

Course Syllabus

Course Information

Course Prefix and Number: CS 3451

Course Name: Computer Graphics

Instructor: Ha, Sehoon

Course Description

This course introduces the fundamental principles and algorithms of computer graphics. Students learn how 3D scenes are represented, transformed, and turned into images. Course topics include 2D and 3D transformations, viewing and projection, line and triangle rasterization, hidden surface removal, color and shading, ray tracing, spatial data structures, texture mapping, GPU programming with shaders, curves, and polygonal meshes. This course requires basic knowledge of linear algebra and object-oriented programming. It focuses on the math and algorithms behind rendering and modeling instead of the practical use of graphics tools, such as Maya, Blender, and/or Unity.

Course Learning Outcomes

By enrolling in this course, students will:

1. Apply transformation matrices and projections to model and view 3D scenes.
2. Implement core rendering algorithms, including rasterization and ray tracing.
3. Explain how lighting, shading, and textures determine the appearance of surfaces.
4. Write GPU shader programs and build polygonal mesh models.

Required Course Materials

No textbook purchase is required. Lecture notes are the primary resource. The recommended textbook is Fundamentals of Computer Graphics by Peter Shirley and Steve Marschner (2nd, 3rd, or 4th edition).

Grading Policy

This course is graded based on the following distribution:

- Programming Projects: 60%
- Quizzes: 10%
- Attendance: 10%

- Midterm Exam: 10%
- Final Exam: 10%

The grade distribution above is subject to minor changes. Any changes will be announced to students on Canvas.

Attendance Policy

This is an **in-person course**, and students are expected to attend all scheduled class sessions. Attendance will be monitored through **periodic checks** conducted throughout the semester. While digital platforms like Discord, Ed Discussion, and Canvas will be used for supplemental communication, they do not substitute for physical presence in the classroom.

Academic and Research Honesty/Integrity Statement

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review the Student Code of Conduct and the Academic Honor Code. Students are expected to perform research and programming assignments in an ethical and responsible manner. All students are required to abide by the principles of academic integrity while performing work for this course.

Core IMPACTS

Not applicable.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Expectations of Advisors and Advisees

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The university articulates some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.