CS421 Advanced Computer Graphics

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- Office: CC-27 / Phone: 277-7439
- Office hours:
  - Monday and Tuesday at 3 P.M.
  - Wednesday at 9 A.M.
  - Thursday at 10 A.M.
- Web: http://people.msoe.edu/~durant/courses/cs421/

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Textbooks

- Required
  - CS-321 Text, one of the following…
    - Hearn and Baker, *Computer Graphics C Version*, 2 ed., Prentice Hall, 1997.
    - Hearn and Baker, *Computer Graphics with OpenGL*, 3 ed., Prentice Hall, 2003.
  - Schreiner, Woo, Neider, and Davis, *OpenGL Programming Guide*, OpenGL Version 1.4, 4 ed., Addison-Wesley, 2003.
- References:
  - Angel, *Interactive Computer Graphics*: A Top-Down Approach with OpenGL, 3 ed., Addison-Wesley, 2000.
  - Fosner, *OpenGL Programming for Windows 95 and Windows NT*, Addison-Wesley, 1997.
  - * Shreiner (ed.), *OpenGL Reference Manual Release 1.2*, Addison-Wesley, 1999.

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Grading Criteria

Quizzes (most Thursdays)	15%
Lab Assignments	20%
Midterm (Thursday 1/20/2004)	20%
Term Project	20%
Final (TBD)	25%
Total	100%

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Class Notes

- The lowest quiz grade will be dropped.
- There is a 10% per business day late penalty for labs and project deliverables.
- No work will be accepted more than one week late.
- You are encouraged to discuss programming assignments and design, but each individual (or team) is responsible for developing his or her (or their) own code.
- The term project will require a presentation.
- See the course policies handout for more information.

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Course Objectives

1. Understand and apply 3-D graphics algorithms related to transformations, illumination, texturing, etc. with the aid of software libraries.
2. Understand the issues relevant to computer animation.
3. Develop interactive applications using 3-D graphics.
4. Investigate and apply software libraries for 3-D graphics and related software needs.
5. Demonstrate proper documentation of software including internal comments, design reports, and user manuals.

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Course Structure

- OpenGL based
- Lecture
  - Theory
  - Application / demos
- Lab
  - Weeks 2-5
    - Individual: "LEGO" theme (intro., modeling transform, lighting, animation)
  - Weeks 6-10
    - Project (2-3 person): proposal, interim report, final report, presentation

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Review of CS321 (1)

- Raster displays
- Raster algorithms
  - Lines, circles, etc.
  - Filling
  - Anti-aliasing
- Attribute-based systems

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Review of CS321 (2)

- Transformations
  - Homogeneous coordinates
  - Matrices
  - Coordinate systems
- Clipping
  - Closing polygons

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Review of CS321 (3)

- 3-D
  - Depth cueing
  - Projections
  - Hidden surfaces
- Color
- GUIs
- Illumination (?)
- Text (?)

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Review of CS321 (4)

- Programming
  - Event-driven systems
  - Polymorphism and inheritance
  - Software libraries
  - Data structure selection

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