

## COURSE SYLLABUS

### CMPT 306: GAME MECHANICS

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#### Catalogue Description:

This course will cover aspects of game graphics, physics, sound, input, AI and networking at an introductory level. This course is intended to provide a broad basis in computer game related fields, serving as a primer and providing context for specialized courses in fourth year.

**Prerequisite(s):** CMPT 270 required, Math 264 or 266 recommended or Permission of the Instructor

**Class Time & Location:** Lecture Tuesday, Thursday 11:30-12:50 THORV 124  
 Tutorial, Monday 5:00-6:20pm Spinks 320  
 Or Tutorial, Thursday 1:00-2:20pm Spinks 320

**Website:** moodle.cs.usask.ca

#### Instructor Information

**Instructor:** Jason Bowey  
**Contact:** Email: jason.bowey@usask.ca

**Office Hours:** Location: Thorvaldson 373  
 Hours: By Appointment

#### Course Objectives

- Students will learn the fundamental concepts underlying computer game development including aspects of graphics, physics, artificial intelligence and networking, to the point where they can apply this knowledge meaningfully in an industrial setting.
- Students will learn how to use the Unity development environment and engine to build robust games.
- Students will learn how to effectively work in teams towards a significant shared project goal.

#### Student Evaluation

##### Grading Scheme

Assignments	12%
Projects	40%
Midterm Exam	15%
Final Exam	33%
<b>Total</b>	<b>100%</b>

The first three assignments will be constructing simple game mechanics for a basic platformer and top-down shooter. The fourth assignment will be due at the end of term and will involve implementing a Procedural Content

Generation algorithm of the student's choice.

Tentative due date for assignments will be: October 6, October 20, November 3, and December 1

Projects will be in groups of 3-5 and will involve designing and creating a complete and polished game. See Project Requirements document on Moodle for complete details and milestones. Major milestones will consist of a project pitch to the class, several progress meetings with Instructor and TA along with a brief code review conducted by TA/Marker after each meeting, user-based playtesting, and a final game demonstration open to the department in third floor Spinks. Each project will be required to incorporate a technically complex component in line with what would be expected in a third year undergraduate course.

Tentative due dates for project milestones are: September 13 (Group formation), September 17 (Project Pitch Slides), October 8 (Project Planning), November 5 (Technical Proof of Concept), November 26 (Alpha Demo), and December 7 (Final Demo and playtesting report).

For all group meetings, appointment slots will be scheduled during the Lab/Tutorials, unless otherwise communicated with the instructor in advance, but the marks assigned for the milestone will be based on the state of the project submitted on the Sunday night prior to the meetings, to ensure fairness for all groups. Appointment slots will be available for groups to sign up one week before the appointments. Only one group member will need to sign up, and time slots will be scheduled on a first-come first-serve basis.

#### **Criteria that must be met to Pass**

Students are expected to submit a project and write the final exam

#### **Attendance Expectation**

Students are expected to attend demonstration sessions associated with project deliverables, as scheduled with the professor

#### **Final Exam Scheduling:**

The Registrar schedules all final examinations, including deferred and supplemental examinations. Students are advised not to make travel arrangements for the exam period until the official exam schedule has been posted.

**Note: All students must be properly registered in order to attend lectures and receive credit for this course.**

### **Textbook Information**

#### **Required Text**

- None

#### **Recommended Texts**

- James M. Van Verth, Lars M. Bishop Essential mathematics for games and interactive applications, CRC Press, 2008.
- Ian Millington and John Funge, Artificial Intelligence for Games, Morgan Kaufman, 2009

### **Lecture Schedule**

- Week 0: Course Intro
- Week 1: Game Design

- Week 2: Project Pitches
- Week 4: Game Architecture and Movement
- Week 3: Game Math
- Week 4: Game Physics
- Week 5: Midterm
- Week 6: Game AI
- Week 7: Game AI
- Week 8: Pathplanning and Playtesting
- Week 9: BREAK
- Week 10: Game Networking and Multiplayer
- Week 11: Advanced Topics
- Week 12: Advanced Topics
- Week 13: Demos

## Course Overview

- This course will use the Unity Development Engine and IDE, and industry standard development environment for indie and cross-platform games. Lectures will address core concepts, while the IDE and associated language constructs will be covered in tutorials.
- Because Computer Graphics is not a pre-requisite, this course will only address aspects of the 2D.
- Lectures will not be recorded. Students with DSS requirements may record the class.

