

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Computer Science and Engineering

Academic Year: **2016-17**

Semester: **EVEN**

COURSE PLAN

Semester: **V**

Subject Code& Name: **10CS56 & Computer Graphics & Visualization**

Name of Subject Teacher: **V. N. Manju**

Name of Subject Expert (Reviewer): **SUPARNA K**

For the Period: From: 1-08-16 to 19-11-16

Details of Book to be referred:

Text Books	1. Interactive Computer Graphics A Top-Down Approach with OpenGL -Edward Angel, 5th Edition, Addison-Wesley, 2008.
Reference Books	1. Computer Graphics Using OpenGL – F.S. Hill,Jr. 2nd Edition, Pearson Education, 2001. 2. Computer Graphics – James D Foley, Andries Van Dam, Steven K Feiner, John F Hughes, Addison-wesley 1997. 3. Computer Graphics - OpenGL Version – Donald Hearn and Pauline Baker, 2nd Edition, Pearson Education, 2003.

Lecture No.	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD
1.	<u>Unit – I</u> <u>Introduction</u> 1. Application of Computer Graphics 2. A Graphics System	Objective: • Introduces the graphics system and the different software and hardware	T1:1-11	13-2-17				

2.	1. Images: Physical and Synthetic 2. Imaging Systems	<p>used in it</p> <ul style="list-style-type: none"> • Introduces the different Imaging systems and models • Demonstrates a wide range of applications of graphics system <p>Application:</p> <ul style="list-style-type: none"> • <p>OUTCOME:</p> <ul style="list-style-type: none"> • Students will demonstrate the understanding of graphics and imaging systems. • Students will understand the different hardware and software used 	T1:11-19	15-2-17				
3.	1. The Synthetic Camera Model 2. The Programmer's Interface		T1:19-29	15-2-17				
4.	1. Graphics Architectures 2. Performance Characteristics		T1:30-34	16-2-17				
5.	1. Graphics Programming 2. The Sierpinski Gasket		T1:41-42	17-2-17				
6.	Programming Two-Dimensional Application		T1:42-48	20-2-17				
7.	Revision / Unit Test			22-2-17				
8.	<u>Unit – II</u> <u>The OpenGL</u> 1. Introduction to Unit 2. The OpenGL API	<p>Objective:</p> <p>Introduces the</p> <ul style="list-style-type: none"> • OpenGL functions • Primitives and attributes • Control Function • Color model • Viewing <p>Application:</p> <ul style="list-style-type: none"> • Implementing the graphics system using OpenGL <p>OUTCOME:</p> <ul style="list-style-type: none"> • Students will be able to develop applications in OpenGL 	T1:48-52	22-2-17				
9.	Primitives and Attributes		T1:52-61	23-2-17				
10.	Primitives and Attributes: <ul style="list-style-type: none"> • More Programming Examples 		T1:52-61	27-2-17				
11.	Color		T1:61-67	1-3-17				
12.	Viewing <ul style="list-style-type: none"> • Programming Examples 		T1:67-72	1-3-17				
13.	Control Functions		T1:72-77	2-3-17				
14.	1. The Gasket Program 2. Polygons and Recursion		T1:77-78	3-3-17				
15.	The Three Dimensional Gasket		T1:80-86	4-3-17				
16.	Plotting Implicit Functions More Programming Exercise		T1:86-87	6-3-17				

17.	Revision / Unit Test			8-3-17				
18.	Unit – 3 <u>Input and Interaction</u> 1. Interaction 2. Input Devices 3. Client and Servers	Objective: <ul style="list-style-type: none"> Introduces the various ways of implementing User with application program using OpenGL Application: <ul style="list-style-type: none"> To get a knowledge of the various syntax and forms of OpenGL for user input and interaction for developing application programs OUTCOME: <ul style="list-style-type: none"> Students will be able develop graphics application programs using the various syntax and forms of OpenGL 	T1:99 - 108	8-3-17				
19.	Display Lists <ul style="list-style-type: none"> Programming Examples 		T1:108-115	13-3-17				
20.	Display Lists and Modeling <ul style="list-style-type: none"> Programming Examples 		T1:116-117	15-3-17				
21.	Programming Event Driven Input <ul style="list-style-type: none"> Programming Examples 		T1:117-124	15-3-17				
22.	Programming Event Driven Input <ul style="list-style-type: none"> Programming Examples 		T1: 117-124	16-3-17				
23.	Menus <ul style="list-style-type: none"> Programming Examples 		T1:125	17-3-17				
24.	Picking <ul style="list-style-type: none"> Programming Examples 		T1:125-138	20-3-17				
25.	1.A Simple CAD Program 2. Building Interactive Models		T1:132-141	22-3-17				
26.	Animating Interactive Programs <ul style="list-style-type: none"> Programming Examples 		T1:141-145	22-3-17				
27.	1. Design of Interactive Programs 2. Logic Operations		T1:145-151	27-3-17				
28.	Revision / Unit Test			28-3-17				

