CSC 415 / S17
Graphics Simulation and Visualization

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...burning with curiosity, she ran across the field after it, and fortunately was just in time to see it pop down a large rabbit-hole under the hedge. In another moment down went Alice after it... Lewis Carroll, "Alice in Wonderland"

CSC 415 is a course to introduce students to the foundational principles of graphics simulation and visualization. Within this framework, the concepts of movement under the influence and constraints of of physical laws will be developed. Students will learn to incorporate texturing, lighting, and shading into graphical objects and be expected to animate these objects in a physically realistic manner. In addition, students will learn to visualize abstract data through the concepts of coordinate and isosurface mapping and rendering. While the use of data-flow environments and 3D modeling packages may be explored, students will still be expected to write a significant amount of code and, in some cases, develop new tools for visualization. Students are expected to have a working knowledge of C or C++, the *OpenGL* graphics library, and the use of *git* for code management and tracking. As such, CSC 315 is a prerequisite for this course. Students in CSC 415 are expected to read at the college level and to also have demonstrated competency in single variable Calculus.

Class Meeting Times and Locations
Lecture: TR 10:50 a.m. – 12:05 p.m., Room 204 CSC Bldg.

Course Materials
REQUIRED: *Computer Graphics with OpenGL, 4^{th} ed.*, Hearn, *et al.*,
RECOMMENDED: *The OpenGL Programming Guide*
Scientific/Graphing Calculator

Course Structure

Topics related to modeling physical systems, realistic rendering, and visualization will be covered during the semester. The lecture time will be used to expound on the topics, discuss problem solving strategies, and demonstrate certain implementations of the *OpenGL* API and how to optimize graphics codes on modern hardware. The use and functionality of various visualization and modeling tools will also be discussed. Students are responsible for all material covered in class as well as the textual material given in class. Several programming projects, including a group project, will be submitted for grading. An individual project with a culminating presentation or poster will also be submitted. Presentations will be peer reviewed by members in the class with a small portion of the overall grade coming from the peer review.

Grading

Simulation Proof-Of-Concept	100 pts
Simulation Project	300 pts
Independent Visualization/Modeling Project	200 pts
Group Project	300 pts
Presentation and/or Poster	100 pts
Total Possible	1000 pts

The following grading scale is assured but *may* be *slightly* lowered based at the professor's discretion.

A	≥900 pts
B+	≥880 pts
B	≥800 pts
C+	≥780 pts
C	≥700 pts
D	≥600 pts
F	<600 pts

General Information

Honor Code: All students in CSC 315 are expected to adhere to the Mercer University Honor Code. Any suspected violations will be reported to the Honor Council for further investigation.

Many students have difficulty in determining how to apply the Mercer honor code to computer courses. A few general guidelines should help you in deciding whether you are violating the honor code or not.

1. You are allowed to receive help on your programs from other students, provided the purpose of the help is to foster your understanding of your own program better, not to write your program for you.
2. You are NOT allowed to use copies of programs written by other students, or copies of programs from published sources, even if you plan to modify them extensively. The only exception to this rule is when the instructor provides you with code that should be incorporated into your program. In such cases the code must clearly be set off and the source or the code noted in the program.
3. You are NOT allowed to give copies of your programs, or parts of your programs, to other students in any form.
4. YOU MUST WRITE YOUR OWN CODE. DO NOT COPY PROGRAMS OR PARTS OF PROGRAMS FROM ANY SOURCE UNLESS I TELL YOU TO DO SO.

Any violation of the above policies will be treated as academic dishonesty and a violation of the Mercer Honor Code.

Attendance: Attendance will be taken at every class meeting. You are allowed two absences. Otherwise you grade will be reduced one letter grade based on the percentage of classes missed: i.e. – for each three classes missed your final grade will be reduce one letter grade.

Partial Credit: Partial credit will not be awarded on any submitted work unless individuals have clearly documented their work and clearly delineated how they arrived at their results.

Re-grading Policy: If a student suspects that an error was made in the grading of a submitted work, they may return the work for re-grading with the understanding that the entire work will be re-graded and not only the portion in question.

Posting of Grades: Grades will not be posted. If you are curious about your cumulative grade, see Dr. Pounds.

Major presentation: As part of the individual project, each student will be required to make a presentation to the class. The project will require either a significant oral presentation[1] or a poster/presentation for Bear Day.

Starfish: This course will use Mercer's web-based success platform, *Starfish*. Throughout the term, you may receive *Starfish* emails containing feedback. These communications are sent to support your success at Mercer. You can access Starfish through your MyMercer portal.

American Disability Act: "Students requiring accommodations for a disability should inform the instructor at the close of the first class meeting or as soon as possible. The instructor will refer you to the ACCESS and Accommodation Office to document your disability, determine eligibility for accommodations under the ADAAA/Section 504 and to request a Faculty Accommodation Form. Disability accommodations or status will not be indicated on academic transcripts. In order to receive accommodations in a class, students with sensory, learning, psychological, physical or medical disabilities must provide their instructor with a Faculty Accommodation Form to sign. Students must return the signed form to the ACCESS Coordinator. A new form must be requested each semester. Students with a history of a disability, perceived as having a disability or with a current disability

[1] Minimum 20 minutes including PowerPoint or equivalent and and coding examples.

who do not wish to use academic accommodations are also strongly encouraged to register with the ACCESS and Accommodation Office and request a Faculty Accommodation Form each semester. For further information, please contact Carole Burrowbridge, Director and ADA/504 Coordinator, at 301-2778 or visit the ACCESS and Accommodation Office website at `http://www.mercer.edu/disabilityservices`"

Cell Phones and Pagers: "Out of courtesy for all those participating in the learning experience, all cell phones and pagers must be turned off, or placed on vibrate, before entering any classroom, lab, or formal academic or performance event."

Electronic Submission of Materials: "Students bear sole responsibility for ensuring that papers or assignments submitted electronically to a professor are received in a timely manner and in the electronic format(s) specified by the professor. Students are therefore obliged to have their e-mail client issue a receipt verifying that the document has been received. Students are also strongly advised to retain a copy of the dated submission on a separate disk. Faculty members are encouraged, but not required, to acknowledge receipt of the assignment."

E-mail Listserve: I communicate heavily with the class (and encourage you to do the same) via an e-mail listserve which I maintain myself. Please subscribe to the listserve by going to

`http://theochem.mercer.edu/mailman/listinfo/csc415`

and filling out the required fields. Once subscribed, you may send e-mail to the class by using the e-mail address `csc415@theochem.mercer.edu` I personally moderate all requests to limit e-mail spam.