

CS6533 Interactive Computer Graphics

Spring Semester 2012

Lectures: Wed. 6:00–8:30pm
Classroom: RH 615
Software Eng. Lab: RH 223
Course Web site: <http://cis.poly.edu/cs653/>

Instructor: Professor Yi-Jen Chiang
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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, 2D and 3D transformations, viewing, polygon scan-conversion, hidden-surface removal, illumination and shading, compositing, texture mapping, programmable shaders, 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++ compiler, running 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. (The last homework is related to programmable shaders, for which the computer needs to have a programmable GPU.)

Prerequisites: CS 540 (Data Structures) or equivalent, and knowledge of C/C++ programming.

Textbook: E. Angel, *Interactive Computer Graphics – A Top-Down Approach Using OpenGL*, Fifth Edition, Addison-Wesley, 2008, ISBN-10: 0321535863, ISBN-13: 978-0321535863.

Recommended Reference: D. Shreiner, *OpenGL Programming Guide, The Official Guide to Learning OpenGL, Versions 3.0 and 3.1*, 7th Edition, Addison-Wesley, 2009, ISBN-10: 0321552628, ISBN-13: 978-0321552624.

Grading Distribution: Midterm Exam: 20%, Final Exam: 30%, 4 Programming Assignments (last three put pieces together to form one course project): 50%. (The total score of the 4 Assignments is 590 points; the sum of the 4 Assignment scores will be **divided by 5** and then multiplied by 50% for the final score).

General Instructions for Programming Assignments: Submit your write-up, your source code (with full comments and documentation), and include your e-mail address as well as brief instruc-

tions on how to compile and run your programs. You can submit by either sending an e-mail to the TA, or handing in a hard-copy write-up and a CD-ROM containing the source code.

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.

Software Engineering Lab (RH 223) Open Hours: To be announced.

Policy for Late Assignment Submissions: All assignments will be 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.) Assume that machine failures may happen. *Start each assignment early!*

Tentative Schedule (subject to change):

- 1 1/25 Motivations, Overview, Graphics Software and Hardware [Ch 1]
- 2 2/1 2D Line-Segment Scan Conversion [Sec 7.8–7.9]; OpenGL Standard [Ch 2, 3]
Assgn 1 given
- 3 2/8 2D and 3D Transformations [Ch 4, Appendix B, C]
- 4 2/15 2D and 3D Transformations [Ch 4, Appendix B, C]; Viewing [Ch 5]
- 5 2/22 Viewing [Ch 5]
Assgn 1 due; Assgn 2 given
- 6 2/29 Polygon Scan-Conversion [Sec 7.10]; Hidden Surface Removal [Sec 7.11]
- 7 3/7 BSP Trees (for Hidden Surface Removal) [Sec 10.12.2, Lecture Notes];
Illumination and Shading [Ch 6]
- 8 3/14 NO CLASS (Spring Break)
Assgn 3 given
- 9 3/21 Illumination and Shading [Ch 6]
Assgn 2 due
- 10 3/28 Midterm Exam
- 11 4/4 Illumination and Shading [Ch 6]; Compositing [Sec 8.11]
- 12 4/11 Textures [Sec 8.6–8.10, 9.13]
Assgn 4 given
- 13 4/18 Textures [Sec 8.6–8.10, 9.13]; Programmable Shaders [Ch 9]
Assgn 3 due
- 14 4/25 Programmable Shaders [Ch 9]
- 15 5/2 Ray Tracing and Radiosity [Sec 13.2, 13.5, Lecture Notes]
- 16 5/9 Final Exam
Assgn 4 due

Departmental Policy on Cheating: see <http://cis.poly.edu/policies/>.

NYU-Poly Syllabus Addendum: see

http://www.poly.edu/sites/polyproto.poly.edu/files/NYU-Poly_Syllabus_Addendum.pdf.