BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI, K.K. BIRLA, GOA CAMPUS
INSTRUCTION DIVISION
SECOND SEMESTER 2013-2014
Course Handout (part II)

Date: 07/08/2013

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : **CS GC471 / IS GC471/ IS F 311**
Course Title : **COMPUTER GRAPHICS**
Instructor-in-charge : **LUCY J. GUDINO**

Course Description Graphics I/O hardware; Generation of dot, lines, conics, curves, surfaces & polygons; Filling closed regions, 2D & 3D Graphics & Transformations, Windowing, Viewing & Clipping, Efficient algorithms, Solid Modeling, Color Models & Dithering, Visible surface detection, Rendering, Animation Techniques, Advanced modeling and Future directions

Scope and Objective of the Course is to introduce the concepts of computer graphics through theoretical, algorithmic and advanced modeling aspects along with, applications in 3D graphics and visualization. This course is also covering part of OpenGL for graphics. After successful completion of the course student should be able to apply the concepts and techniques to various problem domain and visualization of data sets and processes.

Text Book:
James D. Foley, A. Van Dam, S.K. Feiner, and J.F. Hughes, Computer Graphics: Principles and Practice, 2nd ed in C, Addision-Wesley Publishing Company, 1996.

Reference Books:
R1: Rogers B., " Mathematical elements of Computer Graphics", Tata McGraw Hill, 2002.
R2: D. Hearn and M.P. Baker, Computer Graphics: C Version, Pearson Education, 2002
R3: N Krishnamurthy, "Introduction to Computer Graphics", 1st Ed., TMH, 2002

Course Plan:

L. No.	Learning Objectives	Topics to be covered	Reference to Text
01-02	Definition Why to study Applications I/O Devices	Overview of graphics systems – What, Why & Where about Graphics, Hardware & Software, Input & Output Technology, Mathematical complexity involved - Demonstration through some examples	Class Notes
03-04	Fast algorithms to draw Lines, Conic, And filled regions	Raster Graphics Algorithms for Drawing 2D objects: Lines, Circle, Ellipse, Parabola, Hyperbola, Polygon & Filled Closed Objects	Ch 3
05-07	Concepts of 3D and OpenGL	Introduction to 3D- Graphics & 3D Coordinate Geometry and Introduction of OpenGL	Class Notes
08-09	How & why to manipulate objects	2D & 3D Scaling, Translation, Rotation, Shear, Reflection, Projection and Transformations	Ch 5
10-11	Mapping 2D from World to Screen	Viewing & Clipping in 2D	Ch 5 Ch 3
12-14	Mapping 3D from World to Screen, and Foreshortening	Viewing & Clipping in 3D (Perspective & Parallel projection, Clipping against a Canonical View Volume, Clipping in Homogeneous Coordinates, and Mapping	Ch 6

		into a View-port	
15-16	Drawing Smooth Curves & Surfaces	Hermite, Bezier, Continuities, Bspline Curves & Surfaces Rational Cubic Polynomial Curves & Quadric Surfaces)	Ch 11
17-18	Representation of Solid Objects	Solid Modeling (Representations, Operations, Geometry, and Interface)	Ch 12
19-20	Detection of Hidden portions	Visible Surface Detection (Need & Algorithms, Ray Tracing) and Hidden Line elimination	Ch 15
21-22	Perception of light and Color, Dithering	Light & Color Models (Light, half-toning, Color Models, Color Conversion & Interpolation, Dithering Matrix)	Ch 13
23-24	How to shade surfaces and solids	Rendering (Models, Physics, Shading Polygons & Surface, & Shadows)	Ch 16
25	How to show graphics in motion	Animation (Languages, Techniques, Control, Basic Rules & Problems)	Ch 21
26	Research Agenda	Applications of 3D Graphics in Visualization	Class Notes

Evaluation Scheme:

No.	Evaluation Component	Weightage (%)	Remarks
1	Test I	20	CB
2	Test II	20	CB
3	Assignments/lab	30	OB
3	Comprehensive Exam	30	CB

Notices: All notices shall be electronically displayed on the Moodle and/or on the CS&IS Notice Board only.

Make-up Policy: Only in genuine cases, on a case-by-case basis, Make-ups shall be allowed. Prior permission of the instructor shall be necessary, except for the unforeseen circumstances.

Chamber Consultation Hours: To be announced in the class.

Instructor-in-Charge
CS GC471 / IS GC 471/ IS F 311