



Course title and number VIST 470
 Term Fall 2012
 MWF: 10:20-11:10
 Meeting times and location
 Langford, Building B, Room 209

Course Description and Prerequisites

Digital Rendering presents the theory and practice used in the creation of photorealistic images. The theoretical emphasis will provide the student with an understanding of the important perceptual and physical principles that form the foundation for creating realistic images. Outdoor and indoor lighting, environmental effects, properties of materials, rendering models, and techniques for adding visual detail will be discussed. Practical aspects of the course will address the use of several public domain renderers, their features and the techniques which will produce photorealistic images.

Prerequisites: Visualization majors; junior or senior classification.

Learning Outcomes or Course Objectives

1. To develop a theoretical basis for photorealistic image creation
2. To introduce the RenderMan API
3. To gain experience in controlling the rendering process
4. To develop skills in shader writing
5. To better understand the lighting process in synthetic environments

Course Learning Objectives

	1	2	3	4	5
To Stimulate Visual Thinking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Nurture Design Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Enhance a Multidisciplinary Focus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Encourage Collaborative Behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Strengthen Ethical Behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To Improve Personal Responsibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Instructor Information

Name Terry R. Larsen
 Telephone number 979.845.7068
 Email address trl@viz.tamu.edu
 Office hours M-T-R-F 1:00-2:30
 Office location Langford C107

Textbook and/or Resource Material

Required Reading

SIG92	sig92.course21.pdf
SIG95	sig95.course04.pdf
SIG98	sig98.course11.pdf
SIG00	sig00.course40.pdf
SIG01	sig01.course48.pdf
SIG02	sig02.course16.pdf
SIG03	sig03.course09.pdf
SIG06	sig06.course25.pdf

Recommended Reading

Rendering for Beginners

Saty Raghavachary

Focal Press

ISBN: 0240519353

Price: \$40

Grading Policies

Your grade will be based upon the following items:

Rendering Exercises	25%
4 Projects	40%
2 Midterm Exams	20%
Final Exam	10%
Personal Evaluation/participation	5%

During the course, graded exercises will be given to help you understand the concepts and procedures required to develop an understanding of each renderer's functionality. Most, if not all of these exercises will relate to the Renderman shading language. All exercises will not necessarily have the same weight toward the final grade.

Individual projects will be required which will allow the student to exercise a complete range of rendering options. Projects may be divided into several components in order to make them more manageable.

Projects will be due on the date indicated. Late projects will result in a 5 point reduction in the project/exercise grade except for reasons specified in the Texas A&M University Rules and Regulations. All work is to be handed in on the day specified, regardless of the level of completion.

The final exam will be given over concepts, terminology and theory as described in class lectures, handouts, and the required text.

Attendance Policy

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at <http://student-rules.tamu.edu>.

Course Topics, Calendar of Activities, Major Assignment Dates

Week	Topic	Required Reading	Course Objectives
1	Introduction to rendering and shaders	SIGG06 pp. 12-27	1,2
2	Lighting and Illumination models; shader construction	SIG02 pp. 55-72	1,4,5
3	Ambient lighting and ambient occlusion; Light shaders	SIG00 pp. 23-28 SIG02 pp.92-99	1,4,5
4	Diffuse and specular lighting; shadow maps; surface shaders	SIG00 pp. 34-47	2,4,5
5	Camera and exposure control; Motion blur; Depth of Field; Surface patterns	SIG92 pp. 1-18 SIG01 pp. 57-83	2,4,5
6	quality control; Antialiasing; Displacement shaders	SIG98 pp. 62-80	3,4
7	Outdoor Lighting; Bump and image mapping	SIG98 pp. 96-108	2,4,5
8	Character lighting; Subsurface scattering; Noise and turbulence	Handouts	4,5
9	Global illumination; Reflections and transparency; Fractal shaders	Handouts	2,4,5
10	Render passes; Radiosity; Volume shaders	Handouts	3,4,5
11	Photon mapping; caustics; Nonphotorealistic shaders	SIG98 pp. 113-121	3,4,5
12	Atmospheric effects; Luxrender and material definition	Handouts	3,5
13	Compositing; Production pipeline	Handouts	3
14	High definition imagery; Project review	Handouts	1,5

Other Pertinent Course Information

Costs: The only cost for the course, in addition to the texts, is the materials needed for backup of assignments and course related work.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>

Academic Integrity

For additional information please visit: <http://www.tamu.edu/aggiehonor>

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

Statement of Responsibility

"It is unlawful for any person to damage or deface any of the buildings, statues, monuments, trees, shrubs, grasses, or flowers on the grounds of any state institutions of higher education (Texas Education Code Section 51.204)"

The words damage or deface refer specifically to any and all actions, whether direct or indirect, that either diminish the value or mar the appearance of the physical environment.