

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

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

S.No.	Topic	Reference	Contents	Lectures
1	<b>Introduction:</b> Introduction to Graphics systems, Basic elements of Computer graphics, Applications of computer graphics.	[2]	<b>Ch 1</b> Sections 1.1-1.8 (Pages 23-54)	3L
2	<b>Graphics Hardware:</b> Architecture of Raster and Random scan display devices, input/output devices.	[2]	<b>Ch 2</b> Sections 2.1-2.6 (Pages 56-94)	5L
3	<b>Drawing and Clipping Primitives:</b> Raster scan line, circle and ellipse drawing algorithms, Polygon filling, line clipping and polygon clipping algorithms	[1]	<b>Ch 3</b> Sections 3.2 -3.2.2 (Pages 72-78), Section 3.3 (Pages 81-85) (before 2 <sup>nd</sup> 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	<b>Transformations and Viewing:</b> 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations, Vanishing points.	[3]	<b>Ch 2</b> Sections 2.1-2.21 (Pages 61-99) <b>Ch 3</b> Sections 3.1-3.17 (Pages 101-184)	16L
5	<b>Geometric Modeling:</b> Polygon Mesh Representation, Cubic Polynomial curves (Hermite and Bezier)	[1]	<b>Ch 11</b> Section 11.1-11.2.2 (Pages 473-491)	8L
6	<b>Visible Surface determination:</b> Z-buffer algorithm, Depth Sort algorithm and Warnock's algorithm	[1]	<b>Ch 15</b> Section 15.4-15.5.1 (Pages 668-675), Section 15.7.1 Pages (686-689)	6L
7	<b>Surface Rendering:</b> Color Models, Illumination and shading models, Computer Animation	[2]	<b>Ch 14</b> Sections 14.1-14.2 (Pages 516-531), Sections 14.4-14.5 (Pages 536-545), <b>Ch 15</b> Sections 15.3-15.7 (Pages 591-597) <b>Ch 16</b> 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 (2<sup>nd</sup> Edition), D.Hearn, M.P. Baker: Pearson Education, 2006.
3. Mathematical Elements for Computer Graphics 2<sup>nd</sup> Edition, D.F. Rogers, J. A. Adams, McGraw Hill 2nd edition, 2002.

## **Practical List Based on Computer Graphics**

1. Write a program to implement DDA and 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.