CS 5250 : COMPUTER GRAPHICS

Semester Hours: 3.0
Contact Hours: 3

Coordinator: Jong Kwan "Jake" Lee

Text: Computer Graphics with OpenGL
Author(s): HEARN, BAKER, AND CARITHERS
Year: 2010

SPECIFIC COURSE INFORMATION

Catalog Description:
Graphic I-O devices; two-dimensional and three-dimensional display techniques; display processors; clipping and windowing; hidden-line removal; data structures for graphics.
Prerequisites: CS 3350 and one of MATH 2220, MATH 3220, MATH 3320.

Course type: ELECTIVE

SPECIFIC COURSE GOALS

• I know how to draw the basic primitives (e.g., point, line, polygons) using OpenGL.
• I can explain how the Bresenham line scan conversion algorithm works.
• I am able to produce simple animation using OpenGL.
• I know how 2D transformations (e.g., 2D translation, 2D rotations, 2D scaling) work in graphics.
• I know how 3D transformation (e.g., 3D translation, 3D rotations, 3D scaling) work in graphics.
• I understand how simple line and polygon clipping algorithms work.
• I know how spline-based modeling works in graphics.

LIST OF TOPICS COVERED

• Introduction
  ○ Graphics applications
• Languages for CG
• Graphics hardware
• Color and color lookup tables

• Raster Graphics & Raster Graphics Toolkits
  o Standard primitives
  o Primitive generation, e.g., Bresenham
  o Filling algorithms
  o Drawing styles
  o BitBlt

• Interactive Graphics
  o User interface considerations
  o Input devices
  o Interactive programming techniques

• 2D & 3D Graphics
  o Modeling transformation
  o Coordinate systems
  o Clipping
  o Windows and Viewports
  o Wireframe models
  o Animation Techniques

• 3D Realism Techniques
  o Back face removal
  o Viewing issues
  o Shading and smoothing techniques
  o Lighting issues
  o Introduction to Ray Tracing

• Additional Topics as time permits