CSI 422/502 – Computer Graphics – Syllabus and Project 1 – Fall 2005
`http://www.cs.albany.edu/~sdc/CSI422` (Official location for announcements)

Course Policies

Instructor: S. Chaiken
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Office Hours: M, W, F: 11:30AM-12:00; 1:00PM-2:00PM

other times drop-in if I'm not busy

Prerequisites: (1) MAT113 (Calc II). (2) Either CSI333 (CS3–assembly language) or equivalent programming and data structures background. (3) beginning programming/testing/debugging in C/C++ under Unix. (4) MAT220 (Linear Algebra) is helpful but not required.

Teaching Assistant: To be announced.

Required Texts:

1. Donald Hearn and M. Pauline Baker, "Computer Graphics with OpenGL", 3rd edition, Pearson/Prentice Hall. (**Extensive Readings and Assignments**)
2. Mason Woo, Jackie Neider and Tom Baker, "OpenGL Programming Guide", any edition (1.1 or higher), Addison-Wesley/Longman. (This is fondly called the **RedBook**. Some readings and use for reference, especially for projects. Version 1.1 available free on-line–links on `http://www.cs.albany.edu/~sdc/CSI422/Links.html`. You can get away without buying but it is nice to have on paper. The **BlueBook** is also available on the web; it is the OpenGL API Specification document. It may be helpful for students and is indispensible for professionals!
3. "Linear Algebra", Schaum's outline text. Required for some homework and reference..get it unless you did really well in a linear algebra course.
4. A C or C++ textbook or reference as needed.
5. Other handouts, online materials and Web references that will be provided through the lectures and labs throughout the semester.
6. Project assignments are written as software specifications, with pedagogical explanations and expositions. Every word on project assignments is required reading. The professor may refuse to give personal explanations of details that appear in written form which the student hasn't read.

1 Learning Objectives

1. Some selected basic computer graphics technologies to be learned in depth. Mastery comes from learning the three aspects below together:
   - Underlying principles including those from mathematics and computer system architecture.

- How to use it, to the extent of you writing C/C++ programs that invoke the technology by calling OpenGL functions.
- How it works, how it is implemented, implementing it yourself to some extent.

2. For topics included for breadth:
   - Survey of technologies and applications.
   - Very limited introduction to some graphics application software, including the free/open source **Blender** which is implemented in OpenGL.
   - Introductions to some advanced topics.
3. To continue to develop programming fluency, and problem solving ability in programming and applied geometry linear algebra and calculus.

Here are the Hearn and Baker (HB) chapters containing the topics I expect to cover. Consult that text for the topics. This is subject to changes in detail:

- Extensive coverage: Chapters 2-7.
- Detailed coverage of selected parts: Chapters 8, 10 and ll.
- Introductory coverage of selected parts: Chapter 9, 10, 12 and 13.

I expect everyone to also read Chapter 1 and be aware of computer graphics results in life today, such as in movies, TV, video games and other computer software, and other media.

The graduate students will be given additional readings, additional or substitute assignments, and substitute questions on the exams to proved more depth, especially theoretical. They will be graded separately from the undergrads.

B. Evaluation:

Midterm1	–	Sept. 28, 2005 (Wed)	:	In class	–	12%
Midterm2	–	Oct. 24, 2005 (Mon)	:	In class	–	12%
Final	–	Dec. 16, 2005 (Fri)	:	10:30 AM to 12:30 PM	–	20%
5-6 Prog. Proj.	–				–	25%
5-6 Written homeworks	–				–	15%
Blender SW, etc.	–				–	8%
4-8 Surprise quizzes.	–				–	8%

Final letter grades will be based on cutoffs applied to your average score computed as above and modified according to the following policy:

At least 50% on 3 of the programming projects is required for a passing grade (D or better).

If your score on an exam is higher than your score on the immediately previous exam, the higher score will replace the lower score in the calculation of the average with the above weights.

Details regarding the exams will be announced later.

C. Programming Projects: There will be five to six programming project assignments. These assignments will be graded using Albany's ITS/Academic Computing SUN/Sparc/Solaris Unix

cluster systems, so you are expected to fully test them there before submitting them for grading. **Submissions that do not compile and link get ZERO points, automatically! Incremental software development** should be practiced, after you read and ask needed questions about the assignment. (You can log on to these machines over the Internet from computers all over the world, including your dorm, LC-3 and LC-4. A few SUN Ultra workstations are available to you in LC-3/4 for "Power User Experience" but their number is limited. Although the programming work can be done on your own computers, especially if you install a unix variant such as Linux or FreeBSD, problems (hardware, software, network access) with your system will not be accepted as excuses for late or missing programming projects.

Programming guidelines and submission information will appear in a separate handout.

Very Important: If you do not turn in syntax error free and generally working programs for at least three of the programming projects assignments will result an *E grade for the course*, regardless of exam and other grades.

D. Policy on Cheating:

1. Cheating in an exam will result in an E grade for the course. Further, the students involved will be referred to the University Judicial System.

2. The code and any written reports or answers for programming assignments; and answers for homeworks must be written by yourself. You are welcome to discuss the class material, the problems and ideas for solutions; but each person is expected to write the code and answers he or she submits independently, without copying.

