CR325 - Computer Graphics

Description

 This course is designed to support the visualization and computer systems domain. It is a unified introductory treatment to two-dimensional and three-dimensional computer graphics concepts. Topics include Human-computer interfaces using the AWT, applied geometry; homogeneous coordinate transforms; Bezier curves, Bernstein Basis Polynomials, Hermite Polynomials, B-Spline curve fitting. Rendering topics: z-buffer algorithm, painters algorithm, raytracing, and texture mapping.

Prerequisite: CS232, MA211
Textbook:.............."Java 3D Programming" by Daniel Selman, Manning Press, ...ISBN 1-930110-35-9.
Reference Material .... The Java 3D API Specification
Reference Material ....Java for Programmers, by D. Lyon
Course List ....Send me an e-mail to be added to the course list.
Computer Usage: .... Students **MUST** have access to a computer with Java .
Course Notes: ....**Handouts**/diskettes/e-mail, web page
Contact Information

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Office Hours
Monday, Tuesday... 1:00 pm - 2:00 pm
Wednesday .... 5:00 pm - 6:30 pm

Course Offerings
CR311, Image Processing...................................... Mc 203 Mon 2:00-4:30
CR 325, Computer Graphics.................................... Mc 203 Tues 2:00-4:30
SW 409, Java Programming II................................. Mc 203 Wed 6:30-9:20
CR311 -> ECE 430
CR324 -> ECE 440.
ECE510, Thesis I.. By Appointment
ECE420, Readings .... By Appointment

Course Objectives and Learning Outcomes:

   This course designed to support the visualization and computer systems domain in the CE BS degree.
1. The students will learn the principles of Computer Graphics.
Expected learning outcomes:
      a. Applies transform concepts in programming situations

      b. Recognizes interrelationships among geometric modeling and computer graphics

2. The student will become proficient with the usage of the Java language.
Expected learning outcomes:
      a. Demonstrates the ability to utilize Java in practical visualization problems.
      b. Uses appropriate object-oriented design patters to solve problems.
    After the student take this course, they will know how to write programs that display and manipulate 3D objects. They will also have a basic understanding of geometric modeling and computational geometry. Finally, the students will make use of data structures, linear algebra, design patterns and basic software engineering.

    This course requires substantial programming effort and emphasis is place on good software engineering practices.

Outcomes:
    When the course is done, Students will have written Java applications of their own design.

Assessment:
    Aside from the basics assessment procedures based on homeworks and tests, the project will be one of substance. Deployed over the web, projects are submitted to applet development sites, with source code. Such sites provide rating services that enable outside assessment of the students work. This also increases the visibility of the student and school.

Topics (tentative):
    1. Historical perspective and some fundamental issues in hardware, software and applications.
    2. The use and implementation of Java 2D, a simple 2D graphics package.
    3. Graphics hardware.
    4. Transforms in the plane and 3-space, representation by matrices, homogeneous coordinates, 3D views.
    5. Java 3D, a 3D floating-point hierarchical graphics package.
    6. Human color-vision system, various color-description systems.
    7. Shaded graphics, aliasing
    8. Visible-surface determination.
    9. Illumination and shading, texture, shadows, transparency, reflections,
    10. Image manipulations, scaling, shearing, rotation pixmaps. Image storage techniques.
    11. Computer Animation.
    12. physically based illumination models, .
    13. ray tracing
    14. radiosity

Attendance Policy: Students are responsible to acquire notes and homework assignment from classmates in case of absence. A midterm or final may not be missed without special arrangements made with the instructor. A

missed midterm or final will result in a zero grade. A missed class is not an excuse for missed work.

Assignments will be due at the beginning of class. Assignments handed in after the beginning of class will loose 5 points. Assignments handed in after the end of class will lose 10 points. Late homeworks lose 10 points per day late, weeks ends and holidays included. Missed tests result in a zero unless a written excuse is presented. Homeworks handed in more than 10 days late will not be graded.

Homework requirements:
Print out a listing of the program.
Print out the program input and output. You may need to do this at various levels of detail.
Hand in a labeled disk with a printout.
Place the disk in an envelope and put your name on the envelope.
In the event that you *must* miss class, you may hand the homework in via a friend or another student. Should you find that you cannot find anyone in time, you must fax the homework in. Attachments will not be accepted.

Grading:	Weight
Midterm	1/3
Comprehensive Final Examination	1/3
Homework(includes tests, quizzes, projects, etc.)	1/3