Computer Graphics
BIT352CO

YearIII   **Semester:I**

TeachingScheduleHours/Week			ExaminationScheme				Total
Theory	Tutorial	Practical	InternalAssessment		Final		150
			Theory	Practical	Theory	Practical	
3	1	2	20	50	80	-	

CourseObjective:
The main objective of this course is to provide the basic techniques used in computer graphics system.

Course Contents:

Unit 1: Introduction [2 Hrs]
    1.1 History of computer graphics
    1.2 Application of computer graphics

Unit 2: Graphics Hardware [5Hrs]
    2.1 Keyboard, mouse (mechanical&optical), lightpen, touch screen, table tinput hardware, joystick
    2.2 Raster and vector display architecture
    2.3 Architecture of graphical display terminals including frame buffer and color manipulation techniques RGB, CMYK

Unit 3: Two dimensional algorithms [8Hrs]
    3.1 Direct and incremental line drawing algorithms
    3.2 Bresenham's line drawing algorithms for positive and negative slopes (DDAalgorithm)
    3.3 Mid-poin tcircle drawing and mid-point ellipse-drawing algorithms

Unit 4: Two-dimensional transformations [10Hrs]
    4.1 Introduction to transformation
    4.2 Two-dimensional translation, scaling and rotation
    4.3 Successive and composite transformations

4.4 Pivot-point rotation and fixed-point scaling

4.5 Reflection and shearing

4.6 Viewing transformation and windows-to-viewport transformation

4.7 Clipping (The Cohen-Sutherl and line-clipping algorithm,The Sutherland-Hodgman polygon clipping algorithm

Unit 5: Three-dimensional graphics [12Hrs]

5.1 Projection (parallel and perspective)

5.2   3D transformations

    5.2.1 Translation, scaling, reflection

    5.2.2 Rotation (about axex, line parallel to cordinate axis, and line not parallel to coordinate axis)

    5.2.3 Windows to view point transformation

5.3   Hidden line and Hidden surface removal techniques (back face detection, Z-buffer, A-buffer, scan-line)

5.4   Introduction to non-planarsurfaces(Bezier,Splines)

Unit 6: Light, color and shading [5Hrs]

6.1 Introduction

6.2 Need for shading in engineering data visualization

6.3 Algorithms to stimulate ambient, diffuse and specularreflections

6.4 Constants, gouraud and phong-shading models

Unit 7: Graphical languages [2Hrs]

7.1 Need for machine independent graphical languages (PHIGS,GKS)

7.2 Discussion of available languages and file formats (graphicalfileformat)

Unit 8: Introduction to animation [1Hr]

8.1 Introduction to open GL

8.2 Application & today' strends

Laboratory work:

1. Introduction to graphics primitive and graphics drivers
2. Implementation of line drawing algorithms

    2.1 DDA

    2.2 Bresenham's algorithm

    2.3 Bresenham's general algorithm

3. Implementation of mid-point circle algorithm
4. Implementation of mid-point ellipse algorithm
5. Implementation of basic 2D and 3D transformation
6. Implementation of windows-to-view port transformation
7. Implementation ofl ine-clipping process

Reference Books:

1. D.Harn&M.P.Baker,"ComputerGraphics",PHIEdition
2. T. I. James, D. Foley, A. Van Dam, S. K. Feiner& J. F. Hughes, "Computer Graphics, Principles and Practice", PHI Edition