



C.U.SHAH UNIVERSITY – WADHWANCITY

FACULTY OF: - Technology and Engineering (Diploma Engineering)

DEPARTMENT OF: - Computer Engineering

SEMESTER: - V

SUBJECT CODE: - 2TE05COG1

SUBJECT NAME – Computer Graphics

Teaching & Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme				Evaluation Scheme							
		Th	Tu	Pr	Total	Theory				Practical (Marks)			Total
						Sessional Exam		University Exam		Internal		University	
						Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
<u>2TE05COG1</u>	Computer Graphics	03	00	02	05	30	1.5	70	03	20	30	150

Objectives:-

Computer Graphics is the illustration field of Computer Science. Now a day's its use spans virtually all scientific fields and is utilized for design, presentation, education and training. This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends. In recent trends, every computer system interacts with the user through a graphical user interface. User can understand the information in both textual and graphical format. After studying this subject, a learner will be able to work with 2-dimensional, 3-dimensional graphics. It is also useful in many fields such as Engineering drawing, graphics, architectural design, video games and animations.

Prerequisites: - Basic knowledge of C, C++ Programming and vector geometry

Course Outlines:-

Sr. No.	Course Contents	Hours
1	Introduction to Computer Graphics History of Computer Graphics, Graphics standard, Application of Computer Graphics.	3
2	Input – Output Devices Input Devices, Display Devices (CRT, Color CRT, DVST, Flat panel Displays), Raster Scanning, Raster Scanning Display System, Random Scan Display, VGA, Hardcopy Devices.	8
3	Output Primitives Line drawing Algorithm (Simple Line Drawing Algorithm, DDA algorithm, Bresenham's Line Algorithm), Circle Drawing Algorithm (Mid-point circle algorithm), Filled Area Primitives (Scan Line polygon fill algorithm, Boundary Fill algorithm, Flood fill Algorithm), Polygon (Convex Polygons, Concave Polygons), Character generation.	8
4	2D Geometry Basic Transformations (Translation, Rotation, Scaling), Composite Transformations (Translation, Rotations, Scaling), Inverse Transformation, Other Transformation (Reflection,	5

	Shears), Zooming, Panning, Jaggies	
5	2D Viewing Viewing Pipeline, Windows to Viewpoint co-ordinate transformation, Clipping Operations, Point Clipping, Line Clipping(Cohen Sutherland Line Clipping, Liang Bersky Line Clipping), Polygon Clipping(Sutherland Hodgeman Polygon Clipping), Text Clipping, Exterior Clipping	5
6	3D Geometry and Viewing Translation, Rotation, Scaling, Other Transformation(Reflections, Shears), Viewing Pipeline, Projection(parallel projection, Perspective projection)	5
7	Solid Surface Detection and Illumination Classification of Visible Surface Detection Algorithms, Back face detection, Depth buffer method(Z-buffer, A-buffer), Basic Illumination Models(Ambient Light, Diffuse Reflection, Specular Reflection and Phong Model.	5

List of Experiments:-

- Simple animations using built in functions in C.
- Draw line using different line style.
- Draw the circle using Bresenham's algorithm.
- Perform the experiment to draw the polygon.
- Draw the polygon using filling technique.
- Perform the operation of scaling for two dimension picture.
- Perform the operation of translation for two dimensional picture.
- Perform the operation of transformation for 3D picture.
- Perform the operation of windowing and clipping technique.

Learning Outcomes:- After studying this course students will be able to

- Enhance visualization skills
- Understand and write algorithms for construction of various shapes.
- Implement graphics primitives and demonstrate geometrical transformations.
- Create interactive graphics applications using programming interfaces.

Books Recommended:-

- Computer Graphics **By: Donald Hearn & M Paulin Baker** (PHI Publication).
- Computer Graphics **By: Steven Harington** (MGH Publication).

E- Reference:-

- www.cs.uic.edu/~jbell/CourseNotes/ComputerGraphics.
- www.freevideolectures.com/Course/2275/Computer-Graphics.
- www.unm.edu/~tbeach/terms/inputoutput.html.
- www.w3professors.com.
- www.tutorialspoint.com/dip/index.htm.