

COMP 2501: Computer Game Design and Development

Contact

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Prerequisites

This course's official prerequisites are MATH 1104, COMP 1406, and COMP 1501. Strong programming ability and good mathematical knowledge are essential. We will be using OpenGL and writing code in C++; past experience in C++ will be an asset. Of course, you should also have a great deal of experience with and enthusiasm for computer games.

Textbooks and Resources

We will lightly rely on Madhav's "Game Programming Algorithms and Techniques". Additional material will be presented in tutorials and lectures. Course slides will appear on cuLearn soon after the classes covering the topic have finished.

The official textbook is Morgan McGuire's *Graphics Codex*, an ebook filled with examples and solutions to all kinds of issues that come up in game development and computer graphics. Visit graphicscodex.com to buy it.

Topics

The course's main topics include the following:

- Mathematical foundations: coordinate systems, vectors, transformations
- OpenGL: Getting started with OpenGL
- Introduction to the rendering pipeline: geometry, the Z-buffer, shaders, texture
- Game representation: MVC design pattern, state vector, object creation, updating and drawing entities
- Movement: Euler integration, basic physics, collision detection
- Game AI basics: finite state machines, path planning

Other topics, such as special effects from textures and particle systems, will be covered as time permits.

Grading Scheme

Assignments and labs: 30%

Midterm: 15%

Course project: 20%

Final exam: 35%

Course Project

One of the main components of the course is a game development project, to be undertaken in a group of 2 or 3 and to be presented in class. Your final submission will include your implementation, adequately documented, and a written report, not to exceed 10 pages. Particulars of the project will be discussed in class during the term.

Assignments

We will have several assignments throughout the term – approximately weekly, with some gaps. I expect every student to complete every assignment and to engage fully with the labs. The topics build on each other, so keeping up is essential. An incomplete understanding of an earlier topic can come back to haunt you later in the term.

Assignment submissions are handled electronically, and assignment deadlines are firm. Do not wait until the last minute; rather, plan to submit at least 30 minutes in advance of the deadline. Of course, you should begin working on the assignment several days in advance of the due date.

For each assignment you will be submitting one or more files that contain source code. These files must be compressed into a “zip” file – never “rar” or other format.

Use good programming practices: thorough comments; good use of whitespace; breakdown into suitable functions; descriptive variable names. Plan your approach before writing any code (e.g., write some pseudocode). You may be asked to show your pseudocode to the instructor or TA before receiving help.

Important Dates

Jan 8: our first class.

Feb 17-21: winter break, no classes.

Feb 26: midterm exam.

Apr 1: suggested deadline for final project code freeze.

Apr 3: our last class.

Apr 7: final project deadline.

Apr 13-25: exam period for Winter 2020. Our final exam will be somewhere in here with the precise date announced during the term.

Academic Integrity

As defined by Senate, “plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one’s own”. Suspected cases of plagiarism will be reviewed by the Office of the Dean of Science.

Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or the university. Further information on this policy may be found in the Undergraduate Calendar.