

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B.Tech. Computer Science and Engineering
Course Code:	2CSDE95
Course Title:	Computer Graphics
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. explain various aspects of computer graphics and computer visualization
2. infer the working of basic drawing and rendering algorithms in 2D and 3D
3. explain various 2D and 3D transformations
4. design components in 2D and 3D

Syllabus:

Total Teaching hours: 30

Unit	Syllabus	Teaching hours
Unit-I	Introduction to Graphics system: Input devices, Output devices: CRT, Random Scan System, Raster Scan System, Color CRT Monitors, DVST, Introduction to graphics programming (OpenGL)	04
Unit-II	Raster Graphics: line, circle and Ellipse drawing algorithms, Polygon Drawing and filling methods, Attributes of output Primitive, Character Generation: Bit map and Outline font method.	07
Unit-III	Two-Dimensional Viewing: Viewing Pipeline, Windowing and clipping: Cohen and Sutherland line clipping. Linag-Barsky clipping method, Nicholl-Lee-Nicholl; Polygon Clipping: Sutherland-Hodgeman Polygon Clipping and Weiler Atherton Polygon Clipping	07
Unit-IV	2D and 3D Geometrical Transformations: scaling, translation, rotation, Shear, reflection; Three-Dimensional Viewing Transformations: Parallel and perspective projection, 3D clipping.	07
Unit-V	Curves and Surfaces: cubic splines, Bezier curves B-splines, Tensor product surfaces, surface of revolution sweep surfaces Fractal curves and surfaces.	05

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

- Suggested Readings/References:
1. Donald Hearn and M. Pauline Baker, Computer Graphics, , PEARSON EDUCATION.
 2. James D. Foley, andries van Dam, Steven K. Feiner, John F. Hughes,, Computer Graphics Principles and Practice, Addison-Wesley.
 3. Steven Harrington, Computer Graphics: A programming approach, McGraw Hill
 4. Donald Hearn and Pauline Baker, Computer Graphics – Openl GL Version, Pearson Education.
 5. F.S. Hill, Computer Graphics Using OpenGL, Pearson Education

Suggested List of Experiments :	Sr. No.	Practical Title	Hours
	1.	Implement DDA line algorithm.	02
	2.	Implement Bresenham's line algorithm.	02
	3.	Implement midpoint Circle Drawing algorithm.	02
	4.	Implement Ellipse Drawing algorithm.	02
	5.	Write a program to generate a generalized Histogram to show monthly sales of a company and fill every bar with different colours/patterns. The filling has to be done using boundary / flood fill algorithm.	04
	6.	Implement a program to draw a rectangle using mouse.	02
	7.	Implement Polygon filling algorithm. (Scan-line filling Algorithm)	04
	8.	Write a program that draws a polygon of users choice. Implement 2-D transformation concepts. The transformation should be selected by user in forms of menu displaying following options: <ol style="list-style-type: none"> a. Translate b. Rotate c. Scale d. Exit 	06
	9.	(a) Implement Line Clipping algorithm. (As suggested by the faculty) (b) Implement Polygon Clipping algorithm	04
	10.	Implement basic program that draws a simple fractal	02

Suggested Case List: -NA-