

CSC 321 - Computer Graphics

Block 7, March 16 - April 8, 2015

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Class: 9:30 - 11:00 AM in Law 109
1:00 - 3:00 PM in Law 113
Office Hours: Drop-ins welcome
and by appointment

Course description and promises

Computer graphics is a flourishing field within computer science. In this field, we study methods for digitally synthesizing and manipulating visual content. Today, this field touches many aspects of our daily lives: from animation, computer games, art and special effects to graphical user interfaces, information visualization, industrial design and education, computer graphics plays an increasingly important role in our lives, both practically and culturally.

This course will introduce you to fundamental concepts in 2D and 3D computer graphics. The topics covered will include the fundamentals of 2D and 3D graphics, image processing, rendering geometric primitives, 2D and 3D transformations, color theory, 2D image filtering, simple illumination models, future user interfaces, and real-time graphics on the GPU. Prerequisites: CSC 301.

Through active participation in this course you will:

- Be able to describe and implement 2D graphics and algorithms including line drawing, polygon filling, clipping, and transformations.
- Be able to explain and apply the concepts and techniques used in 3D computer graphics including viewing transformations, hierarchical modeling, color, lighting, and texture mapping.
- Be exposed to current computer graphics research areas.
- Develop skills in computer programming using the C++ language and a current graphics API (OpenGL).

This course supports the Educational Priorities and Outcomes of Cornell College with emphases on knowledge, inquiry, reasoning, and communication.

Textbook

There is no required textbook for this course. With special thanks to my colleagues Cindy Grimm, Tao Ju, and Andy van Dam, the slides and lecture notes should be sufficient for our purposes. However, some students prefer to have a textbook, even if it is just for a reference or further reading on the topics covered in class. Here are my recommendations:

Hughes, van Dam, McGuire, Sklar, Foley, Feiner, and Akeley. *Computer Graphics: Principles and Practice*. Addison-Wesley, 2013. (ISBN 978-0321399526)

Shirley, Ashikhmin, and Marschner. *Fundamentals of Computer Graphics*. A K Peters, 2009. (ISBN 978-1568814698)

Course structure and schedule

We will meet each morning in the classroom and each afternoon in the computer lab. Our class time will be spent discussing the slides and lecture notes, presenting solutions to homeworks, and working in small groups on problems and activities that will prepare you for the projects. Our lab time will be spent working on the course projects, which will include designing, writing, testing, and presenting solutions to a series of computer graphics programming projects. Your work outside of class will generally include the written homework assignments and completing the course projects.

The course schedule is maintained on our Moodle course page. It currently includes an outline of the daily topics and assignment due dates that I have planned. This is subject to change, but should give you a good idea of the material that we will cover in the course. The schedule will be updated regularly, to include all of the homeworks, projects, and other materials that you will use in the course.

Grading

Your letter grade in this course will depend upon

- Your project score (70%)
- Your final exam score (30%)

as described in the table below.

Grade	Lowest	Highest
A	93.00%	100.00%
A–	90.00%	92.99%
B+	87.00%	89.99%
B	83.00%	86.99%
B–	80.00%	82.99%
C+	77.00%	79.99%
C	73.00%	76.99%
C–	70.00%	72.99%
D+	67.00%	69.99%
D	60.00%	66.99%
F	0.00%	59.99%

I do not alter the scale for individual exam or project scores, but I may alter the scale for the final grades. I would never lower grades, only raise them, and only if the distribution of final grades indicates that such a shift in the scale is appropriate.

Projects

Most of your labor in this class will involve continuous work on a series of six rigorously graded computer graphics programming projects. The six projects combine to be worth 60% of your final grade. Six written homework assignments are graded for completion and combined to make up the other 10%.

Final exam

There will be one take-home, open-notes, and open-computer final exam. The exam will be distributed on the last Friday of the term and will be due on the last Wednesday of the term.

Late policy

Written homework is due by 9:30 AM on the due date. It will not be accepted late because we go

over the answers during class.

Programming projects are due at 5:00 PM on the due date, but they will be accepted without penalty until 1:00 AM on the next class day. Submissions received after this initial grace period will be given at best 50% of the maximum grade.

Collaboration policy

You are free to discuss answers and help each other with debugging. You are not allowed to copy answers or cut and paste code. You are free to look for more information in books and on the web, but if you find explicit answers to specific questions you may not use them in any form. If you have doubts, please contact me.

If you work substantially with another person or group, or use a particular web site, please include their names in the README file.

Academic honesty

As part of an academic community of learners, students are expected to complete original work that is evidence of high personal integrity and sound academic conduct. Please familiarize yourself with the college's statement on academic honesty in *The Compass*:

<http://www.cornellcollege.edu/registrar/pdf/AcademicHonesty.pdf>

Note that the definitions of cheating and plagiarism apply to all academic work, regardless of the medium (computer programs as well as written papers). I will follow the "Procedures for Dealing with Dishonesty in Academic Work" outlined in *The Compass*. Penalties for academic dishonesty may include failure of the assignment or the course and reporting of the incident to the college administration. Please do not hesitate to talk to me if you have any questions regarding academic honesty in this course.

Students with disabilities

Cornell College is committed to providing equal educational opportunities to all students. If you have a documented learning disability and will need any accommodation in this course, you must request the accommodation(s) from me as early as possible and no later than the third day of the term. Additional information about the policies and procedures for accommodation of learning disabilities is available on the Cornell web site:

<http://www.cornellcollege.edu/academic-support-and-advising/disabilities/index.shtml>

Contacting me

Outside of class, the best way to contact me is by email. While I do not schedule formal office hours, I am generally on campus from 8:00 AM - 4:00 PM on Monday - Friday. You are welcome to drop-in whenever my office door is open. You should also feel free to schedule an appointment with me at any time by sending me an email. If you need to reach me during the evening or on weekends, you may also call me at home (319-535-2299), but as a courtesy, please do not call after 8:00 PM.