## Policies

### Recording of Lectures

Lectures will not be recorded. Students with DSS requirements may record the class.

### Late/Missed Assignments

In general, late assignments are not accepted, except with legitimate excuses (e.g. illness, bereavement)

### Missed Examinations

1. "Students who have missed an exam or assignment must contact their instructor as soon as possible. Arrangements to make up the exam may be arranged with the instructor. Missed exams throughout the year are left up to the discretion of the instructor if a student may make up the exam or write at a different time. If a student knows prior to the exam that she/he will not be able to attend, they should let the instructor know before the exam."
2. "Final exams - a student who is absent from a final examination through no fault of his or her own, for medical or other valid reasons, may apply to the College of Arts and Science Dean's office. The application must be made within three days of the missed examination along with supporting documentary evidence. Deferred exams are written during the February mid-term break for Term 1 courses and in early June for Term 2 and full year courses." (2007/08. <http://www.arts.usask.ca/students/transition/tips.php>)

### Incomplete Course Work and Final Grades

*"When a student has not completed the required course work, which includes any assignment or examination including the final examination, by the time of submission of the final grades, they may be granted an extension to permit completion of an assignment, or granted a deferred examination in the case of absence from a final examination.*

Extensions past the final examination date for the completion of assignments must be approved by the Department Head, or Dean in non-departmentalized Colleges, and may exceed thirty days only in unusual

circumstances. The student must apply to the instructor for such an extension and furnish satisfactory reasons for the deficiency. Deferred final examinations are granted as per College policy.

In the interim, the instructor will submit a computed percentile grade for the class which factors in the incomplete coursework as a zero, along with a grade comment of INF (Incomplete Failure) if a failing grade.

**In the case where the student has a passing percentile grade but the instructor has indicated in the course outline that failure to complete the required coursework will result in failure in the course, a final grade of 49% will be submitted along with a grade comment of INF (Incomplete Failure).**

If an extension is granted and the required assignment is submitted within the allotted time, or if a deferred examination is granted and written in the case of absence from the final examination, the instructor will submit a revised assigned final percentage grade. The grade change will replace the previous grade and any grade comment of INF (Incomplete Failure) will be removed.

A student can pass a course on the basis of work completed in the course provided that any incomplete course work has not been deemed mandatory by the instructor in the course outline and/or by College regulations for achieving a passing grade." (<http://policies.usask.ca/policies/academic-affairs/academic-courses.php>)

For policies governing examinations and grading, students are referred to the Assessment of Students section of the University policy "Academic courses: class delivery, examinations, and assessment of student learning" (<http://policies.usask.ca/policies/academic-affairs/academic-courses.php>)

## Academic Honesty

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary Website and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should read and be familiar with the Regulations on Academic Student Misconduct (<http://www.usask.ca/secretariat/student-conduct-appeals/StudentAcademicMisconduct.pdf>) as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals (<http://www.usask.ca/secretariat/student-conduct-appeals/StudentNon-AcademicMisconduct.pdf>) Academic honesty is also defined and described in the Department of Computer Science statement on Academic Honesty (<http://www.cs.usask.ca/students/academic-honesty/index.php>).

For more information on what academic integrity means for students see the Student Conduct & Appeals section of the University Secretary Website at:  
<http://www.usask.ca/secretariat/student-conduct-appeals/forms/IntegrityDefined.pdf>

## Examinations with Disability Services for Students (DSS)

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Disability Services for Students (DSS) if they have not already done so. Students who suspect they may have disabilities should contact DSS for advice and referrals. In order to access DSS programs and supports, students must follow DSS policy and procedures. For more information, check <http://students.usask.ca/health/centres/disability-services-for-students.php>, or contact DSS at 966-7273 or [dss@usask.ca](mailto:dss@usask.ca).

Students registered with DSS may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through DSS by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by DSS.

## Student Supports

Student Learning Services (SLS) offers assistance to U of S undergrad and graduate students. For information on specific services, please see the SLS web site <https://www.usask.ca/ulc/>.

The Student and Enrolment Services Division (SESD) focuses on providing developmental and support services and programs to students and the university community. For more information, see the SESD web site <http://www.usask.ca/sesd/>.