CS6533/CS4533 Interactive Computer Graphics
Fall Semester 2017

Lectures: Thursdays 3:25–5:55pm
Classroom: 2 MTC, Room 812 (8F)
Software Eng. Lab: RH 223
Course Web site: http://cse.poly.edu/cs653/

Instructor: Professor Yi-Jen Chiang
Office: 2 MTC, 10.050 (10F)
Office Hours: Thursdays 2:00–3:00pm
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TA: To be announced.

Description: This course introduces the fundamentals of Computer Graphics with hands-on graphics programming experiences. Topics include: graphics software and hardware, 2D line-segment scan conversion, 3D transformations, viewing and projection, programmable shaders, polygon scan-conversion, hidden-surface removal, illumination and shading, compositing, texture mapping, effects of shadow, decal, lattice, fog, firework, etc, ray tracing and radiosity, and so on.

Graphics programming projects will be assigned using the academics and industry graphics standard OpenGL, compiled with the Microsoft Visual C++ under Microsoft Windows on a PC. The first homework is a warm-up exercise to get started with OpenGL programming, and the remaining three homeworks put pieces together to form one course project, which is an animation system with various graphics effects. You can work on the programming projects either on the PCs in the Software Engineering Lab (RH 223), or on your own (laptop) computer (but it needs to have a programmable GPU supporting OpenGL 3.1 and above, for shader-based OpenGL.)

Prerequisites: CS 5403 (Data Structures) or equivalents, and knowledge of C/C++ programming.


Grading Distribution: Midterm Exam: 25%, Final Exam: 25%, 4 Programming Assignments (last three put pieces together to form one course project): 50%. (The total score of the 4 Assignments is close to 600 points; the sum of the 4 Assignment scores will be divided by 5 and then multiplied by 50% for the overall score). The full score of the overall score typically exceeds 100 points, and the final grades are based on the distribution of the overall scores of the class.

Midterm and Final Exams: Open Book, Open Notes, In Class. (Note: Only the textbook, your notes, and print-outs of the homeworks and handout sample programs are allowed; all electronic devices, including cell phones and kindles, are NOT allowed.)
General Instructions for Programming Assignments: Submit your write-up, your source code (with full comments and documentation), and include brief instructions on how to compile and run your programs. Submit everything by sending an email to the TA (if your write-up is hand-written, scan it into a PDF file to be sent by email).

Note: You may discuss the programming assignments with other students currently taking the course, but each write-up and program must be done individually and independently, and you should show that you personally understand everything that you submit. Sharing code, including making your code publicly accessible on the web (such as on Github), is Cheating. (See also Policy on Academic Dishonesty below.)

Policy for Late Assignment Submissions: In general, all assignments are due at the beginning of the class. There will be 10% off for each week passed, i.e., the actual score is 90% of the raw score if you are one week late, 80% of the raw score if you are two weeks late, and so on. (But no assignments will be accepted after the date of the Final Exam.)

Tentative Schedule (subject to change):

1 9/7 Motivations, Overview, Graphics Software and Hardware [Lecture Notes]
2 9/14 2D Line-Segment Scan Conversion; OpenGL Standard [Lecture Notes, Ch 1]
   Asgn 1 given
3 9/21 3D Transformations [Ch 2, 3, 4, Appendix B]
4 9/28 3D Transformations [Ch 2, 3, 4, Appendix B]; Viewing & Projection [Ch 5, Lecture Notes]
5 10/5 Viewing & Projection [Ch 5, 10, 11, 12.1, Lecture Notes]; Programmable Shaders & Shader-Based OpenGL [Lecture Notes, Ch 1, 6, Appendix A]
   Assgn 1 due; Assgn 2 given
6 10/12 Programmable Shaders & Shader-Based OpenGL [Lecture Notes, Ch 1, 6, Appendix A];
   [Additional Reading: Appendix B, Ch 12, 13]
   Polygon Scan-Conversion [Lecture Notes, Sec 12.4]
7 10/19 Hidden Surface Removal [Lecture Notes, Ch 11]; BSP Trees [Lecture Notes]
   Assgn 3 given
8 10/26 Midterm Exam
9 11/2 Illumination and Shading [Lecture Notes, Ch 14]
   Assgn 2 due
10 11/9 Illumination and Shading [Lecture Notes, Ch 14]
11 11/16 Illumination and Shading [Lecture Notes, Ch 14]; Compositing [Lecture Notes]
   Assgn 4 given
12 11/23 NO CLASS (Thanksgiving Recess); Assgn 3 due on 11/22 (by 12 noon)
13 11/30 Compositing [Lecture Notes]; Textures [Lecture Notes, Ch 15]
14 12/7 Textures [Lecture Notes, Ch 15]
15 12/14 Ray Tracing and Radiosity [Lecture Notes, Ch 20]
   Assgn 4 due on 12/18 (by 12 noon)
16 12/21 Final Exam

Policy on Academic Dishonesty:
First time: 0 point for the work; second time: F for the course. see Student Code of Conduct: