Course Number: 3460:457/557
Course Name: Computer Graphics
Course Credits: 3
Schedule: Fall (last offered Fall 2007)
Syllabus Date: October 28, 2007
Prepared By: Dr. Yingcai Xiao

Prerequisites: Completion of 316 with C- or better and knowledge of C language.

Text:
INTERACTIVE COMPUTER GRAPHICS: A TOP-DOWN APPROACH USING OPENGL, 4/E, Edward Angel, 0-321-32137-5, Addison-Wesley 2006

Bulletin Description:
Topics in vector graphics, scan line graphics, representation and languages for graphics.

Detailed Description:
This course will expose the student to the fundamental concepts in computer graphics: vector/raster graphics, pixel, GDI, graphics API, graphics primitives, geometry, attributes, interactive graphics, event handling, device measure, bitBlit, raster operations, geometric transformations (translation, scaling, rotation and shearing), homogenous coordinate system, composite transformations, 3D transformations, parallel/perspective projections, foreshortening, animation, motion and update dynamics, key frames, inbetweening, LUT animation, double buffering, gamma correction, dithering, color models (CIE, RGB, CMY, CMYK, YIQ, HSV), lighting, shading, material properties, ambient/diffusive/specular reflections, recursive ray-tracing, virtual reality, VRML, texture mapping, sound effects, scan conversion, clipping, frame buffer, graphic processors, AtoD converters. Students will also write graphics programs.

Course Goals:
After the completion of this course, the student should know the basic concepts in Computer Graphics, should be able to write graphics applications using existing graphics libraries and languages such as OpenGL and VRML and should know how to write graphics libraries like OpenGL.

Topics (in weeks):
1. Overview (0.5)
2. 2D geometric transformation (1)
3. 3D geometric transformation (1)
4. Animation (0.5)
5. Colors (0.5)
6. Shading (1)
7. Ray tracing (1)
8. 3D graphics programming using VRML (2)
9. 3D graphics programming using OpenGL (2)
10. Scan conversion (3)
11. Graphics hardware (1)
12. Input device and interaction (0.5)

Computer Usage:
Five programming assignments and one term project.

References:
OpenGL: A Primer, 2/E, Edward Angel, Addison-Wesley, 0-321-23762-5.
Computer Graphics: Principles and Practice, by Foley et al., Addison-Wesley.
Ray-tracing: www.povray.org
VRML: http://www.web3d.org/x3d/vrml/