University of Regina
Course Information booklet

# CS 458 / CS 858
# Virtual and Augmented Reality

**Calendar Description:** Design and implementation of software in virtual and augmented reality environments. Development practices, assets and avatars, interaction, locomotion, psychological effects, audio, multiplayer considerations, applications. Limitations and future developments..

**Instructor:** David Gerhard, david.gerhard@uregina.ca

**Instructor office:** CW308.8
office hours will be posted on URcourses

**Text:** Virtual Reality
by Steven LaValle
http://vr.cs.uiuc.edu

**Course website:** https://urcourses.uregina.ca/

**Grading Scheme** :

| | 458 | 858 |
|---|---|---|
| Assignments | 20% | 15% |
| Review(s) | 10% | 15% |
| Quizzes and Exams | 20% | 20% |
| Project | 50% | 50% |

Created September 2019 by David Gerhard

Updated September 2020 by David Gerhard

# 1 Online Learning Information

**Technology Requirements.** All graded course activities, including quizzes, exams, assignments, projects, and presentations, will be online via URCourses. To participate in online learning, students are expected to have access to basic computer equipment including a computer, a webcam, and microphone/speakers or an audio headset, as well as high-speed internet. Students may be required to activate their webcam during certain aspects of course delivery such as presentations, attendance, exams, or other activities.

**Zoom Meetings.** Class meetings will take place via Zoom. Links will be made available through URCourses. Students are expected to be polite and respectful during Zoom meetings. Inappropriate content or behaviour will not be tolerated, and will be reported to the Dean.

**Content Videos.** Content videos will be made available before class meetings. Students are expected to watch the videos and be familiar with content, in preparation for the discussion to follow in class. Quizzes may be used to verify that students arrive to meetings prepared.

**Identity Verification.** This course may use the Proctortrack remote proctoring platform for verification of student identity and monitoring of class exams. As a result, your personal information will be securely and temporarily collected and stored under the legal authority of The Local Authority Freedom of Information and Protection of Privacy Act. This personal information will include your first and last name, institution name, student number, image, as well as recordings of you and your computer screen during a proctored exam. Students are advised to complete the Student Onboarding process early in the term to allow as much time as possible to resolve any issues that may arise. Further information can be found here: https://www.uregina.ca/remote-learning/index.html#proctoring

**Grades.** Your grades will be posted when the TA completes the marking. If your posted grades appear incorrect, contact the TA **within two weeks of the date posted**. Your unofficial final grade will be posted after all activities have been marked, and you will have two days to discuss your final grade with the instructor before these grades become official.

**Forum.** All students are automatically subscribed to the forum and are expected to **keep up-to-date**, as some announcements will only appear in the forum. The forum is available to all registered students, TAs and the Instructor, so be respectful and appropriate in your posts. Participation marks may be available to students who actively contribute in the forum, by asking and answering questions, posting course-related links, etc. External tools such as Discord may be used for communication between classmates, but all students registered in the course must be invited to participate in any unofficial online discussion tools.

# 2 Grading Information

**Grading Information.** The grade for the course is primarily dependent on the final project, which can be done individually or in groups of up to 4 students. In addition to the project, there are 6 development assignments designed to develop your skills in the specific development environment we will be using. Knowledge will be tested regularly with small quizzes and occasional larger tests, as the semester progresses. There is no final exam. Students are required to produce a small paper that reviews a piece of VR/AR specific software, to a set of detailed criteria. Graduate students will also produce a small paper reviewing a recent VR/AR specific publication.

## 3 Academic Integrity

All work submitted for grading must be your own work. Submitting someone else's work as your own, or permitting your own work to be copied and submitted under someone else's name, are acts of academic misconduct. Any suspected incidences will be reported to the Dean for investigation.

All online tests for this class will be "open book," meaning you are free to make use of prepared notes, texts, online resources, or online searching. This does **not** mean you are allowed to collaborate with your colleagues, or directly copy material from any resource or person.

