Fall 2023

Computer Graphics (CE)

527970
Fall 2023
9/7/2023

Kyoung Shin Park
Computer Engineering
Dankook University

Course Information

- Course
  - Computer Graphics (CE) (527970)
  - Fall 2023, 3 credits, 3 hours
  - Course hour: Thursday 13:30-16:30 (2nd Engineering 521)
- Instructor
  - Kyoung Shin Park
  - kpark@dankook.ac.kr
  - 031-8005-3161 (office) 010-8636-1960 (mobile)
  - 2nd Engineering Building, Room 512
  - Office hour: by appointment
- Prerequisite courses
  - Data Structure, C/C++ Programming

Purpose

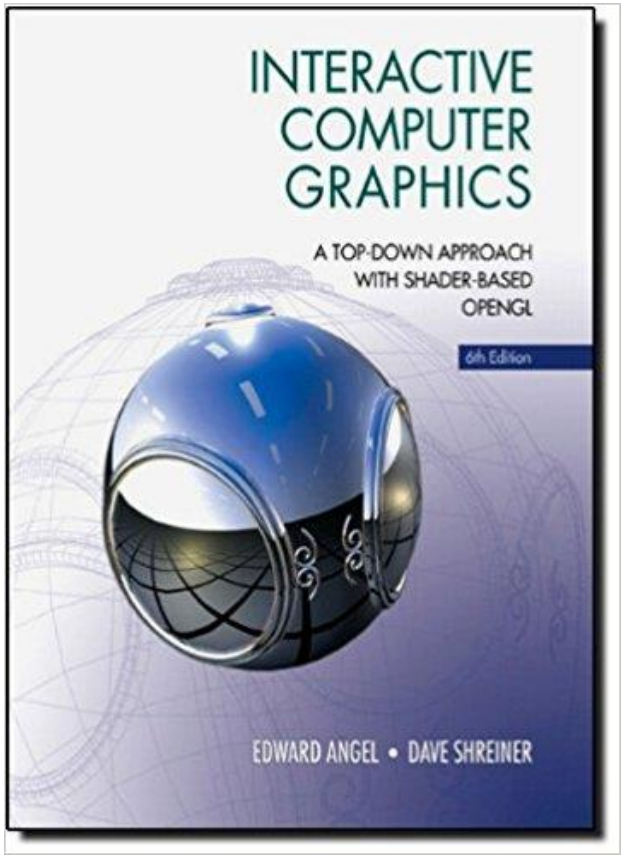
- This course will study the theory and processing of 2D and 3D computer graphics. To do this, we practice the graphics processing technique in a simple form using the graphics tool based on the theory of computer graphics. This course aims to cultivate students' ability to create interactive computer graphics.

Purpose

1. Understands the basic concepts and mathematics required for computer graphics
2. Comprehends computer graphics teaching materials and programming examples, and analysis and resolution
3. Explains the application to engineering using basic theory of computer graphics
4. Acquire technical methods required for computer graphics, use of integrated development environment of Visual Studio, and acquire graphics tools & programming

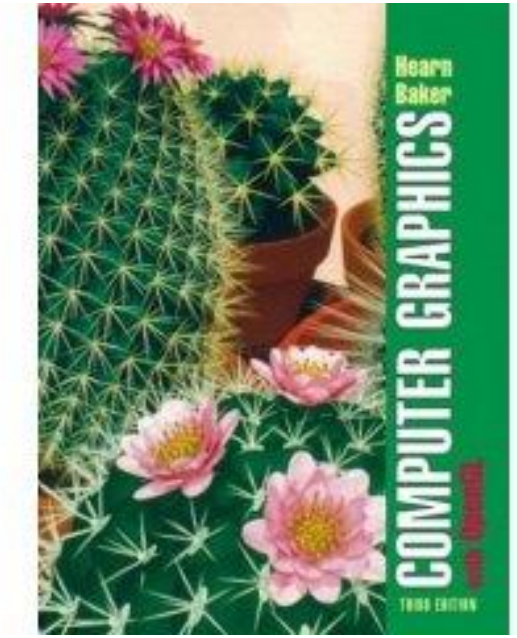
Text Book

- Textbook
  - Interactive Computer Graphics: A Top Down Approach Using Shader Based OpenGL" 6th Edition
  - Edward Angel



Text Book

- Reference Book
  - Computer Graphics with OpenGL, Hearn Baker, Prentice Hall
  - Unity Textbook (6th Edition), Kitamura Manami, Gilbut



Evaluation

- Attendance: 10%
- Midterm Exam: 30%
- Final Exam: 30%
- Term Project: 30 %
- Class Participation & Attitude: extra 10%

Topics

- Overview
- Graphics programming
- Graphics systems
- Input and interactions
- Geometric objects
- Transformations – translation, rotation, scale
- Euler angle, rotation matrix, quaternion
- Viewing– camera movement
- Shading and lighting
- Rendering pipelines
- Clipping
- Visibility
- Texture mapping
- Modeling
- Curves and surfaces
- Radiosity, Ray tracing

Schedule

1. Course Overview
   Introduction to Computer Graphics
2. Computer Graphics Systems and Model (chap 1)
3. Graphics Programming (chap 2)
   Geometric Primitives Programming
4. Input and Interaction (chap 3)
   Interaction Programming
5. Geometric Objects (chap 4)
   Vector & Matrix (Appendix B&C)
6. Transformation (chap 4)
   Transformation Programming

Schedule

7. Transformation (chap 4)
   Orientation Programming
8. Midterm Exam
9. Viewing (chap 5)
   Camera Programming
10. Shading (chap 6)
    Lighting Programming
11. Texture Mapping (chap 8)
    Texture Mapping Programming
12. Blending (chap 8)
    Blending Programming

Schedule

13. Modeling (chap 10)
    Model & Skinned Mesh Programming
14. Line-Drawing & Rasterization (chap 7)
15. Final Exam

Exams

- Midterm Exam
  - Chapter 1-4
  - 2-hour close-book exam
- Final Exam
  - Chapter 5-10
  - 2-hour close-book exam

Term Project

- CG topics of your interests
- Project Group Formation (3rd week)
- Project Proposal (5th week)
  - 5~10 min presentation(ppt) & discussion
  - 2~4-page (single-space, 10-point font) report
- Project Midterm Presentation (9th week) & Progress Report (12th week)
  - Implementation progress
  - 10~15 min presentation(ppt) & discussion
  - 4-page (single-space, 10-point font) report
- Project Final Presentation & Final Report (15th week)
  - 20~30 min presentation(ppt) & project demonstration
  - 10-page (single-space, 10-point font) report
  - Turn in all your source codes & executable

Online Resources

- Unity3D https://unity.com/
- OpenGL http://www.opengl.org/
- GLUT http://www.opengl.org/documentation/specs/glut/spec3/spec3.html
- GLUT for win32 http://www.xmission.com/~nate/glut.html
- Lighthouse GLUT http://www.lighthouse3d.com/opengl/glut/
- NeHe http://nehe.gamedev.net/
- MESA3D http://www.mesa3d.org/
- ACM SIGGRAPH http://www.siggraph.org/
- IEEE Visualization http://vis.computer.org/

Announcement

- Class blog:
  http://dis.dankook.ac.kr/lectures/cg23/