COMPUTER GRAPHICS	
CSE 225	**Credits : 3**
Instruction **:** 3 Periods & 1 Tut/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

PREREQUISITES:

Elementary knowledge in C programming, Solving mathematical expressions, algorithm or pseudo code.

COURSE OBJECTIVES:

- Understand the applications in the real world and the graphics systems used in developing graphics.
- Exploration of fundamental concepts in 2D and 3D computer graphics.
- Learn two dimensional and three dimensional computer graphics with comprehend advanced software tools of computer graphics

COURSE OUTCOMES:

By the end of the course, the student will be able to:	
1.	Explain computer graphics, applications and contemporary terminology, hardware
2.	Design 2D objects using various algorithms.
3.	Apply geometric and viewing transformations on 2D objects.
4.	Design 3D objects and apply geometric and viewing transformations on 3D objects.
5.	Compare visible surface methods.

Mapping of Course Outcomes with Program Outcomes:

Mapping		**PO**												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	**1**	**1**										**1**		
	2	**3**	**2**	**2**	**2**					**2**	**1**		**1**		**2**
	3	**3**	**2**	**2**	**2**					**2**	**1**		**1**		**2**
	4	**3**	**2**	**2**	**2**					**2**	**1**		**1**		**2**
	5	**2**	**1**	**1**						**1**	**1**				**2**

SYLLABUS

UNIT-I **9periods**

Introduction: Basics of computer graphics, Applications
Over view of Graphics systems: Video Display Devices, Raster Scan systems, Random scan systems, Graphics monitors and workstations, Input devices, Graphics software.

Learning Outcomes : At the end of this unit, student will be able to

1. Express about the application in the real world and the computer Graphics.
2. Summarize the different graphic systems

UNIT-II **15 periods**

Output primitives & its attributes: Points and Lines-Line Drawing Algorithms, Loading the Frame buffer, Line function, Circle Generating Algorithms, Ellipse Generating Algorithms, Filled Area Primitives, Filled Area Functions, Cell Array, Character Generation.
Attributes of Output Primitives: Line and Curve Attributes, Color and Gray scale levels, Area Fill Attributes, Character Attributes, Bundled Attributes, Anti-aliasing.

Learning Outcomes : At the end of this unit, student will be able to

1. Observe various 2d output primitive and algorithm
2. Interpret the attributes of output primitives

UNIT –III **15 periods**

Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representations, Homogeneous Coordinates, Composite Transformations, Other Transformations, Transformations between Coordinate Systems.
Two Dimensional Viewing: The Viewing Pipeline, Viewing Coordinate Reference Frame, Window to Viewport Coordinate Transformation, Two Dimensional Viewing Functions, Clipping Operations, Point Clipping, Line Clipping, Polygon Clipping, Curve Clipping, Text and Exterior Clipping.

Learning Outcomes : At the end of this unit, student will be able to

1. Apply 2-dimensional geometric transformation to the real world scenario
2. Evaluate various clipping algorithms and outline 2D viewing transformation

UNIT-IV **12 periods**

Three Dimensional Concepts and Object representations & Transformation : 3D display methods, 3D Graphics, Polygon Surfaces, Curved Lines and Surfaces, Quadratic Surfaces, Super Quadrics, Blobby Objects, Spline Representations, Cubic Spline methods, Bezier Curves and Surfaces, B Spline Curves and Surfaces.

Three Dimensional Geometric and Modeling Transformations: Translation, Rotation, Scaling, Other Transformations, Composite Transformations.
Three Dimensional Viewing: Viewing Pipeline, Viewing Coordinates, Projections, View Volumes, General Projection Transformations, Clipping

Learning Outcomes : At the end of this unit, student will be able to
1. Review the 3d object representations and the analyze various surface representation.
2. Compare the 2D and 3D geometric and modeling transformations and explain the 3D viewing transformation.

UNIT-V **9 periods**
Visible Surface Detection & Hidden Surface Detection Methods: Classification of visible, Surface detection algorithms, Back face method, Depth buffer method, Scan line method, Depth Sorting Method, Z-buffer method, Area sub-division method, Comparison of hidden surface methods.
Polygon Rendering Methods: Constant-Intensity Method, Gouraud Method, Phong Method

Learning Outcomes : At the end of this unit, student will be able to
1. Compare and differentiate visible surface detection methods
2. Differentiate various polygon rendering methods.

Text Books:
1.Computer Graphics C Version by Donald Hearn & M. Pauline Baker Pearson Education, New Delhi, 2004

References Books:
1. Procedural Elements for Computer Graphics by David F. Rogers, Tata McGraw Hill Book Company, New Delhi, 2003
2. Computer Graphics: Principles & Practice in C by J. D. Foley, S. K Feiner, A Van Dam F. H John, Pearson Education, 2004

Web References:
1. http://nptel.ac.in/courses/106106090/
2. https://www.coursera.org/courses?languages=en&query=computer+graphics
3. https://courses.edx.org/courses/BerkeleyX/CS-184.1x/2013_October/syllabus/

,,
Compiled By : Mrs G V Gayathri, Asst Professor,CSE Dept
Mrs G Santoshi, Asst Professor,CSE Dept