Syllabus CS476 COMPUTER GRAPHICS Fall 2009

Text: Computer Graphics: Principles & Practice,
by Foley, van Dam, Feiner, & Hughes(2nd Ed. in C)

Changes will be made as necessary.

Instructor: Hue McCoy
Office Hours: 2:45-3:45 TuTh or by Appointment.
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The purpose of the course:

1) To learn the fundamentals of color, raster, 3-D graphics.
2) To use Java graphics to generate sophisticated color graphics scenes.

Equipment:

Linux Work Stations in SH118
Personal Computers.
Anything else we can get for a small fee.

Programming Language(s):

Java

Homework:

~7 assignments. (500 points.)
The penalty for late homework is 20 % per week.
Work turned in more than two weeks late will not be accepted.

Exams:

You will have two midterm exams and a final comprehensive exam.
150, 150, and 200 points each.

Grading:

~60% exams
~40% homework

Grading Scale:

90-100% A
80- 89% B
70- 79% C
60- 69% D
< 60% F

Class Attendance:

Expected, but not mandatory.
Missing an exam is serious. Let the instructor know in advance if you must miss an exam. Emergencies are considered on a case by case basis.

Semester Calendar

Instruction Begins	Thursday August 20
Late Registration Monday August 24	
Deadline for Registration/Course Addition	Tuesday September 1
Labor Day Holiday	Monday September 7
Last Day to Drop with "W" (Except course carrying designated dates)	**Wednesday October 14**
Last Day to Withdraw from the University	**Friday November 13**
Thanksgiving Holiday for Students	Monday-Friday November 23-27
EXAM WEEK Monday-Friday	December 7-11
12 *Final Grades Due Tuesday*	*December 15*

Feel free to call Michael Armendariz, Coordinator of Services for Students with Disabilities, at 575-646-6840 with any questions you may have on student issues related to the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act of 1973. All medical information will be treated confidentially.

The current Student Code of Conduct definition of plagiarism can be found at:

http://www.nmsu.edu/~vpsa/SCOC/misconduct.html.

Copying others code directly will be dealt with very severely and could lead to an "F" in the course!

Lecture Schedule, Fall 2006

Th 20 AUG **Introduction & Syllabus**

Tu 25 AUG **Scan Conversion/Parametric Lines** **Chapter 3**
- **Bresenham's Line Drawing Algorithm**
- **DDA's**
- **Parametric equations of lines**

Th 27 AUG **Circles** **Chapter 3**
- **Hue's circle**
- **Milke's circle**

Tu 1 SEP **Java Programming**
- **Java structure**
- **javac compile command**
- **appletviewer with *.html files**

Th 3 SEP **Vector/Matrix Math** **Appendix A**
- **adding vectors**
- **dot products**
- **cross products**
- **normalization**
- **addition & multiplication of matrices**

Tu 8 SEP **Filling Triangles & Rectangles** **Chapter 3**
- **a floating point algorithm**
- **filling polygons**
- **slivers**
- **edge coherence**
- **left edge scan**
- **active edge tables**

Th 10 SEP **Line Clipping, Anti aliasing** **Chapter 3**
- **Cohen and Sutherland**
- **Parametric line clipping**
- **Suther-Hodgman Polygon Clipping**
- **Weighted area sampling**
- **Weighted volume sampling**
- **Gupta-Sproull antialiasing**

Tu 15 SEP **A Simplified Approach to Projections**
- **parallel projections**
- **parametric equations of a plane**
- **moving the screen into the real world coordinate system**

Th 17 SEP **Recursive Lines & Line of Sight**
- **recursive line generation**
- **tinning of terrain**
- **line of sight concepts**

Tu 22 SEP **Sphere Shading & Terrain Shading**

- **Lambert's law**
- **Normals for surfaces**
- **Normals for terrain**
- **Dot products (cosine lighting)**

Th 24 SEP **Exam 1**

Tu 29 SEP **Coord.Systems/Geom.Transformations** **Chapter 5**

- **2D translations, rotations, and scaling**
- **2D homogeneous coordinates**
- **composite transformations**
- **the spinning missile problem**
- **the notion of orthogonality**

Th 1 OCT **Geometric Transformations** **Chapter 5**

- **matrix representation of 3D transforms**
- **right hand rule**
- **the notion of homogenous coordinates for 3D**
- **composition of 3D transforms**
- **a sample problem (ad nauseum)**

Tu 6 OCT **3D viewing** **Chapter 6**

- **conceptual model of the 3D viewing perspective projections**
- **parallel projections**
- **pyramid view volumes**
- **view volume for parallel projections**
- **mathematics for planar geometric projections**
- **mper & mort**

Th 8 OCT **Solid Models / Colors / Contours** **Chapters 11/12**

- **polygon meshes**
- **plane equations & triangles (1 more time!)**
- **wire frame models**
- **models from Viewpoint catalogs**
- **polyhedra and Euler's formula**
- **quadtrees and octrees**
- **Bezier curves**
- **quadric surfaces**

Tu 13 OCT **Color and intensities** **Chapter 13**

- **the gamma correction**
- **the dynamic range of intensities in various media**
- **dithering**
- **the color cube**
- **the rgb model**
- **the cmy model**
- **using color in graphics the good, bad, and ugly**

Th 15 OCT **Lighting Models** **Chapter 16**

- **the general lighting model (ambient, diffuse, and speclular)**
- **the physics and the fudge factor**
- **multiple light sources**
- **flat shading or Lambertian shading**

	- **Gouraud shading**	
Tu 20 OCT	**Textures & Texture Mapping** - **procedural textures** - **bump mapping** - **image mapping**	**Chapter 16**
Th 22 OCT	**Image Processing / Compression** - **image sources** - **image rectification** - **simple compression methods** - **wavelets**	**Chapter 17**
Tu 27 OCT	**Hidden Surfaces/Convexity**	**Chapter 15**
Th 29 OCT	**Exam 2**	
Tu 3 NOV	**Hidden Surfaces/Convexity**	**Chapter 15**
Th 5 NOV	**Shadows,Transparencies,Reflectance**	**Chapter 12**
Tu 10 NOV	**Fractals**	**Chapter 20**
Th 12 NOV	**Planning/ Discussion for Final Projects.**	
Tu 17 NOV	**Ray Tracing/Radiosity**	**Chapter 15**
Th 19 NOV	**Photo Modeling/Animation**	**Chapter 15**
Tu 1 DEC	**Virtual Reality (Trade-Offs)/LOD**	
Th 3 DEC	**Final Exam Review**	
Tu 8 DEC	**Final Exam (5-7 PM)**	