Model Syllabus for TCSS 458
Version: March 2012
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Catalog Description

Introduction to the main concepts in image synthesis, modeling, and animation. Topics include displays, drawing and rendering algorithms, geometric transformations, 2- and 3D viewing, objects representation, and computer animation. Prerequisite: a minimum grade of 2.0 in TCSS 342.

Preconditions

- Programming skills developed in a data structures class (TCSS 342).
- Background in analytic geometry, especially use of basic trigonometry.

Course Student Learning Goals (to be added to syllabus handed out to students)

- Create a non-trivial image using a graphical API such as OpenGL
- Explain how matrix operations can specify manipulation of 3D models (rotate, translate, scale) and image projections (orthographics, perspective)
- Use the standard lighting model of a graphics package (such as OpenGL) in the creation of an image
- Implement some portion of the standard rendering pipeline at the level of individual pixels, including some of these: clipping, hidden surface removal, shading
- Create an animation

CSS Degree Student Learning Outcomes that this course contributes to (to be added to syllabus handed out to students). Note that the use of the term *outcome* here instead of *goal* is simply for purposes of integration with ABET and has no other semantic import.

a. an ability to apply knowledge of computing and mathematics appropriate to the discipline;

b. an ability to analyze a problem, identify and define the computing requirements appropriate to its solution;

c. an ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;

i. an ability to use current techniques, skills, and tools necessary for computing practice.

UWT Student Learning Goals that this course contributes to (to be added to syllabus handed out to students)

Inquiry and Critical Thinking
Students will acquire skills and familiarity with modes of inquiry and examination from diverse disciplinary perspectives, enabling them to access, interpret, analyze, quantitatively reason, and synthesize information critically.

Communication/Self-Expression
Students will gain experience with oral, written, symbolic and artistic forms of communication and the ability to communicate with diverse audiences. They will also have the opportunity to increase their understanding of communication through collaboration with others to solve problems or advance knowledge.

Suggested Texts:

Angel, Shreiner *Interactive Computer Graphics*, 6th Ed. 2012
Hearn, Baker, Carithers *Computer Graphics with OpenGL*, 4th Ed. 2010

Suggested Additional Topics:

Model a curved surface using a Bezier patch (or similar technique)
Create an image illustrating the distictive features of ray tracing
Make a graphics program interactive (e.g. vertex picking)