CSH402: Computer Graphics		
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week	**Examination Scheme** Class Test Teachers Assessment Attendance	– 12 Marks – 6 Marks – 12 Marks
Credits: 4	End Semester Exam	– 70 Marks

Prerequisite: Linear Algebra, Matrix, and C-Programming.

Course Objectives:

Students will try to learn:
1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Detailed Syllabus:

Head
Department of Computer Applications
Faculty of Computer Applications
Invertis University, Bareilly (UP)

Registrar
Invertis University
Bareilly

Dean Academics
Faculty of Computer Applications
Invertis University, Bareilly (UP)

Unit-1
Introduction to computer graphics: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Color CRT, Flat panel displays, Frame buffer and video controller, interactive input and output devices

Unit-2
Line drawing algorithms: DDA, Bresenham. Circle generating algorithms: Mid point circle generating algorithm, Bresenham circle generating algorithm.

Unit-3
2D Transformations: Definition of transformation, geometric and coordinate transformation, translation, rotation about origin, scaling, reflection transformations, Matrix representations and homogenous coordinates, Composite transformations.

Unit-4
Polygon Filling: Convex and concave polygons, scan line algorithm, boundary fill algorithm, flood fill algorithm. Two-Dimensional Viewing: Viewing pipeline, Viewing transformations

Unit-5
Clipping: Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit-6
Three Dimensional: 3-D geometric primitives, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.
Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects.

Suggested Readings:
1. Computer Graphics-C Version, Donald Hearn, M. Pauline Baker, Pearson Education, 2007
2. Computer graphics, Schaum's outline, TMH, 2006.
3. Computer Graphics: A Programming Approach, Steven Harrington, TMH, 1984.
4. Computer Graphics Principles and Practice, James D Foley, Pearson education 2004.

Course Outcomes:

After completing the course, students will be able to:

1. Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
2. Have a knowledge and understanding of geometrical transformations and 3D viewing.
3. Have a knowledge and understanding of techniques for representing 3D geometrical objects.
4. Have a knowledge and understanding of interaction techniques.
5. Create interactive graphics applications.
6. Use C builds functions or equivalent graphics tools.
7. Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

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