

## COMPUTER GRAPHICS

(Common to CSE&IT)

**Course Code :13CT1112**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>0</b>	<b>0</b>	<b>3</b>

### Course Educational Objectives:

To teach the students how to write programs that are related to different graphics like lines, polygons, circles and ellipse, also projecting 3D solids.

- ❖ To get awareness about different graphical devices used for personal computers.
- ❖ The algorithms that are adopted by different devices in line, and ellipse drawing and filling which improves the programming capabilities in graphics.
- ❖ The algorithms that are adopted by different devices in polygon, and circle drawing and filling which improves the programming capabilities in graphics.
- ❖ This subject also gives the awareness about creating message box and windows using C.
- ❖ This subject mainly deals with the different objects used in animations both 2D and 3D.

### Course Outcomes:

At the end of the course student will be able to

- ❖ Acquire the knowledge about working principles of different Output devices.
- ❖ Different types of 2D and 3D graphics along with transformation techniques.
- ❖ Get the idea about projections of different views of objects along with elimination of invisible components (points, lines and surfaces).
- ❖ Motion oriented graphics will give the idea about implementing different animation sequences.
- ❖ Get knowledge on visible surface detection methods .

**UNIT-I****(12 Lectures)**

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****(12 Lectures)****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****(12 Lectures)****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****(12 Lectures)****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****(12 Lectures)****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*”, 2<sup>nd</sup> Edition, Pearson Education, 2011.
2. Yaswanth Kanetkar: “*Let Us C*”, 9<sup>th</sup> Edition, Infinity Science Press, 2009.
3. Foley, VanDam, Feiner and Hughes, “*Computer Graphics Principles & Practice in C*”, 2<sup>nd</sup> Edition, Pearson Education, 2002.

**REFERENCES:**

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

**WEB REFERENCES:**

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

