



Paper Code : CMG:502

Paper Name : Computer Graphics

Teaching Hours (Per Week)		Examination Scheme		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	100 (marks)
4		30	70	

Lectures = 68 Hours

Objective : This course aims to impart fundamental concepts of computer graphics and multimedia so that students are able to understand the basic concept of computer graphics, Algorithms to draw various graphics primitives, 2D -3D transformations and to enable the students to develop their creativity.

UNIT 1.: (10 Hours)

What is Computer Graphics? Applications of computer graphics.

Display devices: Random scan and Raster scan systems, color CRT, Plasma panel displays, LCD Panels.

Graphics Input Devices: Keyboard, Mouse, Trackball, Joystick, Data Glove, Digitizer, Scanner, Touch panels, Light pen, Plotter, Film Recorders, Voice System, Display processors, Graphics tablet.

UNIT 2: (15 Hours)

Points and Lines, Digital Differential Analyzer (DDA) and Bresenham's line drawing algorithm, Circle Generating Algorithms, Midpoint circle and DDA circle algorithm, line attributes, color and Grayscale levels.

Polygon Filling: Scan Line Polygon Filling algorithm, Flood-Fill algorithm, Antialiasing.

Windows and Clipping: Concept of a window, viewport, window to viewport transformation.

Line clipping: Cohen-Sutherland line clipping, Liang-Barsky line clipping.

Polygon clipping: Sutherland-Hodgman and Weiler-Atherton polygon clipping Algorithms.

UNIT 3: (15 Hours)

2D Transformation: Basic transformations, Homogeneous Co-ordinates, Composite transformations, translation, rotation and scaling, reflection, shearing, Rotation about an arbitrary point, Zooming and panning, Rubber band methods, Dragging.

UNIT 4: (13 Hours)



Polygon surfaces, polygon tables, plane equations, polygon meshes, curved lines and surfaces, Blobby objects, Cubic Spline curves, Bezier curves, B-spline curves.

UNIT 5:

(15 Hours)

Three dimensional co-ordinate systems, Three dimensional transformations: translation, rotation and scaling, Three dimensional display methods: Parallel projection (mathematical expression), perspective projection(mathematical expression), depth cueing, visible line and surface identification, surface rendering,exploded and cutaway views, three dimensional and stereoscopic views.

Visible Surface Detection: Classification, Back Face Detection method, Depth Buffer method, Scan line method.

TEXT BOOK:

1. Donald Hearn and M. Pauline Baker, **Computer Graphics C Version**, 3rd Edition Prentice Hall of India pvt.ltd., 2002.

REFERENCE BOOKS:

1. Rogers & Adams, **"Procedural Elements for Computer Graphics"**, McGraw Hill, 1997.
2. W M Newman & Sproul R F, **Principles of Interactive Computer Graphics**, McGraw-Hill, 1979
3. Harrington Steven, **Computer Graphics- A Programmers approach**, McGraw Hill, 1987
4. J D Foley and A Van Dam, **Fundamentals of interactive Computer Graphics**, Addison-Wesley Longman Publishing Co., Inc, 1982
5. David F. Rogers and J. Alan Adams "Mathematical Elements for Computer Graphics" (Paperback) McGraw-Hill Science/Engineering/Math; 2nd edition (Pub Date: JUL-02)
6. Schaum's Outline of "Theory and Problems of Computer Graphics" (Paperback) by Zhigang Xiang & Roy A. Plastock McGraw-Hill; 2nd edition (September 8, 2000)
7. Prabhat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003
8. Mark J. Bunzel and Sandra K. Morris "Multimedia Application Development" Mcgraw-Hill Osborne Media; 2nd edition (September 1993)
9. Judith Jeffcoate, "Multimedia in practice technology and Applications", Prentice Hall PTR; 1 edition (February 8, 1995)
10. Bing J. Sheu and Mohammed Ismail "Multimedia Technology for Applications" Wiley-IEEE Press (June 22, 1998)