Sc IT S4 14

Computer Graphics

SEMESTER-IV

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

BLOCK-1

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

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COURSE INTRODUCTION

This is a course on ***Computer Graphics***. One of the most natural ways to interact with a computer is through graphics. The use of a computer to define, store, manipulate, and show visual output is known as computer graphics. It includes the production and display of basic graphic elements and images as well as contemporary methods for creating a virtual reality. One needs to have a rudimentary understanding of the fundamental ideas behind computer graphics in order to properly utilise these techniques. There are several applications for computer graphics in business, government, education, entertainment, and most recently, the home.

This course covers the various basic graphics concepts and techniques for operating with two and three-dimensional objects and overview a few typical applications of computer graphics. The course is divided into two blocks

Block 1 deals with the basic concepts of computer graphics and graphics system. Along with this, it also elaborates about various algorithm like Line drawing, Circle and Ellipse drawing, field area. It also explains about transformations and viewing

Block 2 deals with clipping algorithms, 3 D object representation, Bezier and B-spline curves, Projections, Geometric transformation, 3-D viewing and basic animations

BLOCK INTRODUCTION

This is the first block of the course **Computer Graphics**. This block describes the basic principles, techniques, algorithms for generating and interacting with simple graphical objects on a display screen. Two-dimentional transformations and two-dimentional viewing are described in this block.

This block comprises the following seven units:

Unit 1 is an introductory unit which provides the definition and application areas of Computer Graphics. It also gives the concept of Graphical User Interface.

Unit 2 describes various graphics systems such as Cathod Ray Tube, Raster Scan and Random Scan Display system and Graphics Software.

Unit 3 presents important line drawing algorithms. It mainly focuses on DDA and Bresenham's line drawing algorithm.

Unit 4 presents Circle and Ellipse drawing algorithms.

Unit 5 discusses Filling algorithms. Boundary-fill, Flood-fill algorithms are described in this unit.

Unit 6 focuses on two-dimensional transformations. Homogeneous coordinates, composition of 2D transformations are described in this unit.

Unit 7 is on two-dimensional viewing. The viewing pipeline, window-to-viewport coordinate transformation in matrix form, viewing functions are described in this unit.

Each unit of this block includes some along-side boxes to help you know some of the difficult, unseen terms. Some "EXERCISES" have been included to help you apply your own thoughts. You may find some boxes marked with "LET US KNOW". These boxes will provide you with some additional interesting and relevant information. Again, you will get "CHECK YOUR PROGRESS" questions. These have been designed for you to self-check your progress of study. It will be helpful for you if you solve the problems put in these boxes immediately after you go through the sections of the units and then match your answers with "ANSWERS TO CHECK YOUR PROGRESS" given at the end of each unit.

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

Computer Graphics

DETAILED SYLLABUS

Page No.

Unit 1: Introduction to Computer Graphics [5 marks]

Definition, Application Areas of Computer Graphics (CAD, CAM, Education and Training, Entertainment, Image Processing, Computer Art etc.), Graphical User Interfaces (GUI)

Unit 2: Graphics Systems [5 marks]

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)

Unit 3: Line Drawing Algorithms [7 marks]

Points and Lines, Line Drawing Algorithms (DDA Algorithm, Bresenham s Line Algorithm)

Unit 4: Circle and Ellipse Drawing Algorithms [7 marks]

Circle drawing algorithms, Ellipse Drawing algorithms

Unit 5: Filled area algorithms [6 marks]

Filling (Scan-Line Polygon filling, Inside outside tests, Boundary-fill and Flood-fill algorithm)

Unit 6: Transformations [8 marks]

Basic 2-D Transformations (Rotation, Reflection, shearing, scaling), Homogeneous Coordinate Representation, Translation, 3-D transformations

Unit 7: 2-D Viewing [8 marks]

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing function