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.
- I can analyze relevant research and communicate my findings

LIST OF TOPICS COVERED

- Introduction
- Graphics applications
- Languages for CG
- Graphics hardware
- Color and color lookup tables
- Raster Graphics & Raster Graphics Toolkits
  - Standard primitives
  - Primitive generation, e.g., Bresenham
  - Filling algorithms
  - Drawing styles
  - BitBlt
- Interactive Graphics
  - User interface considerations
  - Input devices
  - Interactive programming techniques
- 2D & 3D Graphics
  - Modeling transformation
  - Coordinate systems
  - Clipping
  - Windows and Viewports
  - Wireframe models
  - Animation Techniques
- 3D Realism Techniques
  - Back face removal
  - Viewing issues
  - Shading and smoothing techniques
  - Lighting issues
  - Introduction to Ray Tracing
- Additional Topics as time permits