

CS 405 Computer Graphics

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Teaching Assistant: TBA

Course Content

This course is an introduction to computer graphics, modeling, animation, and rendering. Topics covered include basic image processing, geometric transformations, geometric modeling of curves and surfaces, animation, 3-D viewing, visibility algorithms, radiosity, ray tracing, shading, and volume rendering. Students gain experience by developing their own graphics programs producing simple animations.

Objectives

The objective of this course is to understand the workings of computer-generated images, animations, and visualizations. The students will master the basics of computer graphics in theory and practice.

Reading List

Ray Tracing in one weekend [Online Book](#)
by Peter Shirley

Fundamentals of Computer Graphics 4th Edition
by Peter Shirley and Steve Marschner
Free access to this book over [Sabanci University](#)

Real-Time Rendering 4th Edition
by Thomas Moller, Eric Haines, Naty Hoffman
Free online access to this book over [Sabanci University](#)

Course Outline

This is the first course on computer graphics, introducing the basics of 2D and 3D graphics. There will special emphasis on 3D interactive software development.

Course Policies

Plagiarism: There is no teamwork encouraged in this course. You are expected to research and develop course homework and projects alone. You can use some allowed resources but before using them you must contact the course instructor or assistants to make sure that you are not crossing the line. This is very important.

Plagiarism and academic integrity are very important issues. You only have your reputation in the academic world. And it takes only one mistake, and it is forever lost. The rule is simple: be honest and open to your Professor/Adviser. Explain them all the sources you used and how you used. If you are doing something you will get embarrassed explaining to them, you are doing something wrong. Any plagiarism will lead to grade F without any exceptions.

Special note on LLMs: In response to recent developments, we have adapted new exam and project evaluation policies. There will be cases where we will ask you to use LLMs, otherwise use of LLMs will lead to disciplinary action.

Project: There will be three projects and several homework assignments:

Grading

Projects & Assignments	50%
Midterm	15%
Final	35%

Participation is expected and highly rewarded...

Week-1 23 September

Course Introduction / Image Formats / DOM / Java Script

Week-2 30 September

Course Linear Algebra / 2D Graphics / SVG

Week-3 7 October

Course Transformations

Week-4 14 October

Course Graphics Pipeline / WebGL / Camera

Week-5 21 October

Course Curves / Splines / Bezier

Week-6 Only 31 October

Course Surfaces / Triangular Meshes

Week-7 4 November (Midterm)

Course Textures

Week-8 11 November

Course Texturing / Shaders

Week-9 18 November

Course Shaders

Week-10 25 November

Course Rendering / Ray Tracing / Shadows

Week-11 2 December

Course Sampling / Aliasing /

Week-12 9 December

Course Animations

Week-13 16 December

Course Animations

Week-14 23 December

Course Advanced Topics