

Modern Computer Games

COMP 521

McGill University, Fall 2020

Course Details

Time: Monday, Wednesday, 11:35–12:55

Place: Your own home!

Instructor: Professor Clark Verbrugge

Office: Zoom meeting <https://mcgill.zoom.us/j/91418326588>

Office hours: Mondays 14:00–15:30, Wednesdays 10:00–11:30, or by appointment.

Email: clump@cs.mcgill.ca

Teaching Assistants: TBA

Email, Website

McGill’s MyCourses will be used for course announcements, to manage assignments and for online discussions. Students are expected to monitor their McGill email account for course-related news and information. The external course website is: <http://www.sable.mcgill.ca/~clump/comp521>

Pre-requisites

- COMP 251 (Algorithms and Data Structures)
- MATH 223 (Linear Algebra)
- COMP 303 (Programming Techniques) *or* COMP 361 (Systems Development Project)
- Ability to program.

I do assume students have all pre-requisites. Please consult the instructor if you are unsure of your background.

Textbook

There is *no* required text for this course. Notes you take during lectures will be your primary resource. The following supplemental texts are useful references for some of the core concepts.

- Ian Millington. “Artificial Intelligence for Computer Games.” 2nd or 3rd edition.
- Christer Ericson. “Real-time collision detection.”

Additional texts that may also be useful:

- Georgios N. Yannakakis, Julian Togelius. “Artificial Intelligence and Games.” (online, free)
- Ian Millington. “Game Physics Engine Development: How to Build a Robust Commercial-Grade Physics Engine for your Game.” 2nd edition.

Description

This course will introduce students to the core concepts and algorithms in modern computer game design. It covers a wide spectrum of game aspects, focusing on components essential to or common in popular computer game styles. Concepts are backed up by non-trivial programming tasks that allow students to gain practical experience in particular components of game implementation.

Note that computer graphics will not be covered in detail, and 3D graphics will not be covered at all. A limited knowledge of basic graphics methods and techniques will be presumed.

Evaluation

4 Assignments:	60%
2 Quizzes:	10%
Exam:	30%

Note that passing the exam (50% or better) is a necessary (but not sufficient) condition for receiving an overall course grade of C or better.

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Assignment and Exam Policy: Assignments must be submitted on time. Late assignments will only be accepted in highly-exceptional circumstances and only with **written** permission of the instructor. No assignment submissions will be accepted after marked assignments have been returned, or after solutions have been discussed in class.

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the Code of Student Conduct and Disciplinary Procedures (see <http://www.mcgill.ca/integrity/> for more information).

More specifically, **work submitted for this course must represent your own efforts.** Copying assignments or tests, or allowing others to copy your work, will not be tolerated.

Course Content

This page shows an approximate lecture plan. Note that lecture topics may (almost certainly will) shift dates.

Sept 2, 9

- Introduction to games.
- Game genres.
- Fun.
- Player demographics and social requirements.

Sept (9), 14

- Storytelling and narratives.
- Narrative modelling and analysis.

Sept 16, 21

- Abstract terrains.
- Realistic terrains.

Sept 23, 28, 30

- Game physics.
- Collision detection.
- Collision resolution.

Oct 5, 7, 14

- Basic Pathfinding.

Oct (14), 19, 21

- Geometry issues.
- Advanced pathfinding

Oct 26, 28, Nov 2

- More geometry.
- Visibility.
- Game AI and planning (guest lecture, October 24).

Nov 4, 9

- Reactive AI.
- NPCs.

Nov 11, 16

- Planning systems in depth.

Nov 18, 23

- Procedural content generation.
- Game balance, player modelling and adaptation.

Nov 25, 30, Dec 2

- Multiplayer games.
- Consistency, dead-reckoning, timing.
- Massively multiplayer games: persistence, scalability.
- Cheating.

Dec 3

- TBD, catch-up.