Course Title: Computer Graphics and Animation (3 Cr.)
Course Code: CACS305
Year/Semester: III/V
Class Load: 6 Hrs. / Week (Theory: 3Hrs. Tutorial: 1 Hrs., Practical: 2 Hrs.)

Course Description

This course is designed to extend students' knowledge and practice in Graphics hardware, software, and applications. It also provides the knowledge of data structures for graphics, graphics languages, and models for 2D and 3D objects, clipping, hidden surface elimination, depth buffer, raster graphics, shading, and rendering.

Course objectives

Upon completion of this course, students should be able to 1. Explain basic principle of computer graphics. 2. Develop 2D and 3D computer graphics applications. 3. Specify lighting and object's materials in computer graphics programming.

Course Contents

Unit 1: Introduction 6

1.1 Advantage of Computer Graphics and Areas of Applications
1.2 Hardware and Software for Computer Graphics. (Hard Copy, Display Technologies),
1.3 Random Scan Display System, Video Controller, Random Scan Display Processor
1.4 Raster Graphics
1.5 Scan Conversion Algorithms (Line, Circle, Ellipse)
1.6 Area Filling (Rectangle, Ellipse), Clipping (Lines, Circle, Ellipse), Clipping Polygons

Unit 2: Two dimensional and three dimensional transformations 7

2.1 2-Dimensional transformation
2.2 2-D Translation, Rotation, Scaling,
2.3 Homogeneous Coordinates, Reflection, Shear transform
2.4 3-dimensional transformation,
2.5 3-D Translation, Rotation Scaling, Reflection, Shear.

3 Unit 3: Clipping 7

3.1 Window to view port transformation
3.2 Clipping, line clipping,
3.3 Cohen –Sutherland line clipping
3.4 Polygon clipping
3.5 Sutherland and Gary Hodgman polygon clipping algorithm

Unit 4: Visible Surface Determination and computer graphics algorithm **15**

4.1 Image space and object space techniques
4.2 Hidden Surface removal—Depth comparison
4.3 Z-Buffer Algorithm
4.4 Back-Face Removal
4.5 The Painter's Algorithm
4.6 Scan-Line Algorithm
4.7 Light and Color and different color models (RGB,CMY, YIQ)

Unit 5: Animation and virtual reality **10**

5.1 Basic Principles of Animation and Types of Animation
5.2 Introduction to the flash interface
5.3 Setting stage dimensions, working with panels, panel layouts
5.4 Layers & Views
5.5 Shaping Objects – Overview of shapes, Drawing & Modifying Shapes
5.6 Bitmap Images & Sounds
5.7 Animation -Principles , Frame by frame animation, tweening, masks
5.8 Introduction to virtual reality

Laboratory Work

Laboratory work should be done covering all the topics listed above and a small project work should be carried out using the concept learnt in this course using Open GL.

Reference Books:

1. Foley, J. D., A. V. Dam, S. K. Feiner, J. F. Hughes, Computer Graphics Principle and Practices, Addison Wesley Longman, Singapore Pvt. Ltd.,
2. Hearn Donald, M. P. Baker, Computer Graphics, 2E, Prentice Hall of India Private Limited, New Delhi
3. Robert R & Snow D Flash CS4 Professional Bible, Wiley Publishing