3/4 B.Tech - SECOND SEMESTER

IT6L3   **COMPUTER GRAPHICS AND ALGORITHMS LAB**   **Credits:2**

Internal assessment: 25 marks

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

Objectives:
- To introduce the basics of output primitives through OpenGL.
- To design different types of transformations in graphics.
- To gain familiarity with different types of clipping and polygon algorithms.

Outcomes:

Students will be able to
- Implement different types of interactive graphics programs using OpenGL.
- Develop various transformations in graphics.
- Build an interactive graphics program to perform various clipping algorithms.
- Implement an interactive graphics program to perform polygon filling.

Prerequisites:

Classic Data Structures, Engineering Mathematics-I and Engineering Mathematics-II

Exercises:
1. Write a program to draw points on 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.
6. Write a program to create a house like figure and rotate it about a given fixed point using OpenGL functions.
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.
9. 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 $xi=x0+i*dx$, $yi=y0+j*dy$.

Reference Books:

1. "Computer Graphics through OpenGL", SumanthaGuha, Chapman and Hall/CRC 2011.
2. "OpenGL graphics through applications", Robert Whitrow, Springer 2008.

e-Learning Resources:

1. http://web.cs.wpi.edu/~emmanuel/courses/cs4731/GettingStartedOpenGL.html
2. http://www.sumantaguha.com/downloads
3. https://www.opengl.org/documentation/books/