29.	Unit – 4 <u>GEOMETRIC OBJECTS</u> <u>AND</u> <u>TRANSFORMATIONS – 1</u> Scalars, points, and vectors	<p>Objective:</p> <ul style="list-style-type: none"> Introduces the basic transforms in 2D coordinate systems like rotation, translation and scaling <p>Application:</p> <ul style="list-style-type: none"> To get knowledge about transforming the graphics objects in the 2D coordinate system <p>OUTCOME:</p> <ul style="list-style-type: none"> Students will be able to develop OpenGL programs by applying animation to the graphics object 	T1:160-168	30-3-17				
30.	Three-dimensional primitives		T1:169	31-3-17				
31.	Coordinate systems and frames		T1:170-187	3-4-17				
32.	Modeling a colored cube		T1:187-195	5-4-17				
33.	Affine transformations		T1:195	5-4-17				
34.	Rotation, translation and scaling		T1:197-201	6-4-17				
35.	Revision / Unit Test			7-4-17				
36.	Unit – 5 <u>GEOMETRIC OBJECTS & TRANSFORMATIONS – II</u> Transformation in Homogenous Coordinates	<p>Objective:</p> <ul style="list-style-type: none"> Introduces the basic transforms in 3D coordinate systems like rotation, translation and scaling and also concatenating them <p>Application:</p> <ul style="list-style-type: none"> To get knowledge about transforming the graphics objects in the 3D coordinate system <p>OUTCOME:</p> <ul style="list-style-type: none"> Students will be able to develop OpenGL programs by applying animation to the graphics objects. 	T1:201-206	10-4-17				
37.	Concatenation of Transformation		T1:207-214	12-4-17				
38.	OpenGL Transformation Matrices		T1:214-219	12-4-17				
39.	Interfaces of Three-Dimensional Applications		T1:220-225	13-4-17				
40.	Quaternions		T1:226-230	20-4-17				

41.	Revision / Unit Test			21-4-17				
42.	<u>Unit -6</u> <u>VIEWING</u> Classical And Computer Viewing	Objective: <ul style="list-style-type: none"> Introduces the various aspects of placing the camera, viewing and projection of the graphics object in the device and world coordinate system Application: <ul style="list-style-type: none"> This is used to form an realistic image by projecting and displaying the shadow formed thereby OUTCOME: <ul style="list-style-type: none"> Students will be able to develop OpenGL programs with realistic effects on the graphics objects. 	T1:239-247	24-4-17				
43.	1.Viewing with a Computer 2.Positioning of the Camera		T1:247-258	26-4-17				
44.	Simple Projections		T1:258-262	26-4-17				
45.	Projections in OpenGL		T1:262-266	27-4-17				
46.	Hidden Surface Removal		T1:266-269	28-4-17				
47.	Interactive Mesh Display		T1:269-274	3-5-17				
48.	Parallel- Projection Matrices		T1:274-280	3-5-17				
49.	1.Perspective-Projection Matrices 2.Projections and Shadows		T1:280-288	4-5-17				
50.	Revision / Unit Test			5-5-17				
51.	<u>Unit – 7</u> <u>LIGHTING AND SHADING</u> 1.Light and matter 2.Light sources	Objective: <ul style="list-style-type: none"> Introduces the various aspects of light sources and shading of the graphics object in the device and world coordinate system Application: <ul style="list-style-type: none"> This is used to form an realistic image by applying the light source, shading 	T1:294-302	8-5-17				
52.	1.The Phong lighting model 2.Computation of vectors		T1:302-312	10-5-17				

53.	1.Polygonal shading 2.Approximation of a sphere by recursive subdivisions	<p>and displaying the shadow formed thereby</p> <p>OUTCOME:</p> <ul style="list-style-type: none"> • Students will be able to develop OpenGL programs with realistic effects on the graphics objects. 	T1:314-319	10-5-17				
54.	Light sources in OpenGL		T1:322-344	11-5-17				
55.	Specification of materials in OpenGL		T1:324-326	12-5-17				
56.	1.Shading of the sphere model 2.Global illumination.		T1:326-329	18-5-17				
57.	Revision / Unit Test			19-5-17				
58.	<p align="center"><u>Unit – 8</u></p> <p align="center"><u>Implementation</u></p> <p>1.Basic implementation strategies</p> <p>2.The major tasks</p>	<p>Objective:</p> <ul style="list-style-type: none"> • Introduces the various aspects of clipping and rasterization and the different algorithms used for the same <p>Application:</p> <ul style="list-style-type: none"> • This is applied in clipping and hiding portions of the graphics objects which are outside the viewing space <p>OUTCOME:</p> <ul style="list-style-type: none"> • Students will be able to perform clipping and rasterization on the graphics objects using OpenGL 	T1:334-340	22-5-17				
59.	1.Clipping 2.Line-segment clipping 3.Polygon clipping		T1:340-348	24-5-17				
60.	1.Clipping of other primitives 2.Clipping in three dimensions		T1:348-355	24-5-17				
61.	1.Rasterization 2.Bresenham's algorithm		T1:353-358	25-5-17				
62.	1.Polygon rasterization 2.Hidden-surface removal		T1:358-373	26-5-17				
63.	1.Antialiasing 2.Display considerations		T1:373-382	29-5-17				

64.	Revision / Unit Test			31-5-17				
65.	Revision	Solving VTU Question Paper		31-5-17				
66.	Revision			1-6-17				
67.	Revision			2-6-17				

Prepared By: **V.N.MANJU** Reviewed by: **SUPARNA K** Approved by: **N.S.SARADHA DEVI** Approved by: **Dr. A.POWLY THOMAS**

Date & Sign _____ Date & Sign _____ Date & Sign _____ Date & Sign _____