   Cheating in a programming or homework assignment will result in a ZERO for that requirement for *all* the students involved. Students who cheat in two or more assignments will receive an E grade for the course.

   A report of the every cheating incident will also be made to the Office of Undergraduate or Graduate Studies in accordance with the University regulations concerning "Penalties and Procedures for Violations of Academic Integrity" in the Undergraduate or Graduate Bulletin.

   We may do automated code comparisons between submissions of current students together with submissions from prior course offerings to detect copying.

3. Violations of Computer and Network Usage policy on laboratory systems are regarded as academic integrity violations, like cheating.

E. Policies on Computer and Network Usage:

1. Attempts to use UAlbany computers and networks in violation of the regulations set forth in all the Web pages linked from
   `http://www.albany.edu/its/policies/`
   may result in account suspension, course failure or referral to University disciplinary action. The implications of the responsible use requirements of shared computer and network infrastructure is an element of this course's curriculum and so course failure or grade reduction can be imposed by the instructor as a sanction against the violation of University rules and procedures. Failure to comply with instructions given to you by system administration or course instructional team staff members in regard to such usage is disruptive and is grounds for sanction.

Willful illegal, malicious or disruptive use, or attempts to disguise one form of computation as another will be taken particularly seriously.

You are also warned against disclosing your password to anybody either willfully or by accident. Another person knowing your password can really get you into trouble. Similarly, if your password is compromised or you change the permissions of your files so that others can read them, they might copy your work and you might get caught when we compare submissions.

2. Ignorance of the `quota -v` command to monitor your Unix account disk quota and the steps you must take to reduce disk space usage are likely to result in you account becoming unusable when you need it most. If this happens, corrective actions might take several days. Lateness of programming projects or lab exercises will not be excused, nor can any "urgent" system administration actions be taken.

F. Make-up Exams: Make-up exams will be given only for valid and verifiable excuses (e.g. a major medical situation). In such a case, it is your responsibility to contact the instructor *ahead of time* if at all possible.

G. Policy on I grades: A grade of **I** will only be given for genuine extenuating circumstances that are beyond your control after the midterm point. Both of the following conditions must be met:

1. Your work must be in good standing as of October 24, 2005, the day of second midterm exam, defined as follows: You must have an average score of at least 50% on all the assignments due up to that point; and further, your midterm grades must also be equivalent to at least a **C**. Therefore, if you miss the midterm or have performed poorly on assignments, you are not eligible for an **I** grade.

2. Written documentation must, upon request, be supplied about the extenuating circumstance either by you or by the University administration. The Dean of Undergraduate Studies and her assistants are there to assist you and will write letters to your professors that request appropriate accomodations.

Under no circumstances will the condition for completing an **I** grade be that the entire course be retaken later without a new registration.

H. Disabilities, etc: Accomodations will be made for clients of the Office of Disabled Student Services upon adequate prior notice and according to that office's policies.

Students with genuine continuing hardship situations, or any disability related problems with Lab usage should confer with the professor before October.

I. Attendance: You are responsible for all material presented in the lectures. Some of that material will not be presented anywhere else.

Sometimes quizzes will be given in lectures. They will be counted into score as indicated above. No makeups will be given except for genuine, documented extenuating circumstances.

Make sure you have a trusted friend to lend you lecture notes if you are going to miss a lecture.

J. Other Notes:

1. During their office hours, the instructor and the teaching assistants for this class will be glad to help you with the course material and the programs.

2. In addition to the regular office hours, you can also set up an appointment to meet with your instructor and the teaching assistants.

3. We will answer "reasonable" questions by email; which means definite questions that have definite and short answers; and which are at the academic level of the course and on course topics. We may edit and post on the Web questions and answers we think would be helpful to others (but I will email you a personal reply too.) We will remove your name to preserve privacy, unless you specifically state in your message that you would like your name included if we decide to post the question. We might ignore any others. We will not write or copy long explanations that repeat material we presented or are available for you to read.

2 Project 1 – Due Fri, Sept. 9

Besides the specific sections in HB below, reading the first 55 pages of the GL RedBook and applying selected information there will be helpful.

Study HB 2-9 and type in the program therein, and get it to compile and run. The command to use on ITSUNIX is
`gcc -g -lglut -lGLU -lGL -lXft -lXi -lm` *[one or more .c file names]]*

Study HB 3-3, 3-4 and add to the program your creation using points and lines, using each primative `GL_POINTS`, `GL_LINES`, `GL_LINE_STRIP`, and `GL_LINE_LOOP`

Study HB 3-16 and add a filled `GL_POLYGON`, `GL_TRIANGLES`, `GL_TRIANGLE_STRIP`, `GL_TRIANGLE_FAN`, `GL_QUADS` and `GL_QUAD_STRIP`.

Study HB 3-21 and add some text.

Study HB 4-1, 4-3 (first 2 pages and last page), 4-7, 4-8, 4-14 and 4-16. Add a demonstration of the use of these attributes by applying them in interesting combinations to the primatives you had drawn and possibly to new ones.

Begin the assignment right now. Instructions for submitting your program file will be supplied by next class.