Course Number: CSC 630
Course Title: Computer Graphics Systems Design
Number of Credits: 3
Schedule: Three hours of lecture/discussion per week.
Prerequisite: a grade of C or better in CSC 313 or CSC 340 and MATH 325.

Catalog Description
This course covers computer graphics systems design and display hardware architecture. An overview is given of device-independent graphics systems,

two- and three- dimensional viewing pipelines, hidden line and surface removal algorithms, raster graphics techniques and color space models. Web page design and Flash exercises give an introduction to animation and multimedia. Programming with the OpenGL library affords the class a chance to design advanced animation programs in three-dimensions.

This course meets Group Project Requirement.

Expanded Description

Computer Graphics Systems Design

Mathematics for Graphics
Review of matrices, dot and cross products

Graphics theory
Classic graphic algorithms
Bresenham's line drawing algorithm
Cohen-Sutherland clipping algorithm in 2d and 3d
Transformations and Projections in 3d by matrices
View parameters
Curves and splines

Introduction to practical 2-dimensional graphics, both static and animated
Graphics and the World Wide Web
HTML, compression, video, Flash animation
Pixel editing tools and layers
Sound editing tools

Introduction to practical 3-dimensional graphics, both static and animated
OpenGL
OGL vertices, matrices, shapes, projections, fog, translations, lighting
Alpha blending and anti-aliasing
3D View volumes, display lists
Milkshake and 3DMax modelers
Texture maps

Course Objectives and Role in Program

The objectives of this course include:

- Teach important graphics principles and applications.
- Teach the student the Open Graphics Language

Students will develop several small applications and one large team application.
These projects will be the basis for professional demos to work in the graphics field.

Learning Outcomes
At the end of this course students will

- Have a personal web page introduced by an avatar with a professional resume, sound, and animation.
- Have written two 3-dimensional OpenGL programs with lighting, sound, and texture
- Have written two team-based 3 dimensional OpenGL programs.
- Be able to design, document and develop a large application as a team project.

Method of Evaluation
Student learning will be evaluated on the basis of
• Completeness and quality of programming assignments.
• Grade on midterm and final examination
• Grade on team projects
• Class participation.

The weight assigned to each element of evaluation will be determined by the instructor of the course on the first day of the class.

Required: *CSC630 Class Reader*
Author: Lawrence S. Kroll
Publisher: SFSU bookstore
Required: *OPENGL PROGRAMMING GUIDE*
Authors: OpenGL ARB, Woo, Neider, and Davis
Publisher: Addison Wesley (available from Amazon.com)
Suggested: *OpenGL SuperBible*
Authors: Wright and Sweet
Publisher: Waite Group Press
Suggested: *OPENGL REFERENCE MANUAL*
Author: OpenGL ARB, Kempf, and Frazier
Publisher: Addison Wesley
Suggested: *Interactive Computer Graphics*, 4th edition
Author: Edward Angel
Publisher Addison Wesley

Modified by: Lawrence Kroll
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