JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2018 BATCH AND THEREAFTER

Programme: B.C.A **Semester: III**

COMPUTER GRAPHICS

Course Code: 18BCAIIIT5 **No. of Hours: 60**

COURSE OBJECTIVES:

- To introduce the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
- To understand 2 Dimensional and 3 Dimensional computer graphics concepts.
- To provide an understanding to the basic geometrical primitives and transformation of geometrical shapes.
- Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
- To make students understand how to implement the computer graphics concepts using OpenGl.

LEARNING OUTCOMES:

- To implement various algorithms to scan, convert the basic geometrical primitives, transformations and clipping.
- To define the fundamentals of animation, graphic design and its related technologies.
- To describe the importance of viewing and projections.
- To implement Computer Graphics concepts using OpenGl.

UNIT- I **11 HRS**

Overview of Graphics Systems: Graphics applications-CAD, Computer art, Education & Training, Entertainment, Visualization, Image Processing

Video display devices –Cathode Ray Tube, Raster–scan displays, Random–scan displays, color CRT monitors – Beam penetration, shadow mask, Flat panel displays – plasma panel, LCD. Graphics Workstation & Viewing system, Interactive Input devices, Hard copy devices.

Introduction to OpenGL - syntax, related libraries, header files, display window management using GLUT.

UNIT - II **11 HRS**

Graphics Output Primitives: 2 Dimensional world coordinate reference frame in openGL, openGL – point function, Line functions, Polygon Fill – Area functions, character function.

Line drawing Algorithm-DDA and Bresenham's, Circle drawing Algorithm–DDA and midpoint, Attributes of Graphics Primitives – color and gray scale, OpenGL- Color functions, Point attributes, Line attributes, Fill area attributes, Character attributes.

UNIT - III **12 HRS**

Geometric Transformations: Basic 2 Dimensional transformation - translation,rotation and scaling, Matrix representation and homogenous coordinates, Inverse transformation, Composite translate, rotation and scaling, general 2D pivot point rotation, general 2Dfixed point scaling. OpenGL functions for 2-D geometric transformation.

UNIT- IV **14 HRS**

Two-Dimensional Viewing:2 D viewing pipeline, clipping window, Normalization and viewport transformations. OpenGL - 2 D viewing functions.

2 D Clipping - Point clipping, Line clipping-Cohen Sutherland Line clipping, Nicholl-Lee-Nicholl line clipping, Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler-Atherton polygon clipping, Text clipping.

Interactive Input Methods and GUI: Logical classification of Input devices, Input functions for graphical data, Interactive Picture Construction techniques.

UNIT -V **12 HRS**

Three Dimensional Viewing and Computer animation:3 Dimensional Viewing: Overview of 3 D viewing concepts, 3D viewing pipelining , three dimensional geometric Transformations-Translation, Rotation and Scaling, Visible surface detection methods - Back face detection, Depth buffer method, Octrees methods, ray casting method.

Computer Animation: Raster methods for Computer Animation, Design of Animation Sequences, Motion specifications, Periodic motions.

OpenGL Animation Procedures.

REFERENCES:

1. Computer Graphics with OpenGL, Donald Hearn and M. Pauline Baker :Pearson Education, Fourth Edition 2018
2. Edward Angel – “Interactive Computer Graphics – A Top-down Approach using OpenGL”, Pearson Education, 5th Edition 2009