

CMSC 381: Computer Graphics (3 credits) Spring 2013

Instructor: Robert Marmorstein, 395-2185, marmorsteinrm@longwood.edu

Lecture: 4:00pm-5:15pm MW, Ruffner 352

Office Hours: 1:00pm-2:00pm MWF, 3:00pm-4:00pm TR, Ruffner 329 or by appointment

Course Web Site: <http://marmorstein.org/~robert/Spring2013/cs381.html>

Course Description:

This course is designed to introduce students to computer graphics programming techniques. It will combine the use of a high level programming language with a publicly available graphics application programming interface. Other topics will include the mathematics to manipulate geometric objects.

Prerequisite: CMSC 162 and MATH 261

Course Objectives:

The student will learn:

- * To draw basic primitives, such as points, lines, and polygons, in OpenGL
- * To develop complete graphical applications that take user input and manipulate three dimensional scenes.
- * The mathematical underpinnings of computer graphics, including vector arithmetic, affine transformations, and homogenous coordinate systems.

Textbook:

The textbook for this class is "Interactive Computer Graphics" by Edward Angel and Dave Shreiner, 6th Edition, Addison Wesley, ISBN: 978-0132545235

Course Requirements:

This is a project-driven course. Programming projects will count for 60% of your grade. There will also be quizzes on the weekly reading and regular homework assignments. These will count for an additional 20% of your grade. The midterm and final exams will each count for 10% of your grade.

Grading Policy:

Late work will not be accepted unless you have a medical condition or family emergency which prevents you from completing the assignment on time. However, I allot three slip days at the beginning of the semester which you may use to extend the due date of one or more homework or lab assignments. In the event of a medical or family emergency, you do not need a doctor's note, but you must contact me by e-mail as soon as possible to arrange an extension. In such cases, I may, at my option, extend the due date on the project or grant you additional slip days.

Grading Scale:

Letter grades will be assigned using the following scale. Note that there is no grade of D- in this class.

A: 91-99	A-: 90	
B+: 89	B: 81-88	B-: 80
C+: 79	C: 71-78	C-: 70
D+: 69	D: 64-68	F: Below 64

Attendance:

I expect you to attend class unless you are sick or engaged in a school sponsored sports event or extra-curricular activity. I will rely on your honor to enforce the attendance policy. In accordance with Longwood policy, missing more than 10% of scheduled class time to unexcused absences may result in loss of one letter grade. Missing more than 25% of class (whether excused or unexcused absences) may, at my discretion, result in a failing grade.

Food and Drink:

I prefer that you do not eat in class (it distracts me and the other students). You may bring water or other non-alcoholic beverages to class. I occasionally make exceptions to this rule for students who would otherwise miss a meal or who have medical needs. If you feel that you need such an exception, you **MUST** make arrangements with me before you bring food to class. Violations of this policy will be considered an unexcused absence.

Cell Phones and Laptops:

Cell phones and laptops must be turned off and put away during lecture, unless I have specifically requested, usually by e-mail, that you bring them to class (e.g. for a lab day). Violations of this policy will be considered an unexcused absence.

Honor Code:

I take the honor code seriously in my classes. Students suspected of an honor code violation will be taken before the honor board. A student convicted of an honor offense will receive an F in the course in addition to any penalties imposed by the honor council.

All work in this class should be considered pledged, whether or not you have written the pledge on it. Tests and quizzes must be completed entirely on your own and will be taken closed-book and closed-notes. You *may* discuss homework problems and laboratory projects with other students subject to the following restrictions:

1. You must acknowledge any help you receive, including any discussion of the homework problems, by leaving a short note at the top of the assignment, or in the case of a project, placing appropriate comments in the code.
2. Your submitted work must consist entirely of *your own answers in your own words* which you have typed or written yourself. You may discuss assignments verbally with other students, but do not share code or answers electronically.
3. Do not simply copy answers from other students. You can discuss the general approach to an assignment and you can help other students find syntax errors in their code, but any block of code longer than three lines should be entirely your own work.
4. Use the Internet only as a general reference. There are web sites which contain solutions to the problems in our book. **DO NOT USE THEM.** However, if you find a web page which outlines the general algorithm or proof you need, you may use it as long as you cite it appropriately (make sure to give at least the complete URL) and don't simply copy and paste code off the web site. The three-line rule is a good guideline here, too.

Tentative Course Schedule:

Week 1: January 14-16

Introduction, Hardware, Graphics Models
Read Chapter 1

January 21
January 22

Martin Luther King Day (NO CLASS)
Last day of Add/Drop (by 5pm)

Week 2: January 23

Drawing and Input in OpenGL
Read Chapter 2

Week 3: January 28-30

Scalars, Points, Vectors, Coordinate Systems, Frames,
Read Sections 3.1 to 3.5

Week 4: February 4-6

The Color Cube, Affine Transformations, Animation
Read Sections 3.6 to 3.13

Week 5: February 11-13

Catchup, Review, and Midterm Exam

February 18

Pass/Fail Deadline

Week 6: February 18-20

Viewing, Projections, Hidden Surface Removal
Read Sections 4.1 to 4.8

Week 7: February 25-27

Meshes and Shadows
Read Sections 4.9 and 4.10

March 4-8
March 13

SPRING BREAK : NO CLASS
Deadline to Withdraw (by 5pm)

Week 8: March 11-13

Quaternions
Read Section 4.13

Week 9: March 18-20

Lighting and Shading
Read Chapter 5

Week 10: March 25-27

Fragment Processing, Rasterization,
Read Sections 6.1 to 6.11

Week 11: April 1-3

Advanced Hidden Surface Removal, Anti-aliasing
Read Sections 6.11 to 6.13

Week 12: April 8-10

Buffers, Images, and Texture Mapping
Read Chapter 7

Week 13: April 15-17

Advanced Topics

Week 14: April 22-24

Catchup and Review

Final Exam: April 30

Final Exam (3:00pm - 5:30pm) Tuesday