BHAGWAN MAHAVIR UNIVERSITY

Effective From (2020-2021)

Bachelor of Computer Application (BCA)

Semester: VI

Subject Code	Subject Title	Teaching Scheme					
		(Hours/Week)		Credits	Examination Marks		Total Marks
		Theory	Tutorial		Internal	External	
1020201601	Computer Graphics	4	0	4	40	60	100

Duration of Exam: 2:30 Hours

Objectives of the course:

- The objective of the course is to introduce the programming principles and theoretical foundations of computer graphics.
- This course provides depth knowledge of computer graphics environment and tools to developgraphics application.

Sr. No.	CO statement	Marks % weightage
CO	After completion of the course, the student will be able to • To develop and manage Computer Graphics applications.	100

Detail Content:

UNIT	Topics	Total Hours
1	**1. Introduction** 1.1 Application areas of Graphics Systems 1.2 Computer Graphics File Formats 1.3 Graphic Standards: GKS , PHIGS, OpenGL 1.4 Raster Scan and Random Scan Display 1.5 Raster Graphics and Vector Graphics	6
2	**2. Mathematical Foundation for Computer Graphics** 2.1 Basic Geometry 2.2 3-Dimensional Geometry 2.3 Trigonometry 2.4 Matrix Algebra 2.5 Object Concepts : Point, Line, Circle, Ellipse and Polygons	8
3	**3. Line Generation** 3.1 Line Drawing Alg rithms 3.1.1 VECGEN Line Drawing Algorithm using DDA 3.1.2 Bresenham Line Drawing Algorithm 3.2 Circle Generating Algorithms 3.2.1 Parametric Circle Drawing Algorithm 3.2.2 Bresenham Circle Drawing Algorithm 3.3 Line Styles 3.3.1 Thick line 3.3.2 Line caps and joint 3.4 Anti-aliasing of line	12
4	**4. Polygons** 4.1 Polygon Representation 4.1.1 Polygon Inside Tests 4.1.2 Even-Odd Method 4.1.3 Winding Number Method 4.2 Polygon Area Filling 4.2.1 Flood Fill 4.2.2 Scan – line Fill 4.2.3 Boundary Fill 4.3 Filling Polygon with a pattern	12
5	**5. Geometric Transformations** 5.1 Basic Transformat ions 5.1.1 Scaling 5.1.2 Translation 5.1.3 Rotation 5.1.3.1 Rotation about origin 5.1.3.2 Rotation about Homogeneous Coordinates	12

	5.2 Other Transformations 5.2.1 Reflection 5.2.2 Shearing	
6	**6. Introduction to Advanced Graphics Techniques** 6.1 Computer Animation 6.2 Morphing 6.3 Digital Image Processing 6.3.1 Image Restoration and Enhancement Methods 6.4 Fractals 6.4.1 Hilbert's Curve 6.4.2 Koch Snowflake Curve 6.4.3 Fractal Surface	10

Text books :

1. Computer Graphics - second edition, Donald Hearn & M. Pauline Baker – Tata
2. Computer Graphics, Harrington S. -Tata McGraw Hill.
3. Computer Graphics, Desai A. A. –PHI.
4. Computer Graphics: Algorithms & Implementations, Mukherjee & Jana – PHI.
5. Interactive Computer Graphics, Giloi W. K. –Prentice Hall India.
6. Principles of Interactive Computer Graphics, New Man W. &Sproul P. F. –McGraw Hill

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