

Advanced Computer Graphics

CS 395/495 –Section 24, Winter (Jan.-March) 2004

This seminar/project course will introduce you to a broad variety of new topics that build on the basic techniques covered in Introductory Graphics (CS351). We will survey a new topic area each week with readings, discussions, and presentations from both students and the instructor. To gain more in-depth knowledge, students invent a graphics project in one of the topic areas, and demonstrate their results in class and on a website at the end of the quarter.

Prerequisites: CS 351 or equivalent

Grading: 1 reading assignment presentation, 1 project presentation, ‘reader quizzes’. No exams.

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Website: www.cs.northwestern.edu/~jet/Teach/2004_1win_AdvGraphics/index.htm

Look there for all presentations, schedules, reading assignments, and announcements.

Textbooks:

Required: A. Watt, *3D Computer Graphics*, 3rd edition, Addison-Wesley.

The textbook gives a good introduction to many of the topic areas.

In some cases the big ideas get lost in practical details, but no textbook is perfect.

Required: *web-available research papers (see website)*

You are expected to complete the reading assignment before class each week, and to be ready to discuss it. You aren’t required to understand everything, but it is necessary for you come to class with specific, well-formed questions to discuss. “I just don’t get it!” isn’t instructive.

Coursework:

Students in this course are expected to:

- 1) Complete the weekly reading assignments before class (caution! reading quizzes!)
 - 2) Attend class and actively participate in class discussions,
 - 3) Prepare one scheduled in-class presentation & discussion of a reading assignment,
 - 4) Complete one graphics project that explores a topic area (can be a different one)
 - 5) Demonstrate the graphics project to the class and describe it well on a webpage.
- The course covers one new topic each week, and always begins with the instructor’s topic survey. We continue with student presentations of the reading assignments and in-depth discussions of how these methods work, why these are good ideas, and how they might be improved or applied in novel ways.
 - Each week includes a ‘reading quiz’ to trick you into compliance. This quick written test (<5 minutes) asks a question that is trivial to answer if you completed the reading assignment, but procrastinators will usually find it impossible. Grading is binary (1/0).
 - In the first week, I briefly survey all the topics for the entire quarter. By the end of that week, each student must select their presentation topic, or it will be assigned to you by

default. In the week of your topic, you will give an in-class presentation of the reading assignment and guide its discussion. Please make a few PowerPoint slides to illustrate ideas that are too tough to sketch on the whiteboard—stick to pictures, animations, etc. and don't make text-only slides. We will post your presentation on the class website.

- Project proposals are due on or before the start of the 3rd week. Write a short (<1 page) description of what you plan to implement (be specific!), what results you plan to show, and the measures the class members should use to judge the success of your efforts. Proposals are 'sanity checks' to ensure planning ahead and appropriate ambitions for a 1 quarter project. Team proposals are welcome for larger projects, but standards are higher.
- Project progress reports are due at the start of the 6th week. At this point your project should be about halfway finished. Send a short (about one page) description of your current progress, and a copy of your current code. Progress reports are 'sanity checks' to make sure you start early, and to help us re-direct you if you're getting into trouble.
- Projects themselves are due on the last week of class. Each student (or team) will demonstrate their program to the class, show us a webpage that describes their project, and turn in the webpage and source code they wrote.

A graphics project can be any interesting course topic exploration that will produce interesting new pictures that you made yourself. Good choices include:

- a stand-alone programming project to implement something described in the reading assignments (using OpenGL, Java3D, NVidia Cg or other libraries if possible),
- an application project that uses web-available computer graphics programs (e.g. RenderPark, HDRshop, POVray, Blender, game engines, etc.) in multi-step picture-making process you find fascinating (e.g. how can you emulate the jewelry or diffraction patterns from a CD with texture mapping and multi-texturing?)
- Any desired combination of the above. Try to amaze us!

Course Evaluation

Your final grade will be assigned by these proportions:

Class Participation	20%
Reading Quizzes	10%
Reading Presentation	25%
Graphics Project:	
Proposal	2%
Progress Report	2%
Code & Results	25%
Final Presentation	8%
Final Webpage	8%