

Computer Graphics (ID) (IT – 3004)

Course Code	(ID) IT-3004	Credits-4	L -3, T- 1, P-0
Name of the Course	Computer Graphics		
Lectures to be Delivered	52 (1 Hr Each) (L= 39, T = 13 for each semester)		
Semester End Examination	Max. Marks: 100	Min. Pass Marks: 40	Maximum Time: 3hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max. Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D, and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 40% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each section will carry 15% of the total marks of the semester end examination for the course.

2. **For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section –A

Graphic Hardware: The Functional characteristics of the systems are emphasised.

Input devices : Keyboards, Touch Panel, Light pens, Graphics tablets, Joysticks, Trackball, Data glove, Digitizer, Image scanner , Mouse, Voice Systems.

Hard Copy Devices: Impact and non-impact printers, such as line printer, dot-matrix, laser, ink-jet, electrostatic, flatbed and drum plotters.

Video Display Devices: Refresh cathode- ray tube, raster scan displays, random scan displays, colour CRT-monitors, direct view storage tube, flat-panel displays, 3-D viewing devices, virtual reality, raster scan systems, random scan systems, graphics monitors and workstations.

Section –B

Scan conversion algorithms for line, circle and ellipse, Bresenham's algorithms area filling techniques, character generation.

2-dimensional Graphics : Cartesian and Homogeneous co-ordinate system, Geometric transformations (Translation, Scaling, Rotation, Reflection, Shearing), Composite transformations, Affine transformation, Two dimensional viewing transformation and clipping (line, polygon and text)

Section –C

3-dimensional Graphics: Geometric transformation (Translation, Scaling, Rotation, Reflection, Shearing), Composite transformation, Mathematics of Projections (parallel and perspective). 3-D viewing transformation and clipping. Hidden line and surface elimination algorithms, z-buffer, scan-line, sub-division, Painter's algorithm.

Section –D

Shading: Modeling Light intensities: Diffuse reflection, Specular reflection, refracted light, texture surface patterns, halftoning.

Surface Shading Methods : Constant Intensity method, Gouraud Shading, Phong Shading.

Animation: Principles of animation, animation techniques- draw – erase, animation with the look-up table, storyboards for animation, key-frame system, basic requirements in animation, animation softwares.

Books:

1. Foley, van Dam et al: Computer Graphics: Principles and Practice In C, 2nd Ed., Addison Wesley, 1997.
2. Hearn and Baker: Computer Graphics, 2nd Ed., Prentice Hall of India, 1999.
3. Woo, Neider, Davis, and Shreiner: Open GL Programming Guide, 3rd Ed., Addison Wesley, 2000.
4. Steven Harrington: Computer Graphics: A programming approach, 2nd Ed., McGraw Hill International Editions.
5. A. Watt: Three-dimensional Computer Graphics, 3rd Ed., Addison Wesley, 2000.
6. D.F. Rogers: Procedural Elements of Computer Graphics, 2nd Ed., McGraw Hill, 1998.
7. Edward Angel: Interactive Computer Graphics; a top-down Approach with Open GL, 2nd Ed., Addison Wesley, 2000.
8. Yeshwant Kanetkar: Graphics under C
9. Stevens: Graphic Programming in C.
10. Plastock R.A. and Kalley G., Computer Graphics, McGraw Hill 1986.