CS488/688 - Introduction to Computer Graphics - Winter 2020

School of Computer Science, University of Waterloo
Instructor: Gladimir V. G. Baranoski, DC3520
Regular Office Hours: Friday (3:30-4:30PM)
Project Extended Office Hours: March 11, Wednesday 3:30-5:30PM
Project Extended Office Hours: March 18, Wednesday 3:30-5:30PM
Lecture Times: Tuesday and Thursday, from 8:30-9:50, MC4063.

Schedule

Week	Date	Tutorials/Assignments/Project/Exams
2	January 15, Wednesday	Tutorial (5:30-6:30PM, Room MC4063)
2	January 16, Thursday	Assignment 0
2	January 16, Thursday	Tutorial (5:30-6:30PM, Room MC4063)
3	January 23, Thursday	Assignment 1
5	February 6, Thursday	Assignment 2
6	**February 13, Thursday**	**Midterm Exam (8:30AM, Room MC4020)**
8	February 27, Thursday	Assignment 3
9	March 5, Thursday	Assignment 4
10	March 12, Thursday	Project Proposal
11	March 19, Thursday	Revised Project Proposal
13	**March 30, Monday**	**Project Code**
13	**March 31, Tuesday**	**Project Demos**
13	**April 1, Wednesday**	**Project Demos**
14	**April 2, Thursday**	**Project Written Report, (8:30AM, Room MC4063)**

Important Notes:

- The deadline for the submission of assignment code is **8:00AM** on the days specified as the assignment due dates.

- The deadline for the project code is **8:00PM** on the day specified above.

- Assignments and project materials submitted after these deadlines will receive **ZERO** marks.

- Assignments whose marking require any action from the course staff to address student's submission mistakes (e.g., missing files, files with incorrect names and/or permissions, problems with makefiles ...) will also be treated as late assignments and receive **ZERO** marks.

- Students should contact course staff within the first two week of classes to resolve any issue related to lab access and account on lab machines. Assignments not submitted due to these issues will also receive **ZERO** marks.

- Although the revised project proposal is not marked, if it is not submitted on the due date specified above, the corresponding project will receive **ZERO** marks.

- Project written documents (proposals and final report) should be handed in at the beginning (first five minutes) of the lectures given at the above specified due dates.

- Project proposals will be returned in class after they have been marked.

Course TAs:

- Spencer R. Van Leeuwen (srvanlee@uwaterloo.ca). Office hours: Tuesday, 2PM-3PM, Undergraduate Graphics Lab, MC3007.

- Petri Varsa (pmvarsa@uwaterloo.ca). Office hours: Wednesday, 11AM-12PM, Undergraduate Graphics Lab, MC3007.

Course Description

Software and hardware for interactive computer graphics. Implementation of device drivers, 3-D transformations, clipping, perspective, and input routines. Data structures, hidden surface removal, colour shading techniques, and some additional topics will be covered.

Course Objectives

At the end of the course you should be able to:

- write interactive 3D computer graphics programs;

- understand how linear and perspective transformations are used in modeling and rendering in 3D computer graphics;

- understand the process of rendering, lighting, hidden surface removal, and other computer graphics techniques;

- write a simple ray tracer.

Required Text

- CS488/688 Course Notes.

Recommended Texts

- OpenGL Programming Guide.

- Computer Graphics with OpenGL by Hearn, Baker and Carithers.

General Overview of Topics

- The Graphics Environment

- Mathematical Underpinnings

- Transformations

- Picking, Selecting, and Control Tasks

- Hidden Surfaces and Shading

- Ray Tracing

- Physically Based Rendering

- Splines

- Animation

Marking Scheme

- Programming component:

  - Assignments: 24%
  - Project proposal: 4%
  - Project: 22%

- Examination component:

  - Midterm: 20%
  - Final: 30%

Students must average at least a 50% in both the programming and examination components of the course to pass. If a student fails to obtain a passing grade on either component, his/her final mark is going to be the mark obtained in this component. The instructor reserves the right, where appropriate, to adjust raw marks downward in the case of cheating and upward in other situations.

Course Delivery and Expected Behaviour
For this offering (Winter 2020), class attendance will be particularly critical. Course delivery will consist mostly of traditional lectures with occasional use of slides and technical demonstrations. The following guidelines will apply during this offering:

- In case of missing a lecture, or parts of a lecture, the student will be responsible for obtaining the information and materials provided by the instructor during the lecture;

- The course guidelines provided by the instructor (in this course outline or in class) regarding exams, assignments and project components (proposals, demo and written report) supersede course guidelines employed in previous terms;

- Absence from a lecture, or part of a lecture, will not be accepted as an excuse for not complying with the course guidelines provided by the instructor;

- In case of any issue regarding information provided by the instructor (in class or made available in the course website) about course materials and/or activities (*e.g.*, specifications for assignments or guidelines for the project demo), the students should contact the instructor directly to resolve it before the day scheduled for the given activity (*e.g.*, exam, assignment hand-in or project demo);

- During the lectures, the use of personal computers (or other devices) is not allowed, except with explicit instructor's authorization for assessing or recording information being delivered by him during the lecture.

Course Work Policies

- Project marked work will be first returned in lectures and then available during the instructor's office hours.

- Any project submission that remains unclaimed by May 1, 2020, will be destroyed.

- Students should contact the teaching assistants about concerns with respect to the marking of submitted work within two weeks of the date it was first returned to the students. If the issues cannot be resolved between the teaching assistant and the student, the teaching assistant will meet with the instructor, who will make the final decision.

- Use the piazza for general questions about assignments that may be of interest to other students in the course. Do not discuss implementation details (such as code particulars) via piazza. Use the following link to sign up to piazza:

    `https://piazza.com/uwaterloo.ca/winter2020/cs488`

- Use the course e-mail for simple technical issues pertaining only to you.

- Issues requiring detailed answers should be addressed during course staff's office hours.

- If a student cannot attend the course staff's office hours due to time conflicts with regular lectures or tutorials from other courses, she/he should contact the course staff at the beginning of the course to find an alternative time to meet during the term.

University Mandatory Information

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check *www.uwaterloo.ca/academicintegrity/* for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, *www.adm.uwaterloo.ca/infosec/Policies/policy70.htm*. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity [check *www.uwaterloo.ca/academicintegrity/*] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about 'rules' for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, *www.adm.uwaterloo.ca/infosec/Policies/policy71.htm*. For typical penalties check Guidelines for the Assessment of Penalties, at the following web site: *www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm*.

Appeals: A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) *www.adm.uwaterloo.ca/infosec/Policies/policy72.htm*.

Note for Students with Disabilities: The AccessAbility Services Office (AAS), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AAS at the beginning of each academic term.