

MCA – 204**Computer Graphics**

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Course Objectives:

The Course is introduced to impart students with conceptual knowledge of the graphics techniques and algorithms. To study the multimedia concepts and various I/O technologies. It will enable the students to develop their creativity.

UNIT – I

Introduction: Definition Of Computer Graphics And Its Applications, Video Display Devices- Raster-Scan Displays, Random-Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays Input Devices: Keyboard, Mouse, Trackball and Space ball, Joysticks, Digitizers, Image Scanners, Touch Panels, Light Pens, Voice Systems.

UNIT – II

Output Primitives: Line Drawing Algorithms (DDA, Bresenhaus's Circle) Generating Algorithm: Midpoint Circle Drawing Algorithm, Ellipse Generating Algorithm, Midpoint Ellipse Generating Algorithm, Character Generation, 2D Transformations: Translation, Rotation, Scaling, Reflection, Shear, Composite Transformation-Translation, Rotations, Scaling.

UNIT – III

Two Dimensional Viewing: Window-To-Viewport Coordinate Transformation, Clipping Operations, Point Clipping, Line Clipping–(Cohen-Sutherland Line Clipping, Liang-Barsky Line Clipping, Nicholl-Lee-Nicholl Line Clipping), Polygon Clipping–(Sutherland-Hodgeman Polygon Clipping, Weiler-Atherton Polygon Clipping), Curve Clipping, Text Clipping.

Three Dimensional Concepts: Three Dimensional Display Methods–Parallel Projection, Perspective Projection, Surface Rendering.

Three Dimensional Transformations: Translation, Rotation, Scaling, Reflection, Shear.

UNIT – IV

Curves and Surfaces: Bezier Curves, B-Spline Curves, Fractal Geometry Methods, Octrees.

Visible-Surface Detection Methods: Back Face Detection, Depth Buffer Method, A-Buffer Method, Scan Line Method, Depth Sorting Method.

Concept of Shading: Modeling Light Intensity, Diffuse And Specular Reflection, Refracted Light, Concept Of Shading Methods.

Text Book:

1. D. Hearn and M.P. Baker, **Computer Graphics** (4th ed.), Prentice–Hall of India, 2010.

Reference Books:

1. J.D. Foley, A van Dam, S.K. Feiner and J.F.Hughes, Computer Graphics: Principals and Practices (3rd ed.), Addison-Wesley, MA, 2013.
2. D.F. Rogers, Procedural Elements in Computer Graphics (4th ed.), McGraw Hill Book Company, 2019.
3. D.F. Rogers and A.J. Admas, Mathematical Elements in Computer Graphics (2nd ed.), McGraw Hill Book Company, 1990

Course Outcomes:

By the end of the course, students will be able to :

CO 1: Get Familiar with the principles of graphical user interfaces.

CO 2: Learn the introductory concepts in computer graphics and multimedia processing.

CO 3: Explain the core concepts of computer graphics, including viewing, projection, perspective, modelling and transformation in two and three dimensions.

CO 4: apply the concepts of color models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and rendering.

CO 5: Use techniques which will allow them to create user-friendly interfaces for computer applications.

CO 6: Learn the fundamentals of animation, parametric curves and surfaces, and spotlighting.

CO 7: Apply graphic programming techniques to design and create computer graphics.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5-10 parts, out of the entire syllabus. In all, five questions are to be attempted.