

CS6533 Interactive Computer Graphics

Fall Semester 2009

Lectures: Wed. 6:00–8:30pm
Classroom: RH 302
Software Eng. Lab: RH 223
Course Web page: <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 you cannot work on your own computer unless it has a programmable GPU.)

Prerequisites: CS 540 (Data Structures) or equivalents, and knowledge of C or 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%.

General Instructions for Programming Assignments: Hand in your write-up, a hard-copy of your source code (with full comments and documentation), and a diskette/CD-ROM containing

the source code. Include your e-mail address. Brief instructions on how to compile and run your programs are required.

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 6pm at the beginning of the class, which is the only checkpoint time. There will be 10% off for each checkpoint passed, i.e., the actual score is 90% of the raw score if you miss the first checkpoint, 80% of the raw score if you miss the second checkpoint, and so on. (But no assignments will be accepted after the checkpoint time of the date of the Final Exam.) Assume that machine failures may happen. *Start each assignment early!*

Tentative Schedule (subject to change):

- 1 9/9 Motivations, Overview, Graphics Software and Hardware [Ch 1]
- 2 9/16 2D Line-Segment Scan Conversion [Sec 7.8–7.9]; OpenGL Standard [Ch 2, 3]
Assgn 1 given
- 3 9/23 2D and 3D Transformations [Ch 4, Appendix B, C]
- 4 9/30 2D and 3D Transformations [Ch 4, Appendix B, C]; Viewing [Ch 5]
- 5 10/7 Viewing [Ch 5]
Assgn 1 due; Assgn 2 given
- 6 10/14 Polygon Scan-Conversion [Sec 7.10]; Hidden Surface Removal [Sec 7.11]
- 7 10/21 BSP Trees (for Hidden Surface Removal) [Sec 10.12.2, Lecture Notes];
Illumination and Shading [Ch 6]
- 8 10/28 Illumination and Shading [Ch 6]
Assgn 2 due; Assgn 3 given
- 9 11/4 Midterm Exam
- 10 11/11 Illumination and Shading [Ch 6]; Compositing [Sec 8.11]
- 11 11/18 Textures [Sec 8.6–8.10, 9.13]
- 12 11/25 NO CLASS (Friday Classes Meet)
(11/24: Assgn 3 due, Assgn 4 given)
- 13 12/2 Textures [Sec 8.6–8.10, 9.13]; Programmable Shaders [Ch 9]
- 14 12/9 Programmable Shaders [Ch 9]
- 15 12/16 Ray Tracing and Radiosity [Sec 13.2, 13.5, Lecture Notes]
- 16 12/23 Final Exam
Assgn 4 due

Departmental Policy on Cheating: see <http://cis.poly.edu/info/cheatingpolicy.htm>.

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