

CSC 415 / S21

Graphics Simulation and Visualization

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Office Meetings: Via arranged *ZOOM* videoconference

...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 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: MWF 11:30 a.m. – 12:20 p.m., Room 218, Godsey Science Center

Course Materials

REQUIRED: *Computer Graphics with OpenGL, 4th ed.*, Hearn, *et al.*,
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. Significant amounts of classtime will be spent utilizing the graphics computers and hardware. 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 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. Individual contributions to the group project will also have a small portions of the grade determined by other team members.

Grading

Window Manager Conversion	100 pts
Shader (Proof of Concept)	100 pts
Simulation Project (Proof of Concept)	100 pts
Simulation Project	200 pts
Independent Visualization/Modeling Project	100 pts
Independent Visualization/Modeling Presentation	100 pts
Group Project	300 pts
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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 or you get the approval of the instructor to adapt code, with attribution, for your project. In such cases the code must clearly be set off and the citation 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 your 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 presentation¹ 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 ADA/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.

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

Students with a history of a disability, perceived as having a disability or with a current disability 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 Katie Johnson, 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 listserv which I maintain myself. Please subscribe to the listserv 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.

University Health and Safety Protocols for the Spring 2021 Semester

The Pledge

All students are expected to commit to the following pledge found in the MyMercer student portal:

I pledge to protect myself by following recommended safety guidelines for self-care put forth by the University and reporting immediately to the Student Health COVID-19 Hotline (478-301-7425) if I become symptomatic or exposed to COVID-19.

I pledge to protect others by wearing a mask, exercising appropriate social distancing, respecting the rights of others, and acting responsibly so that other community members are not put at risk of exposure to COVID-19.

I pledge to protect the community by participating in testing and contact tracing, isolating until cleared by Mercer Medicine if I test positive for the coronavirus, and observing all relevant instructional signs and directions posted by the University.

Students are expected to monitor and adhere to all policies and guidelines pertaining to COVID-19 found on the [University's COVID-19 website](#).

Violations of these policies may include but are not limited to the following:

- A review of the University's student code of conduct charges
- Removal of a student from a particular University activity
- A registration hold on a student's account
- Deactivation of a student's Bear Card
- Dismissal from class
- A review of the standards of professional conduct penalties (by academic program)

Violations of any policy should be reported immediately to

- the Student Affairs professional in your academic area,
- the Office of Student Affairs (Macon 478-301-2685 or Atlanta 678-547-6823),
- the Director of Regional Academic Center Operations, Mr. Scott Mahone, at 678-547-6551 (for Center students),
- or Mercer Police (Macon 478-301-2970 or Atlanta 678-547-6358).

What You Need to Know

In order to promote safe campuses, students and employees are required to follow these COVID-19 mitigation strategies and testing protocols:

- Everyone on campus is required to wear an appropriate face covering in shared indoor settings and outdoor settings when appropriate distancing cannot be maintained outdoors. Indoor settings include classrooms, hallways, lobbies, communal offices, common spaces, public restrooms, meeting rooms, libraries, and other spaces where people tend to gather. Face coverings are also required outdoors when six-foot physical distancing cannot be maintained or during a class or event that is held outdoors or under a tent. Refer to the [University's policy on face coverings](#) for additional information.
- Students are required to space themselves in classrooms with either empty seats between classmates or as arranged if furniture has been removed from the classroom to enable social distancing.
- Students and employees are required to be screened and/or tested for COVID-19 prior to the semester. Students and employees may not attend in-person class, labs, orientations, clinical/field experiences, other on-campus activities, or work on campus without **clearance** from Student Health/Mercer Medicine.

- Students and employees may be tested at the Student Health Center either by choice or on the advice of a physician. If asymptomatic, go to go.mercer.edu/covidappt to schedule an appointment at the Macon or Atlanta Student Health Center. If symptomatic, call the 24/7 COVID Hotline at **(478) 301-7425** for a testing appointment at the Student Health Center.
- Students and employees are required to participate in surveillance testing at the Student Health Center throughout the Spring 2021 Semester. Exceptions include
 - students who are enrolled in totally online programs,
 - students and employees with University-approved accommodations who are learning/working remotely from home, and
 - students and employees who have tested positive for COVID-19 within the past 90 days.
- If a student or employee is symptomatic of COVID-19, the symptomatic person **cannot attend** in-person class, labs, orientations, clinical/field experiences, other on-campus activities, or work on campus. The symptomatic person should immediately contact Student Health by calling the 24/7 COVID Hotline at **(478) 301-7425** for a testing appointment. In the case of a symptomatic student, the faculty member is notified that the student is symptomatic and isolating while awaiting test results; the faculty is required to provide academic accommodations during this brief isolation period. The student and faculty are notified of the student's test result.
- If a student or employee tests at the Student Health Center and is **positive**, a Student Health staff member will call the COVID-positive person from a Mercer phone number with the positive results. With negative results, the person will receive an email to the Mercer email account.
- All students and employees must provide off-campus, **positive** COVID-19 results to Student Health at mytestreport@mercer.edu. In the subject line of the email, type "Macon Test" (for Macon, Savannah, and Columbus students) or type "Atlanta Test" (for Atlanta, Henry, and Douglas students). Employees should type "Employee Test" in the subject line of the email. Be sure to include your full legal name and your MUID in the body of the email.

Students do not submit COVID-19 results directly to faculty, the Dean's Office, or Student Affairs for COVID-related, excused absences. All COVID-related absences must be processed through Student Health and the Office of the Provost. Faculty are notified of COVID-related student absences.

- Faculty are required to provide academic accommodations to students who are in isolation after either testing positive at the Student Health Center or submitting off-campus, positive test results to Student Health at mytestreport@mercer.edu. Also, if a symptomatic student has been tested and is awaiting results, the student must isolate and be provided academic accommodations during this brief isolation period.
- Students and employees must be cleared from isolation by Student Health before they can return to campus.

The University COVID-19 protocols and other important COVID-19 information can be accessed on the University coronavirus webpage, <https://www.mercer.edu/coronavirus/>. Information is updated as needed.