tata Mc- Graw Hill Edition, 2007.
3. David F Rogers, *"Procedural elements for Computer Graphics"*, 2nd Edition, Tata Mc Graw Hill, 2008.
4. Neuman and Sproul, *"Principles of Interactive Computer Graphics"*, 2nd Edition, TMH, 2008.
5. Shalini Govil, Pai, *"Principles of Computer Graphics"*, 1st Edition, Springer International Edition, 2005.
6. Steven Harrington: *"Computer Graphics - A Programming approach"*, 1st Edition TMH, 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IITDelhi/Computer%20Graphics/csmain.htm