PG CA S3-05 (DSE)

TWO YEAR MASTER'S DEGREE COURSE

(CBCS in Accordance with NEP 2020)

SEMESTER - III

COMPUTER GRAPHICS

MSc IT

Hiranya Chandra Bhuyan School of Science and Technology

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

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COURSE INTRODUCTION

Welcome to the course on Computer Graphics! This course will delve into one of the most intuitive and visually engaging ways to interact with computers. Computer graphics involve the creation, storage, and manipulation of visual images using computers, encompassing everything from simple graphic elements to advanced virtual realities. Understanding the core concepts of computer graphics is essential for leveraging its numerous applications in fields such as business, education, entertainment, and beyond.

We will begin with an introduction to the definition and application areas of computer graphics, including CAD, CAM, and entertainment, followed by a study of graphical user interfaces. We'll explore various graphics systems, including different types of displays and graphics software. You will learn essential algorithms for drawing lines, circles, and ellipses, as well as techniques for filling areas. The course will cover both 2-D and 3-D transformations, viewing techniques, and clipping algorithms. Additionally, we'll delve into 3-D object representation, Bezier and B-spline curves, projections, and geometric transformations. The final units will focus on the basics and design principles of animation, covering both its technical aspects and practical applications. This comprehensive journey through computer graphics will equip you with the knowledge and skills to create and manipulate visual content effectively.

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

Computer Graphics

DETAILED SYLLABUS

	Page No.
Unit 1: Introduction to Computer Graphics Definition, Application Areas of Computer Graphics (CAD, CAM, Education and Training, Entertainment, Image Processing, Computer Art etc.), Graphical User Interfaces (GUI)	**7-24**
Unit 2: Graphics Systems Cathode Ray Tubes, Random Scan Displays, Raster Scan Displays, Color CRT Monitors, FlatPanel Displays (Plasma-Panels, Liquid Crystal Displays(LCD), Electroluminescent displays), Graphics Software (GKS, PHIGS)	**25-47**
Unit 3: Line Drawing Algorithms Points and Lines, Line Drawing Algorithms (DDA Algorithm, Bresenham s Line Algorithm)	**48-65**
Unit 4: Circle and Ellipse Drawing Algorithms Circle drawing algorithms, Ellipse Drawing algorithms	**66-89**
Unit 5: Filled area algorithms Filling (Scan-Line Polygon filling, Inside outside tests, Boundary-fill and Flood-fill algorithm)	**90-110**
Unit 6: Transformations Basic 2-D Transformations (Rotation, Reflection, shearing, scaling), Homogeneous Coordinate Representation, Translation, 3-D transformations	**111-121**
Unit 7: 2-D Viewing 2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing function	**122-130**

UNIT 8 : CLIPPING ALGORITHMS **131-147**

Clipping,Line Clipping :Cohen-Sutherland Algorithm,Cyrus-beck line clipping algorithms,Polygon Clipping ,Sutherland –Hodgeman algorithm

UNIT 9 : 3-D OBJECT REPRESENTATION **148-161**

3-D Object Representation,Polygon surfaces,Quadric surfaces,Spline representation,Basic illumination models,Polygon rendering methods

UNIT 10 : BEZIER AND B-SPLINE CURVES **162-171**

Hermite Curve ,Bezier Curve and B-Spline Curves :Bezier Curve,B-Spline Curve,Bezier and B-spline surfaces:Bezier Surface,B-Spline Surface

UNIT 11 : PROJECTIONS **172-181**

Projection,Projection Classification,Parallel projections,Perspective projections,Hidden Layer Projection

UNIT 12 : 3-D GEOMETRIC TRANSFORMATIONS **182-198**

Translation,Rotation,Scaling,Reflection and Shearing transformation, Composite transformation

UNIT 13 : 3-D VIEWING **199-208**

Viewing pipeline,Viewing coordinates,View volume ,General projection transforms ,Clipping

UNIT 14 : BASICS IN ANIMATION **209-217**

Animation Basic,Computer Animation,Principles of Animation,Types of Animation,Animation Software and Hardware,Common Terms in Animation

UNIT 15 : ANIMATION DESIGNING **218-224**

Design of Animation sequence,Morphing, Application of Computer Animation, Future of Animation