COMPUTER GRAPHICS AND VISUALIZATION

Subject Code: 10IS665	**I.A. Marks : 25**
Hours/Week : 04	**Exam Hours: 03**
Total Hours : 52	**Exam Marks: 100**

PART - A

UNIT – 1 **7 Hours**

Introduction: Applications of computer graphics; A graphics system; Images: Physical and synthetic; Imaging Systems; The synthetic camera model; The programmer's interface; Graphics architectures; Programmable Pipelines; Performance Characteristics

Graphics Programming: The Sierpinski gasket; Programming Two Dimensional Applications.

UNIT – 2 **6 Hours**

The OpenGL: The OpenGL API; Primitives and attributes; Color; Viewing; Control functions; The Gasket program; Polygons and recursion; The three-dimensional gasket; Plotting Implicit Functions

UNIT – 3 **7 Hours**

Input and Interaction: Interaction; Input devices; Clients and Servers; Display Lists; Display Lists and Modeling; Programming Event Driven Input; Menus; Picking; A simple CAD program; Building Interactive Models; Animating Interactive Programs; Design of Interactive Programs; Logic Operations

UNIT – 4 **6 Hours**

Geometric Objects and Transformations-I: Scalars, Points, and Vectors; Three-dimensional Primitives; Coordinate Systems and Frames; Modeling a Colored Cube; Affine Transformations; Rotation, Translation and Scaling;

PART - B

UNIT – 5 **5 Hours**

Geometric Objects and Transformations-II: Geometric Objects and Transformations; Transformation in Homogeneous Coordinates; Concatenation of Transformations; OpenGL Transformation Matrices; Interfaces to three-dimensional applications; Quaternion's.

UNIT – 6 **7 Hours**

Viewing: Classical and computer viewing; Viewing with a Computer; Positioning of the camera; Simple projections; Projections in OpenGL; Hidden-

surface removal; Interactive Mesh Displays; Parallel-projection matrices; Perspective-projection matrices; Projections and Shadows.

UNIT – 7 **6 Hours**

Lighting and Shading: Light and Matter; Light Sources; The Phong Lighting model; Computation of vectors; Polygonal Shading; Approximation of a sphere by recursive subdivisions; Light sources in OpenGL; Specification of materials in OpenGL; Shading of the sphere model; Global Illumination.

UNIT – 8 **8 Hours**

Implementation: Basic Implementation Strategies; Four major tasks; Clipping; Line-segment clipping; Polygon clipping; Clipping of other primitives; Clipping in three dimensions; Rasterization; Bresenham's algorithm; Polygon Rasterization; Hidden-surface removal; Antialiasing; Display considerations.

Text Books:

1. Edward Angel: Interactive Computer Graphics A Top-Down Approach with OpenGL, 5th Edition, Pearson Education, 2008. (Chapters 1 to 7)

Reference Books:

1. Donald Hearn and Pauline Baker: Computer Graphics- OpenGL Version, 3rd Edition, Pearson Education, 2004.
2. F.S. Hill Jr.: Computer Graphics Using OpenGL, 3rd Edition, PHI, 2009.
3. James D Foley, Andries Van Dam, Steven K Feiner, John F Hughes, Computer Graphics, Pearson Education 1997.

PROGRAMMING LANGUAGES

Subject Code: 10IS666	**I.A. Marks : 25**
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PART - A

UNIT – 1 **7 Hours**

Introduction; Names, Scopes, and Bindings: The art of language design; Programming language spectrum; Why study programming languages? Compilation and interpretation; Programming environments.

Names, scope, and bindings: The notion of binding time; Object lifetime and storage management; Scope rules; Implementing scope; The meaning of names within a scope; The binding of referencing environments; Macro expansion.