***Cheating will not be tolerated***. Co-operation on assignments is generally encouraged, but *it must be limited to verbal discussion of concepts*. Under no circumstances should you share program code or written documentation, unless specifically encouraged by the instructor, and in that case you must provide detailed and specific documentation of the nature of the code sharing.

Any close resemblances in submitted work will be investigated. Copying of assignments from a colleague or online source (such as chegg) is academic misconduct. You are not allowed to work in groups except as explicitly indicated by the instructor, on specific projects. ***The consequence of academic misconduct may range from a zero grade, to failure in the class, to expulsion from the University***. Refer to the General University Calendar for complete University policies, specifically the section on Academic Misconduct and Penalties.

You are encouraged to cooperate with your fellow students. A good heuristic is: *think together, work apart*. If you have any doubts, err on the side of transparency. The purpose of the assignments is to help you practice the material, and the purpose of the exams is to test your understanding of the material.

Do not copy solutions from the internet. If you find something online that covers a particular topic well, treat it as you would a colleague: learn what you can, then go and do it yourself. Better yet, post it to the forum so that we can all benefit from your discovery. Such contributions may result in a higher participation mark.

DO NOT PAY FOR SOLUTIONS FROM THE INTERNET. We are familiar with the solutions that are available, and their sources, and can easily identify them. You will waste your money, support a highly unethical practice, and be investigated for academic misconduct.

## 4 Submission Expectations

Indicate, on a cover page or at the top of the first page: your name; student number; email address; course; assignment number; and the date. Submit your written solutions in `PDF` format. Use your student number in the filename of all submissions.

For any program code you write during the course, you must submit your source code. All program code must be commented and documented. Indicate clearly which libraries, frameworks, and resources you use, and where they were sourced from, as well as what code is your own.
The following standards are always in effect. Individual assignments may also have specific criteria.

- Submit it on time and correct.
- Read, understand, and answer the question that is being asked.
- Be legible and use correct English grammar and spelling.
- Talk to the Instructor, a TA or an LI *before the due date* if you are having problems.

We can only mark what you submit to us. Make sure your submission is complete and that your assignment represents your knowledge and abilities, including how you got your answers. In

most cases, a correct answer without a justification or a discussion of how you got the answer will be worth little or nothing. **It is your job to convince us that you know the material, it is not our job to scour your assignment to find any extra marks that may be hidden.**

Due dates will be announced with each assignment, and posted on URcourses. Assignments are normally due at 11:55 pm on the due date. Assignments will be submitted, marked, and returned electronically. Make sure to verify your assignment marks on urcourses, as grades sometimes get recorded incorrectly. Consult the marker **within two weeks of the date the mark was posted** if you notice an incorrectly *recorded* grade.

If you have any complaint about the marking itself, either with respect to an assignment or an exam, please submit your complaint directly to the instructor within two weeks of the date the mark was posted. Explain which course component you want investigated, your current mark, and the perceived problem with the marking.

Late assignments will not be accepted. In the case of provable illness, with a written medical excuse from a doctor on letterhead with doctor contact information, missed course work will be removed from the calculated grade. If the student misses more than 50% of assignments due to a provable illness, the instructor has the right to assign make-up work.

## 5 Project Details

Full details and project requirements are posted on URcourses. Projects are completed individually or in groups. Students will complete a series of project phases as the semester progresses, including an elevator pitch, a proposal, an outline, a progress report, a draft report, a project presentation, and a final written report.

Your final mark for the project will be a combination of your mark for your report, demonstration, and all phases of the process, with the majority of the mark coming from the final report. This means that a team who had significant development challenges and did not fulfil their initial project plan, but documented these challenges and their process well will still receive a high mark, while a team that is successful in all development phases but does not document their progress and does not produce a high-quality report may lose marks.

## 6 Tentative List of Topics

- History of VR and AR
- Immersive Systems
- Sensation and Perception
- Current VR Hardware
- Interaction Design
- Kinematics and Locomotion
- Information and Accessibility
- Audio and Spatialization
- 3D Rendering