CSCI-4961/6961: Three-Dimensional Computer Graphics
Fall 2006

1 Course Information

Instructor:	Prof. Srinivas Akella
Email:	sakella@cs.rpi.edu
Office:	MRC 330B, x8770
Office hours:	Monday 2:00-3:00pm, or after class

Lectures:	Monday, Thursday 10:00am–11:50am
Classroom:	Carnegie 201
Prerequisites:	Data structures and algorithms (CSCI-2300) and Multivariable calculus and matrix algebra (MATH-2010), or permission of instructor.

Teaching Assistant:	Steve Berard
Email:	sberard@cs.rpi.edu

Course web page: Course announcements and information will be available at
http://www.cs.rpi.edu/~sakella/graphics

Textbooks:
Computer Graphics with OpenGL, third edition. Donald Hearn and M. Pauline Baker. Prentice Hall, 2003.
OpenGL Programming Guide, fifth edition. Dave Shreiner, Mason Woo, Jackie Neider, and Tom Davis. Addison Wesley, 2005.

2 Course Description

This is a 4-credit course that is an introduction to the principles of 3D computer graphics modeling, rendering, and animation. The focus will be on the underlying algorithms and mathematics. Topics include 3D geometric and modeling transformations, 3D viewing and projections, modeling of curves and surfaces, solid modeling, illumination models and shading, texture mapping, visibility algorithms, ray tracing, animation and physically based modeling. The course will involve substantial programming assignments using OpenGL.

3 Syllabus

This is the tentative list of topics to be covered. Be sure to check the course web page regularly for course announcements and the updated schedule.

1. Introduction to Computer Graphics
2. 3D Geometric and Modeling transformations
3. 3D Viewing and Projections
4. Illumination models and Shading
5. Modeling of curves and surfaces
6. Texture mapping
7. Solid modeling, Procedural Modeling, and Fractals
8. Visibility algorithms
9. Ray tracing
10. Animation and Physically based modeling

4 Grading

Programming Projects

There will be four programming projects given throughout the semester. Programs must be written using OpenGL. Students will have at least two weeks to do each project. Projects must be submitted by 11:59:59 pm on the scheduled due date. Submission will be by electronic file transfer; submission details will be specified in the project description. Programming projects will count for 44% of the semester grade.

Lateness Policy: Each student will be given three days (whole or partial) of grace for late programs. Use these late days carefully. Once you have exhausted these days, **late programs will not be accepted** without a written excuse from the Dean of Students' office. This includes late days for illnesses, plant trips, etc.

As an example, if you submit your 1st program 26 hours late, you will have used two late days and have only one day left. If you submit your 2nd program 5 hours late, you will have used your last late day. If you then submit your 3rd program 1 minute late, it will not be accepted. USE YOUR LATE DAYS WISELY, IF AT ALL.

Written Homeworks

There will be five written homework assignments spaced throughout the semester, supplemented with occasional exercises. These will count 16% of the semester grade. You will typically have at least a week to complete each homework. **No late homeworks will be accepted.**

Exams

There will be a midterm exam and a comprehensive final exam for the course. The midterm exam will count for 15% of the course grade and the final exam for 25% of the course grade. Exams will be closed-book and will be based on material covered in class, assigned readings, projects, and homeworks. No makeup exams will be scheduled; in exceptional circumstances, prior arrangements must be made with the instructor.

Summary of Requirements and Grading:

Programming Projects	44%
Homeworks and exercises	16%
Exams	40%

The grading requirements for CSCI-6961 will be similar to that for CSCI-4961, and will require additional work (to be discussed in class).

The maximum lower bound cutoffs for A, B, C, and D grades will be 90%, 80%, 70% and 60%, respectively. Lower cutoffs may be established at the end of the semester when assigning grades.

If you feel there is a grading error on a programming assignment, homework, or exam, you should bring this to the attention of the instructor or TA as soon as you receive your grade and **no later than a week** after you receive the grade. **All grades will be treated as final two weeks after they are issued.**

Attendance policy: Students are responsible for knowing all material covered in class, and on assigned readings, exercises, homeworks and programming assignments.

Important Dates

Here is a tentative schedule of homework and project due dates and exam dates.

Class(es)	Date(s)	Event
3	9/7	Homework 1 due
	9/22	Project 1 due
8	9/25	Homework 2 due
	10/13	Project 2 due
14	10/16	Homework 3 due
15	10/19	Midterm exam
	11/3	Project 3 due
20	11/6	Homework 4 due
22	11/13	Homework 5 due
	12/1	Project 4 due
28	12/7	Final exam

5 Academic Honesty

Students are encouraged to discuss class material, programming assignments, and homeworks. However they must submit their own work for programming assignments, homeworks, and ex-

ams.

Academic integrity is a problem on programming assignments. Students naturally want to work together, and it is clear they learn a great deal by doing so. Getting help is often the best way to interpret error messages and find bugs, even for experienced programmers. In response to this, the following rules will be in force. Students are allowed to work together in high-level design of algorithms (i.e., pseudocode), in interpreting error messages, in finding bugs, but NOT in writing code. Students may not share code, copy code, or discuss code in detail (line-by-line or loop-by-loop) while it is being written or afterwards. Students may not "show" their code to other students as a means of "helping them". Students may not leave their code (either the electronic versions or the printed copies) in publically accessible areas. Students may not use code obtained on the web or from other sources (unless permitted by the instructor). Shared or copied code is easy to spot manually and is easily detected using a variety of software tools. Students caught illegally collaborating in writing code or violating the above rules will receive a 0 on the assignment plus a 5 percentage point penalty on their semester grade and a report to the Dean of Students office. Students caught a second time will receive an F in the course and will be reported to the Dean of Students office. For a flagrant violation, a student will immediately receive an F in the course and will be reported to the Dean of Students office.

Students may discuss homeworks, however they must write their homeworks individually. Again, copying on this course work is not allowed and will result in a 0 for the submission plus a 5 percentage point penalty on the semester grade and a report to the Dean of Students office.

Copying, sharing answers, or using disallowed materials during an exam is cheating, of course, and will result in a 0 on the exam, plus a 5 percentage point penalty on the semester grade and a report to the Dean of Students office.

Any student violating these academic honesty rules for a second time will receive an F in the course and will be reported to the Dean of Students office. For a flagrant violation, a student will immediately receive an F in the course and will be reported to the Dean of Students office.

Refer to the Rensselaer Handbook of Student Rights and Responsibilities, which defines various forms of academic dishonesty and procedures for responding to them. Students found in violation of academic honesty policies will receive a failing grade for the course.