

CSCE 565: COMPUTER GRAPHICS

Catalog Description:

565—Computer Graphics. (3) (Prereq: CSCE 245, MATH 526) Graphics hardware, graphics primitives, two-dimensional and three-dimensional viewing, shape modeling, rendering.

Prerequisite(s) By Topic:

Introductory programming and data structures
Linear algebra

Textbook(s) and Other Required Material:

Edward Angel, *Interactive Computer Graphics: A Top-Down Approach Using OpenGL*, 4th edition, Addison-Wesley, Boston, MA, 2006.

Dave Schreiner, Mason Woo, Jackie Neider, and Tom Davis, *OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 2*, 5th edition, Addison-Wesley, Boston, MA, 2006.

Computing Platform: UNIX or Windows XP with OpenGL API

Course Objectives: {Assessment Methods Shown in Braces}

1. Describe the concept of OpenGL {tests}
2. Describe geometrical transformations involved in computer graphics {tests, homework, project reports}
3. Describe the fundamentals of graphics hardware {tests, project reports}
4. Describe shading models {Tests, homework, project reports}
5. Model simple objects using OpenGL primitives {projects}
6. Write a program to render scenes with OpenGL {projects}
7. Use advanced techniques to render realistic computer graphic images {tests, projects}

Topics Covered:

1. Computer graphics hardware (1 lecture)
2. Geometrical transformation (6 hours)
3. Shape modeling (4 hours)
4. Surface shading (4 hours)
5. Hidden surface removal (3 hours)
6. Ray tracing (4 hours)
7. Texture mapping (2 hours)
8. Realistic rendering (6 hours)
9. OpenGL programming (6 hours)

Laboratory Projects

Several substantial programming projects

Syllabus Flexibility: Medium

Relationship of Course to Program Outcomes:

The contribution of each course objective to meeting the program outcomes is indicated with the scale:

3 = major contributor, 2 = moderate contributor, 1 = minor contributor. Blank if not related.

Course Objectives	Program Outcomes										
	1. Logic & Math	2. Computing Fundamentals	3. Apply Computing Principles	4. Work on teams	5. Communicate Effectively	6. Liberal arts & Soc. Sciences	7. Basic Science and Lab Procedures	8. Learn New Tools & Processes	9. Employed upon Graduation	10. Application Area	11. Electronics and Digital Sys Design
1. Describe the concept of OpenGL		2									
2. Describe geometrical transformations	2	3									
3. Describe the fundamentals of graphics hardware		3									
4. Describe shading models		3					2				
5. Model simple objects using OpenGL primitives			3					2			
6. Write a program to render scenes with OpenGL			3				3	3			
7. Describe and use advanced techniques to render realistic computer graphic images			3				3	2			

Estimated Computing Category Content (Semester hours):

Area	Core	Advanced	Area	Core	Advanced
Algorithms		1	Data Structures		1
Software Design		1	Programming Languages		
Computer Architecture					

Estimated Information Systems Category Content (Semester hours):

Area	Core	Advanced	Area	Core	Advanced
Hardware and Software		1	Networking and Telecommunications		
Modern Programming Language			Analysis and Design		1
Data Management		1	Role of IS in an Organization		
Quantitative Analysis			Information Systems Environment		

Oral and Written Communication: None

Social and Ethical Issues: None

Theoretical Content:

Computational Geometry (geometrical transformation and surface modeling) and Optics (illumination, surface reflection and color)

Analysis and Design:

Some high-level language programming

Class/Laboratory Schedule:

Lecture: 3 periods of 50 minutes or 2 periods of 75 minutes per week

Course Coordinator: Song Wang

Modification and Approval History:

Initial description, April 20, 2001

Modified June 2005 by Caroline Eastman to reflect change in coordinator and textbook