

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
HYDERABAD CAMPUS
INSTRUCTION DIVISION, FIRST SEMESTER 2016-2017
Course handout (Part II)

Date: 01/08/2016

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. : IS F311
Course Title : Computer Graphics
Instructor-in-charge : Dr. Tathagata Ray

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

T1: James D. Foley, A. Van Dam, S.K. Feiner, and J.F. Hughes, Computer Graphics: Principles and Practice in C, 2nd edition Pearson education.

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
01-03	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	Ch 1 Ch 4.4 Class Notes
04-07	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 3.1-3.9
08-10	Concepts of 3D and OpenGL	Introduction to 3D- Graphics & 3D Coordinate Geometry and Introduction of OpenGL	Class Notes
11-13	How & why to	2D & 3D Scaling, Translation, Rotation, Shear,	Ch 5.1–5.3

	manipulate objects	Reflection, Projection and Composite Transformations	Ch 5.5-5.8
14-16	Mapping 2D from World to Screen	Viewing & Clipping in 2D (Cohen's and Parametric Line Methods)	Ch 5.4 Ch 3.11-3.12
17-20	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 into a View-port	Ch 6
21-25	Drawing Smooth Curves & Surfaces	Hermite, Bezier, Continuities, Bspline Curves & Surfaces Rational Cubic Polynomial Curves & Quadric Surfaces)	Ch 11
26-28	Representation of Solid Objects	Solid Modeling (Representations, Operations, Geometry, and Interface)	Ch 12
29-33	Detection of Hidden portions	Visible Surface Detection (Need & Algorithms, Ray Tracing) and Hidden Line elimination	Ch 15
34-35	Perception of light and Color, Dithering	Light & Color Models (Light, half-toning, Color Models, Color Conversion & Interpolation, Dithering Matrix)	Ch 13
36-38	How to shade surfaces and solids	Rendering (Models, Physics, Shading Polygons & Surface, & Shadows)	Ch 16
39-40	How to show graphics in motion	Animation (Languages, Techniques, Control, Basic Rules & Problems)	Ch 21
41-42	Research Agenda	Applications of 3D Graphics in Visualization	Class Notes

Evaluation Scheme:

E.C.NO	Evaluation Component	Duration (minute)	Weightage (%)	Date & time	Nature of component
01	Test 1	50	15	10/9, 1.00--2.00 PM	Closed Book
02	Test 2	50	15	22/10, 1.00--2.00 PM	Closed Book
03	Project + Seminar		10	Will be announced in class	Open Book
03	Coding Assignments	-	20	Will be announced in class	Open Book (take home)
04	Comprehensive	180	40	01/12 FN	Closed book

Chamber Consultation Hour: TBA.

Notices: Will be displayed only on the CS&IS notice board, 1st floor B-block and CMS.

Makeup Policy: Makeup is highly discouraged for this course. Makeup will be given only in genuine cases and that too with prior notification only. In any case, the discretion to give makeup for tests lies with IC.

Instructor- in-charge
IF F311