Computer Graphics CSCI 441 - Syllabus

Computer graphics is a field of computer science that involves generating visual content. Applications of computer graphics includes modeling and animation software, CAD design software, image manipulation packages such as Photoshop or Illustrator, video games, medical visualisation tools and much, much more. In this class, we'll be going over some of the fundamentals of computer graphics from transformations and camera projections, to light and shading models, to simulations that approximate phenomena in the real world. We'll be using C++, Qt and OpenGL to explore practical, real-time, graphics programming while learning the theory behind it so you can apply it to other environments.

Assignments

There will be many lab assignments, generally one per week, that should take about one full class session to complete. Code will be provided to get you up and running with the labs, which you can work on in pairs or a maximum of 3 people. You must demo your labs to me in class to get credit. There will also be a few major programming assignments as well. The program assignments will take significantly more time than the labs and are designed to inspire individual creativity and self expression. I'll try to keep lectures as short as possible to give you time in class to work on your assignments with me available to ask questions. Mondays will be a lab only day, where I generally won't lecture at all. All assignments will be made available via Github:

https://github.com/jallwine/MSU-CSCI441-Spring-2015

See instructions at the link above to get started.

January Schedule

Date	Topic
1/14	Intro, applications of computer graphics
1/16	Overview of graphics pipeline - Assign Lab 1
1/19	MLK Day - No class
1/21	Rasterization / Barycentric coordinates / Color basics
1/23	OpenGL Basics / 2D coordinate systems
1/26	Lab day - Assign Lab 2
1/28	Graphics math - vectors, matrices and quaternions
1/30	Camera projections - Last day to demo Lab 1

Meeting Times

MWF 1:10-2pm in Reid Hall 201

Instructor

John Allwine

Office hours

MWF 2:10-3 in EPS 358

Online Resources

- [OpenGL Programming Guide, 8th Edition](#)
- [Qt 5 Documentation](#)
- [C++ Documentation](#)

Catalog Information

PREREQUISITE: M 221 and CSCI 232. High resolution computer graphics. 3D graphics programming using a high level API. Vector mathematics for graphics. Graphics primitives. Curve and surface representations. Transformations using matrices and quaternions. Representing natural objects with particle systems and fractals. Shading and lighting models. Global illumination models. Color representations.

Course Offerings

At the end of the course, students should be able to
- Write basic graphical applications using OpenGL and C++
- Understand the modern graphics pipeline and how to leverage hardware to write real-time graphics applications
- Use vectors and matrices to transform geometry in 3D space
- Understand common shading and lighting models for displaying 3D models
- Use particle systems to simulate real world phenomena.

Graded Items

- Programs - 50%
- Midterm + Final - 25%
- Labs - 25%

Grading Policy

At the end of the semester, grades will be determined (after any curving takes place) based on your class average as follows:

- 93+: A
- 90+: A-
- 87+: B+
- 83+: B
- 80+: B-
- 77+: C+
- 73+: C
- 70+: C-
- 67+: D+
- 63: D
- 60: D-

If you fall within one percentage point of the next grade higher, your grade on the final exam will be examined. If it justifies you being in the next higher grade category, you will receive that higher grade.

Late Policy

Deadlines for all assignments will be noted in their descriptions. Turning in a project late will result in severe deductions as follows:

- -20% within first 24 hours after deadline
- -40% within 48 hours
- -100% after 48 hours

However, you are allowed 2 late days throughout the semester that can be used on your program assignments. You do not need to explain why you are using the days – these two late days will be automatically applied to any late program assignments. *After your two late days have been used up, the late penalties apply.*

Collaboration Policy

All students should read the [MSU Student Conduct Code](#).

When it comes to assignments, you *may*
- Work with the other people on your team if teams are allowed. Each assignment will specify the maximum number of people per team.
- Share ideas with people in other teams.
- Help other teams troubleshoot problems.

You may *NOT*
- Share code you write with other teams.
- Submit code that someone on your team did not write.
- Modify another team's solution and claim it as your own.

Failure to abide by these rules will result in an "F" for the course and being reported to the Dean of Students.