CMPT 361 - D100 Introduction to Computer Graphics

Instructor(s): Richard Zhang

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Calendar Objective/Description:
This course provides an introduction to the fundamentals of computer graphics. Topics include graphics display and interaction hardware, basic algorithms for 2D primitives, anti-aliasing, 2D and 3D geometrical transformations, 3D projections/viewing, Polygonal and hierarchical models, hidden-surface removal, basic rendering techniques (color, shading, raytracing, radiosity), and interaction techniques.

Instructor’s Objectives:
Computer graphics provides the tools to model 2D, 3D, or higher dimensional data and processes, to generate photorealistic (or at least believable) or artistic rendering of the models, to interact with them through graphical user interfaces, and to create animations for communication, education and entertainment. This course offers an introduction to the modeling and rendering aspects of computer graphics. The mathematical concepts and techniques behind the development of various computer graphics algorithms will be covered. You will also learn to implement some of these algorithms through programming assignments using OpenGL, gaining hands-on experience programming things ranging from simple 2D games and creative scene modeling to photorealistic rendering.

Prerequisites:
CMPT 225 and MATH 232 or 240.

Topics:
- The graphics pipeline and programmable pipeline
- Basic raster graphics algorithms for drawing 2D primitives
- 2D and 3D geometrical transformations, 3D projections/viewing
- Hidden-surface removal and visibility
- Basic rendering techniques (illumination & shading, global illumination, ray tracing, texture mapping)
- Curves and surfaces; polygonal models
- Antialiasing; sampling and reconstruction
- Introduction to programming using OpenGL and shading language

Grading:
Three assignments (45%), midterm (20%), final exam (35%) Students must attain an overall passing grade on the weighted average of exams in the course in order to obtain a clear pass (C- or better).

Required Books:

Recommended Books:

**Reference Books:**

- OpenGL Shading Language, Rost, Licea-Kane, Ginsburg, kessenich, Lichtenbelt, Malan, Weiblen, Addison Wesley, 2009, 9780321334893

**Academic Honesty Statement:**

Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).