

Computer Graphics

Course Title: Computer Graphics

Course Code: HCI302

Credit Hours: 3

Knowledge Domain: Human Computer Interaction

Prerequisite(s): Algorithms and Data Structures (SFT206)

Learning Objectives:

Upon completion of this course, the student will be able to:

1. Acquire the basic elements to build applications for computer graphics.
2. Demonstrate the main aspects of two-dimensional graphics and indicate some of its applications.

Learning Outcomes

1. Acquaintance with the basic units in a computer graphics system.
2. Grasping the main aspects of two-dimensional graphics together with a basic exposition to three-dimensional graphics.

Overview and Syllabus

A survey of computer graphics. Overview of graphics systems. Output primitives and their attributes. Two-dimensional geometric transformations. Two-dimensional viewing. Structure and hierarchical modeling. Three-dimensional concepts.

Course Outline

| | Topic |
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| 1 | <u>Module 01: Computer Graphics: Basic Definitions</u> Introduction Objectives Lesson 01: Definitions and critical CG History Lesson 02: Where to use CG Lesson 03: Graphics Systems (Hardware and Software) Lesson 04: Graphics Pipeline Architecture And The Programmable Pipeline Summary Assessment |
| 2 | <u>Module 02: An Interactive Introduction to OpenGL Programming</u> Introduction Objectives Lesson 01: OpenGL and GLUT Overview |

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| | <p>Lesson 02: Elementary Rendering</p> <p>Lesson 03: Transformation In Opengl</p> <p>Lesson 04: Graphics Pipeline Architecture And The Programmable Pipeline</p> <p>Summary</p> <p>Assessment</p> |
| 3 | <p><u>Module 03: Graphics Output Primitives</u></p> <p>Introduction</p> <p>Objectives</p> <p>Lesson 01: Output Primitives: Basics</p> <p>Lesson 02: Line Drawing Algorithms</p> <p>Lesson 03: Midpoint Algorithms</p> <p>Lesson 04: Circle Drawing Algorithms</p> <p>Lesson 05: Fill Area Algorithms</p> <p>Summary</p> <p>Assessment</p> |
| 4 | <p><u>Module 04: 2D Geometric Transformations</u></p> <p>Introduction</p> <p>Objectives</p> <p>Lesson 01: Basic 2D Geometric Transformation</p> <p>Lesson 02: Homogenous Coordinates and Matrices Composition</p> <p>Lesson 03: The Raster Method for Transformations</p> <p>Lesson 04: Two-Dimensional Composite Transformation</p> <p>Summary</p> <p>Assessment</p> |
| 5 | <p><u>Module 05: 2D Viewing Transformation</u></p> <p>Introduction</p> <p>Objectives</p> <p>Lesson 01: The Viewing Pipeline</p> <p>Lesson 02: Line Clipping Algorithms</p> <p>Lesson 03: Polygon, Curve and text Clipping</p> <p>Summary</p> <p>Assessment</p> |
| 6 | <p><u>Module 06: Lighting And Shading (Illumination Models)</u></p> <p>Introduction</p> <p>Objectives</p> <p>Lesson 01: Light Source</p> <p>Lesson 02: Basic Illumination Models</p> <p>Lesson 03: Lighting in OpenGL</p> <p>Lesson 04: Polygon-Rendering Methods</p> <p>Summary</p> <p>Assessment</p> |
| 7 | <p><u>Module 07: Structure and hierarchical Modeling</u></p> <p>Introduction</p> <p>Objectives</p> <p>Lesson 01: Structure concepts</p> <p>Lesson 02: Hierarchical Models (Hierarchical Modeling With Structure)</p> |

Lesson 03: Trees And Traversal

Lesson 04: Hierarchical Modeling In OpenGL

Summary

Assessment