

### Computer Graphics

<b>Course Code</b>	20CS4601D	<b>Year</b>	III	<b>Semester</b>	II
<b>Course Category</b>	PEC	<b>Branch</b>	CSE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	-
<b>Continuous Evaluation :</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

#### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Understand graphics applications, architectures and openGL program structure	<b>L2</b>
<b>CO2</b>	Apply openGL functions to design interactive programs	<b>L3</b>
<b>CO3</b>	Apply basic transformations on objects	<b>L3</b>
<b>CO4</b>	Apply line and polygon clipping algorithms	<b>L3</b>

#### Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	√													
<b>CO2</b>										√			√	
<b>CO3</b>	√									√				
<b>CO4</b>	√								√	√				

Syllabus		Mapped CO
Unit No.	Contents	
I	Introduction: Applications of computer graphics; A graphics system; Images: Physical and synthetic; Imaging systems; the synthetic camera model; the programmer's interface; Graphics architectures. Graphics Programming: The Sierpinski gasket; Programming two-dimensional applications. The OpenGL API; Primitives and attributes; Color; Viewing; Control functions; The Gasket program.	CO1,CO2
II	Input and Interaction: Interaction; Input devices; Clients and servers; Display lists; Display lists and modeling; Programming event-driven input; Menus; Picking; Animating interactive programs; Logic operations.	CO1,CO2
III	Geometric Objects and Transformations: Scalars, points, and vectors; Three-dimensional primitives; Coordinate systems and frames; Modeling a colored cube; Affine transformations; Rotation, translation and scaling. Transformations in homogeneous coordinates; Concatenation of transformations; OpenGL transformation matrices.	CO1, CO3
IV	Viewing: Classical and computer viewing; Viewing with a computer; Positioning of the camera; Simple projections; Projections in OpenGL; Parallel-projection matrices; Perspective projection matrices.	CO1,CO3
V	Implementation: Basic implementation strategies; Clipping; Cohen-Sutherland Line-segment clipping; Polygon clipping; Clipping of other primitives; Clipping in three dimensions; Rasterization; Bresenham's algorithm; Polygon rasterization;	CO1,CO4

### Learning Resources

#### Text Books

1. Interactive Computer Graphics A Top-Down Approach with OpenGL, Edward Angel, 5th Edition, Pearson, 2009.
2. Computer Graphics through OpenGL: From Theory to Experiments, Sumantha Guha, Chapman and Hall/CRC, 2011 (For OpenGL and related examples).

#### References

1. Computer Graphics with OpenGL, Hearn & Baker, 3rd Edition, Pearson 2004.
2. Computer Graphics Using OpenGL, F.S. Hill, Jr, and M. Kelley, Jr., 3rd Edition, Pearson/PHI, 2009.