ITC09 :: Computer Graphics

(3L-0T-2P)

Introduction to computer graphics: Application areas of computer graphics, Output Devices, Graphical Display Devices, Raster scan Displays, Random scan Displays, Colour Monitors/Displays: mechanism and working principle with concepts like Right handed and left handed coordinate system (RHCS & LHCS), resolution video mode, video memory, video adapter, and display processor, Graphical Printing Devices.

Scan Conversion: Point generation: Representation of an image, Line – drawing: symmetric DDA, Simple DDA, Bresenham's line algorithm, Circle Drawing: General methods, symmetric DDA, Bresenham's circle algorithm, Ellipse – Drawing methods Polygon filling.

Two Dimensional Transformations and Clipping: Geometric Transformation, Coordinate system transformation, Composite transformations and Homogeneous coordinates, Viewing transformations: world coordinate system (WCS), Screen coordinate system (SCS), Window, Viewport, Aspect ratio, Two – Dimensional Clipping, Point clipping and line clipping: Sutherland Cohen algorithm, Mid-point subdivision algorithm, Cyrus-beck algorithm and other methods for clipping line against rectangular and non – Polygon clipping : Sutherland –Hodgmann algorithm, Curve clipping and text clipping.

3 Dimensional object representation: point, line polygon, curve and surfaces, 3-D Transformations: Translation, Rotation, Scaling, Mirror Reflection etc, Representation of 3 –D object on 2 – D screens, 3-D WCS, Parallel and perspective projection, perspective depth, Need of 3-D screen coordinate system.

Hidden Surface Elimination and Curves & Surfaces: Z-buffer, Scan line algo, Shape description requirements, Parametric curves, Beizer Curves, B- Spline methods.

Illumination & Shading: Reflection, Phong & Gourond Models, Color Models: Achromatic light RGB, CMY, YIQ, HSV, and HLS color models, Rendering, Animation Techniques.