

Computer Graphics

CS 420
Fall 2026

Instructor Tom Kelliher, Ph.D., Associate Professor of Computer Science
Pronouns: he/him/his
Office: Julia Rogers 133
Office hours: MWF 10:00 am–11:00 am, drop-in when my office door is open, or email to request an appointment.
Phone: (410) 913-7164
Email: kelliher@goucher.edu

Course Textbook and Other Resources:

1. S. Guha, *Computer Graphics through OpenGL, From Theory to Experiments*, 3rd edition. Taylor & Francis, 2019. Required.
2. See the course web site for additional resources: [CS 420 Materials, Fall 2026](#)

Meetings Julia Rogers 121, MW 2:40 pm–4:30 pm

Description An application-oriented introduction to computer graphics. Graphics devices and their programming interfaces. Fundamentals of two-dimensional graphics: rendering, object and view transformations, and interactive animation. Introduction to three-dimensional graphics: clipping, lighting, and hidden-surface removal. Large programming projects in a modern graphics API are an integral part of the course.

Prerequisite CS 205.

Learning Objectives:

At the end of this course students will be able to:

1. Explain and use the mathematical foundations of transformations.
2. Describe the function of the graphics pipeline, the camera model, and viewing.
3. Describe and use the various tools available for coloring pixels in 3D graphics.
4. Apply the model-render paradigm to the design of graphics programs.
5. Design and implement significant 2D and 3D graphics programs using the C++ programming language and the shader-based OpenGL API.

Expectations Because so much of your learning is happening during class as you work on experiments, assignments, and projects, attendance is required. If you miss more than six classes during the semester for any reason (personal issues, job,

illnesses, athletics, etc.), then your final grade will be reduced by one letter grade. This policy is meant to be a reminder of how important class attendance is in determining your success in this course. If you have things going on in your life (personal issues, job, illnesses, athletics) that are causing you to miss class, and therefore put your success at risk, then we need to discuss your situation before you miss too many classes.

You are expected to give CS 420 the attention it deserves as a college-level computer science course. In particular, you are expected to:

- Spend an average eight hours per week outside of class working on the course. This includes the entire range of activities from preparing for class, to working-on and completing outside-of-class assignments, to completing in-class assignments that you are unable to complete in class, to attending office hours.
- Attend class each time it meets, with all assigned preparation activities completed. During each class meeting, you are expected to pay attention respectfully, take notes, work productively, and not interrupt the learning of your classmates.
- Take initiative to seek out help in a combination of forms and channels when needed, and to be honest about when help is needed.

Registering for a four-credit class is a 12-hour-per-week commitment, four hours of which take place during our class meetings. Outside-of-class time should be spent in productive, engaged work in individual and group study and in attending office hours. Unless stated otherwise, your work is to be completed individually; see the Academic Integrity section for details.

Grading:

Grade Distribution

At the conclusion of the semester, your grades will be weighted as detailed below, rounded up, and converted to a letter grade as follows: A = [92–100], A- = [90–92), B+ = [88–90), B = [82–88), B- = [80–82), etc.

Graded Work

As necessary, grades will be scaled to a [0–100] scale. Work is to be completed individually.

1. Experiments — For the most part, class time will be spent learning about computer graphics concepts and topics through in-class programming and “written” experiments. Answers to individual experiments will be graded on a 0–3 scale, as follows:
 - (a) 0: An answer was not submitted.
 - (b) 1: The submitted answer does not adequately address the experiment.
 - (c) 2: The submitted answer is mostly correct, but not entirely correct.
 - (d) 3: The submitted answer is entirely correct.

This category will be 25% of your final grade.

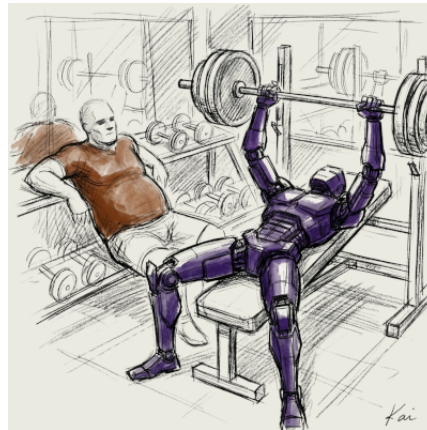
2. Assignments and Projects— There will be two written/programming assignments and three projects. The last project will be presented during the Final Experience. This category will be 75% of your final grade.

If the unforeseen happens, such as an illness or a family emergency, you are responsible for contacting me as soon as possible to discuss if a due date extension is warranted. Late assignment submissions will be penalized 5% per day. Weekends (Saturday and Sunday) count as one day. Fall break and Thanksgiving break do not count. Submissions more than three days late will not be accepted.

Academic Integrity

You can always ask questions and get assistance from me and your fellow students, both inside and outside of class. What you can't do is simply copy an answer, code, etc. from someone else or from an online source, including generative AI, such as ChatGPT, etc. A good rule of thumb is that you can talk about the problems but you should not share or copy written work. You definitely can't copy work from an online source or from someone else's work.

Turning in work that was produced by someone else, or something else, is plagiarism and is considered an [Academic Honor Code](#) violation. I have also written a statement that applies the Honor Code to this course, [Integrity in My Computer Science Courses](#). I expect you to be familiar with both of these documents. The main reason for why it is important that you don't violate the Academic Honor Code is that you would be harming your own learning, since you would not be putting in the effort to develop your computational thinking skills. For generative AI, a good analogy is work vs. the gym, as discussed in the essay [Keep the Robots Out of the Gym](#). The image at the beginning of this essay is a good way of picturing the message:



At this stage in your computational thinking development, you're in the gym. You should be developing your intellectual "muscle" by not using generative AI.

Achieving Academic Success

If you are struggling in this or other courses, I strongly encourage you to reach out for help sooner rather than later. Proactive strategies could include contacting me directly, attending office hours, and/or taking advantage of the multitude of academic services that the Academic Center for Excellence offers. The responsibility is upon you to recognize when you need help and to take the steps

necessary to succeed. Goucher College has a variety of resources available to help you succeed in your classes; use them!

Office hours are perhaps the most effective and immediate way to get help. My goal in office hours is to answer your questions in such a way that you will not only get your question answered, but also strengthen your ability to answer your own questions.

If you don't need an immediate answer to a question, you may submit it by email. I check email several times during the day, and usually during the evening. Please note, however, that I am not available on a 24x7 basis, and don't check email very frequently the weekends.