B.Sc. (H) Computer Science VI Semester (LOCF)

Computer Graphics (BHCS14) Discipline Specific Core Course - (DSC)

S.No.	Topic	Reference	Contents	Lectures
1	**Introduction:** Introduction to Graphics systems, Basic elements of Computer graphics, Applications of computer graphics.	**[2]**	**Ch 1** Sections 1.1-1.8 (Pages 23-54)	3L
2	**Graphics Hardware:** Architecture of Raster and Random scan display devices, input/output devices.	**[2]**	**Ch 2** Sections 2.1-2.6 (Pages 56-94)	5L
3	**Drawing and Clipping Primitives:** Raster scan line, circle and ellipse drawing algorithms, Polygon filling, line clipping and polygon clipping algorithms	**[1]**	**Ch 3** Sections 3.2 -3.2.2 (Pages 72-78), Section 3.3 (Pages 81-85) (before 2nd order differences), Section 3.4 (Pages 88-90), Sections 3.6 (Pages 92-99), Section 3.12-3.12.3 (Pages 111-117), Section 3.14 (Pages 124-127), Section 3.17-3.17.3 (Pages 132-137)	14L
4	**Transformations and Viewing:** 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations, Vanishing points.	**[3]**	**Ch 2** Sections 2.1-2.21 (Pages 61-99) **Ch 3** Sections 3.1-3.17 (Pages 101-184)	16L
5	**Geometric Modeling:** Polygon Mesh Representation, Cubic Polynomial curves (Hermite and Bezier)	**[1]**	**Ch 11** Section 11.1-11.2.2 (Pages 473-491)	8L
6	**Visible Surface determination:** Z-buffer algorithm, Depth Sort algorithm and Warnock's algorithm	**[1]**	**Ch 15** Section 15.4-15.5.1 (Pages 668-675), Section 15.7.1 Pages (686-689)	6L
7	**Surface Rendering:** Color Models, Illumination and shading models, Computer Animation	**[2]**	**Ch 14** Sections 14.1-14.2 (Pages 516-531), Sections 14.4-14.5 (Pages 536-545), **Ch 15** Sections 15.3-15.7 (Pages 591-597) **Ch 16** Sections 16.1-16.6 (Pages 604-616)	8L

References

1. Computer Graphics: Principles and Practice 2nd Edition in C, James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, Pearson Education Asia, 1999.
2. Computer Graphics C version (2nd Edition), D.Hearn, M.P. Baker: Pearson Education, 2006.
3. Mathematical Elements for Computer Graphics 2nd Edition, D.F. Rogers, J. A. Adams, Mc Graw Hill 2nd edition, 2002.

Practical List Based on Computer Graphics

1. Write a program to implement Bresenham's line drawing algorithm.
2. Write a program to implement mid-point circle drawing algorithm.
3. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
4. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
5. Write a program to fill a polygon using Scan line fill algorithm.
6. Write a program to apply various 2D transformations on a 2D object (use homogenous Coordinates).
7. Write a program to apply various 3D transformations on a 3D object and then apply parallel and perspective projection on it.
8. Write a program to draw Hermite /Bezier curve.