Advanced Computer Graphics - Syllabus

General Information:

Course: CS 6/77101, Spring 2008 Call Number: 12447/12448

Time: Tuesday, Thursday 11:00 am -12:15 pm Room: MSB 276

Instructor:

Ye Zhao, Assistant Professor Office: MSB 220 Email: zhao@cs.kent.edu

Office Hours: Tuesday, Thursday 4:00 pm - 5:00 pm

Goal:

This course will discuss some advanced concepts and methods in three dimensional computer graphics. The focus will be on learning recent methods in rendering, modeling, and animation.

Prerequisite:

You must have completed the course: CS 4/57101 Computer Graphics or equal. If not, you will need the permission from the instructor.

Programming skills in C, C++ and OpenGL are required. This is an advanced class and we will not teach basic programming skills.

Course Syllabus:

Topics covered will include (may be changed):

Advanced Rendering Techniques:
- Photorealistic rendering
- Global Illumination
- Participating media rendering
- Ray tracing
- Monte Carlo algorithm
- Photon mapping

Texture Synthesis and Image Processing;
- Environmental mapping;
- Texture synthesis;
- Anisotropic image smoothing;

Volume Rendering
- Volume graphics overview;
- Marching cubes;
- Direct volume rendering;

Surfaces and Meshes
- Subdivision;
- Distance fields and level sets;

Physically-based Modeling
- Stable fluid solver;
- Lattice Boltzmann method;

Graphics Hardware
- Cg programming;
- General-purpose computation;

and possibly included some of the following if time permits:

Acceleration Methods: culling, level of detail

Anti-aliasing: Fourier theory, stochastic sampling
Solid Modeling
Non-photorealistic Rendering

Text:

Unfortunately, no single textbook covers all the material of this course. We will make class notes and papers available instead.

We highly recommend the textbooks below:

Tomas Moller and Eric Haines ***Real-Time Rendering*** A K Peters Ltd, 2nd edition, 2002

Alan H. Watt and Mark Watt, ***Advanced Animation and Rendering Techniques : Theory and Practice,*** Addison-Wesley, 1992

Matt Pharr and Greg Humphreys, ***Physically based rendering***, Morgan Kaufmann, 2004

James D. Foley, Andries van Dam, Steven K. Feiner andJohn F. Hughes, ***Computer Graphics : Principles & Practices***, Addison Wesley, 2nd edition in C, 1995

Assessment:

No paper examinations for the course.

Grading: Home works: 20%; Programming projects: 50%; Final project and presentation: 30%

Submission:

All programs should conform to the submission standards given in URL
http://www.cs.kent.edu/~zhao/acg08/submission.htm

Notes:

Home works and project submission deadlines are firm. There will be a penalty for late submission.

This syllabus and most subsequent information on the course will be available using the WWW. The home page for the course is: www.cs.kent.edu/~zhao/acg08/index.htm

Academic Integrity:

All programs submitted must be your own work, and you are expected to develop your programs independently. You may receive as much help as you wish on the use of the operating system, text editors, debuggers, file transfer protocols and so on. You may consult with other members of the class about interpreting the projects, and you may get help in finding bugs, but not fixing bugs, but you are not allowed to look at or copy another person's code or discuss design decisions with others, and you cannot show your code to others. Students found to be in violation of these guidelines will fail the project, and will be reported to the dean.

Students with Disabilities:

University policy 3342-3-18 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Disability Services (contact 330-672-3391 or visit www.kent.edu/sds for more information on registration procedures).