UPES

Year: 2024
Semester: V

1. Name of the Faculty: Dr. Arjun Arora — Course Code: CSEG 3003
2. Course : Computer Graphics — L: 36
3. Program : B. Tech CSE+CCVT — T: NA
4. Target : Level-1 — P: NA
   C: 3

COURSE PLAN

1. References:

Text Books	Web resources	Journals	Reference books
1) Computer Graphics- C version, Second Edition, Pearson, Donald D. Hearn and M. Pauline Baker 2) Computer Graphics with OpenGL, Fourth Edition, Pearson, Donald D. Hearn, M. Pauline Baker and Warren Carithers	https://youtube.com/results?search_query=Computer+Graphics+IIT+Madras		1) Mathematical Elements for Computer Graphics, Second Edition, McGraw Hill, David F. Rogers and J. Alan Adams 2) Procedural Elements for Computer Graphics, Second Edition, McGraw Hill, David F. Rogers

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BROAD PLAN OF COURSE COVERAGE

Course Activities:

S. No.	Description	Planned			Remarks
		From	To	No. of Sessions	
1.	**UNIT -1** **Introduction to computer graphics :** Overview of computer graphics, Raster /Random scan display, Calligraphic refresh graphics , Display Input and output Device(CRT) Introduction to OpenGL GL,GLU,GLUT 3D Viewing Pipeline, Demo of OpenGL code.			4	
2.	**UNIT 2:** **Scan conversion-Lines, Circles and Ellipses. Polygon Filling Algorithms and Clipping Algorithms** Points & lines: Line drawing algorithms DDA algorithm Bresenham's line algorithm Problems of Aliasing ,end point and clipping lines Circle generation algorithms Ellipse generating algorithm Scan line polygon Flood fill algorithm Boundary fill algorithm Point clipping Line clipping Liang-Barsky line clipping algorithm			8	

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	Cohen Sutherland line clipping algorithm Polygon clipping Sutherland –Hodgman algorithm Weiler-Atherton Polygon clipping Text clipping				
3.	**UNIT-3:** **2D Transformations** Homogenous coordinate system (HCS). Translation Rotation Scaling Shearing Composite transformation Window to viewport transformations Rotation about point Reflection about a line			5	
4.	**UNIT-4:** **3D Transformations** Translation Rotation scaling Instance Rotation about an arbitrary axis in space reflection through an arbitrary plane polygon meshes			4	
5.	**UNIT-5:** **Curves** Curve Representation, Non Parametric curves Cubic Splines Bezier Curves B-spline curves Rational B-spline curves			6	

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	Curved surfaces Quadric Surfaces Bezier Surfaces fractal – geometry				
6.	**UNIT-6:** **Hidden Surfaces** Techniques for Efficient VSD, Depth comparison, Z-buffer algorithm, Back face detection, *BSP tree method, *The Printer's algorithm, Scan-line algorithm, Hidden line elimination, Area sub division methods			5	
7.	**UNIT-7:** **Color & Shading** Transparency, Shadows, Constant – Intensity shading, Gouraud Shading, Phong shading, Wireframe –visibility methods, Recursive ray, tracing algorithm , Radiosity model			4	