COMP 3388B, Winter 2023
Computer Graphics I
Syllabus

Course Information

Calendar Description

The viewing pipeline; clipping and visibility problems. The graphical kernel system; picture generation and user interfaces.

Prerequisite Requirements

Prerequisites: Computer Science 2211A/B or (Software Engineering 2203A/B, Software Engineering 2205A/B and Software Engineering 2250A/B); and one of Mathematics 1600A/B, Numerical and Mathematical Methods 1411A/B or the former Applied Mathematics 1411A/B.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Teaching Staff + Office Hours

Alex Brandt
abrandt5@uwo.ca
MC 369, Wednesdays 15:30 - 16:30

Teaching Assistants

TBA

Class Schedule

Tuesdays, 15:30 - 17:30, WSC 55
Thursdays, 16:30 - 17:30, WSC 55

Special Dates

Classes begin: January 9
Reading Week: February 18–26, inclusive
Classes end: April 10

In the event of a COVID-19 resurgence which requires moving away from in-class teaching, lectures will proceed synchronously via Zoom. Details to be announced, if required. The grading scheme will not change. Any remaining assessments will also be conducted online.

Course Materials

All course materials will be posted to OWL: http://owl.uwo.ca. This includes course notes and supplementary materials. Students are responsible for checking OWL on a regular basis for news, announcements, and forum posts. This is the primary method by which information will be disseminated to all students in the class. If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk at 519-661-3800.

There is no required textbook for this course. However, suggested readings will be given from *Computer Graphics using OpenGL*, 3rd Edition, 2007, by F.S. Hill, Jr. and Stephen M. Kelley; and *Computer Graphics: Principles and Practice*, 3rd Edition, 2014, by John F. Hughes et al.

Forums and Email Contact

Students should post all questions about course content to the OWL site's forums. This includes any question about lectures, assignments, tutorials, exams, etc. Please check existing questions and answers on the forums first before submitting a new question. Emails (from your uwo.ca account only) should be used only for personal and private matters only. If your forum question goes unanswered for a day or two, a friendly email reminder to the TAs or the professor is okay.

Include "CS3388" in your email subject. Otherwise, you may not receive a reply to your email.

Course Topics

This course is separated into 4 parts: Introduction, 2D Graphics, 3D Graphics, and "Fun", which includes shading models, programmable pipelines, ray tracing, and the Vulkan graphics library.

This course uses OpenGL as the graphics environment. The programming language to interface with it should be C/C++ or Python. But, C/C++ will be the language of choice for examples.

1. Introduction
    - A review of linear algebra
    - Raster Displays, Pixels
    - Overview of graphics libraries and paradigms
    - Window Systems

2. "2D" Graphics
    - Drawing Basic Shapes and Pictures
    - Plots
    - Viewports and Clipping
    - Lerps and Tweens
    - Curves and Splines

3. 3D Graphics
    - 3D transforms
    - Projective Geometry
    - Model View Projection
    - Polygon Meshes
    - Rendering Pipeline

4. Fun Additions
    - Shading Models
    - Programmable Rendering Pipeline
    - Physical-Based Rendering
    - Ray Tracing
    - Vulcan

Evaluations & Regulations

Assignments		**62%**
1	January 19	4%
2	February 2	8%
3	February 16	10%
4	March 9	10%
5	March 23	15%
6	April 9∗	15%
Problem Sets	Ongoing	**10%**
Quizzes	February 9	**14%**
	April 6	**14%**

∗*Must* be submitted by April 10, 23:55.

Note: Dates are tentative.

Assignments

- Assignments are to be submitted electronically to OWL. See the OWL website.
- Assignments are due at 23:55 on the due date. Late assignments will be handled as follows.
    - 0-24 hours late: you make the professor sad :(
    - 24-72 hours late: -30%
    - >72 hours late: submissions are no longer accepted, you will receive 0.
- Under extenuating circumstances, students may not be able to complete an assignment on time. In such cases, students should contact the academic counselling of their home faculty. Except in very special circumstants, the accommodation will be a waiver of the late penalties. That is, students must still submit the assignment within 72 hours of the original due date, but will not receive late penalties.
- Plagiarism is unacceptable. It is reasonable to assume that students discuss assignments and possible solutions, however all assignments shall be independent.
- Any concerns with assignment marking must be addressed *within one week* of the assessment being returned. No adjustments will be made after this time.

Problem Sets

- There are 10 problem sets to be given throughout the semester. They are basically "knowledge checks". They should not be difficult or take too much time. They are good preparation for the quizzes!
- Students should submit their solutions to the problem sets electronically to OWL.
- Problem sets are due on the Friday (at 23:55) of the week in which they are given.
    - Jan. 13, Jan. 20, Jan. 27, Feb. 3, Feb. 17, Mar. 3, Mar. 10, Mar. 17, Mar. 24, Mar. 31
- Late submission of problem sets *will not be accepted*.

- The 8 best problem sets will be used to calculate the Problem Set portion of the student's final mark. Thus, a student may miss 2 problem sets throughout the semester without penalty. No communication with the instructor is required for the first two missed problem sets. If more than two are missed, please communicate with the professor to determine an accommodation.

Quizzes

- The quizzes will occur **in-class** during the Thursday lecture.
- Quizzes are closed book. Any required information, numerical constants, formulas, etc. will be provided to you.
- No electronic devices other than a simple scientific calculator may be used.
- If you miss a quiz, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. If your academic consideration is approved, the weight of the quiz will be moved to the other quiz. There are no makeups.
- Missing both quizzes will be handled on a case by case basis.

Policies, Accommodation, Accessibility

Physical Health

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. All documentation required for absences must be submitted to the Academic Counselling office of a student's Home Faculty

For the policy on Accommodation for Medical Illness - Undergraduate Students, see: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf and for the Student Medical Certificate (SMC), see: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Mental Health

Mental and emotional well-being is highly important and should not be treated lightly. Students who are in emotional/mental distress should refer to Health and Wellness at Western for a complete list of options about how to obtain help. Students in immediate distress should contact Student Health Services, Campus Police, or Psychological Services whose contact information can be found here.

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar: https://multiculturalcalendar.com/ecal/index.php?s=c-univwo

Accessibility

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Student Accessibility Services via their website or at (519)-661-2147 if you have any questions regarding accommodations.

Ethical Conduct

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this web site.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Student Support

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being.

Learning-skills counsellors at the Student Development Centre are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exams, textbook reading, and more. Support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round via individual counselling.

Other services are also provided by the University Students' Council

Registration Services

Students should refer to the Registrar's website for registration information and services.