3/4 B.Tech. FIRST SEMESTER

CS5L3 **COMPUTER GRAPHICS LAB** **Credits: 2**

(Common to CSE & IT)

Required

Lecture: -- **Internal assessment: 25 marks**

Lab: 3 periods/week **Semester end examination: 50 marks**

Course context and Overview: This lab course would cover practical assignments broadly to address: interactive computer graphics; 2-D and 3-D rasterization and rendering pipelines, including geometric object and view transformations, projections, hidden surface removal; lighting models for local and global illumination; free form drawing with Curves; hierarchical modeling of 3-D objects; systems and libraries supporting display and user interaction through OpenGL

Prerequisite: Computer Graphics, A Programming Language, Open GL

Objectives:

1. Students should learn the simple basics of OpenGL by displaying the points, line and circle on a plane.
2. Student should study and understand how to work with the transformations in graphics through OpenGL by displaying the color cube and spin it.
3. Students should learn how to perform the clipping algorithms in OpenGL.
4. Students should learn how to perform the polygon Filling using scan line method.

Learning Outcomes:

Ability to:

1. Draw Geometric primitives using OpenGL.
2. Execute scan line polygon filling using OpenGL.
3. Implement basic transformations on objects using OpenGL.
4. Implement clipping algorithm on lines using OpenGL.

Exercises:

1. Write a program to draw points on a plane in OpenGL
2. Write a program to draw a line on plane in OpenGL.
3. Write a program to draw circle on plane in OpenGL.
4. Write a program draw a white rectangle on a black background in OpenGL.
5. Write a program to draw a color cube and spin it using openGL transformation matrices in OpenGL.
6. Write a program to create a house like figure and rotate it about a given fixed point using OpenGL functions in OpenGL.

7. Write a program to implement the Cohen-Sutherland line clipping algorithm. Make provision to specify the input line, window for clipping and viewport for displaying the clipped image. in OpenGL

8. Write a program to fill any given polygon using scanline area filling algorithm in OpenGL.

Program to display a set of values {fij} as a rectangular mesh. Rectangular Mesh using set of points f(i,j)=f(xi,yi) where xi=x0+i*dx, yi=y0+j*dy

Learning Resources

Text Book:

Computer Graphics through OpenGL: From Theory to Experiments, Sumantha Guha, Chapman and Hall/CRC, 2011