

# Carleton University, Computer Science, Winter 2015

## Comp 4501 Advanced Facilities for Real-Time Games

**Times/Instructor:** Mon 6pm (3 hours) Room Tory 217, W.R. Lalonde

**Workshop (Assignment help):** Tues 6pm (3 hours) Gaming Lab. Help starting the assignment. Watch others work. See status of other people's work...I will personally be there and will also stay late as long as you do. I can also be there on other days if this conflicts with your timetable.

**Course Description:** The theory and implementation of advanced real-time 3D game facilities with OpenGL and C++.

**Course Goals:** A practical course aiming to understand the details of advanced facilities supported by state of the art game engines. Such facilities include notions such as relief mapping, ambient occlusion, shadows, deferred renderers, physics engines, occlusion culling, water effects, instancing, and geometry shaders. The topics are suggestions that we will use to drive the course and may include fewer or more topics depending on circumstances. Materials are taken from the advanced books detailed below. The students will gain experience with the concepts through at most 4 assignments related to the concepts plus an optional assignment on a topic chosen by the student. See **Grading** below for details. There is NO exam.

**Course Work:** The course will require you to work on at most **4 assignments plus an optional assignment** equivalent in complexity to 1 assignment. The mandatory assignments contribute at most B+ to the final mark, The optional assignment extends that mark to A+.

**Main Book:** None. However, it may prove useful to have access to materials on OpenGL including its shader language.

**Advanced:** **Game Programming Gems, II, III, IV, V, VI, VII, and VIII**, Charles River Media, Inc.

**GPU Gems, II, and III**, Addison Wesley.

**GPU Pro, II, and III**, A.K Peters.

**Real-time Shadows**, CRC Press

**Mathematics for 3D Game Programming & Computer Graphics (Third edition is the latest)**, Eric Lengyel, Charles River Media, Inc.

**Software:** You will need Microsoft Visual Studio 2008 or later for C++ along with a computer capable of handling modern shaders.

**Grading:** Assignments will be marked personally with a simple letter grade. The assignments should be handed in at the class on a CD which includes all the software, tools, and textures needed to compile and run what you did. The CD should include a Microsoft WORD or TEXT file of the form "Jim Smith #6592211.docx" which allows the author to be determined without opening the file. The file itself should contain an e-mail address and phone number where you can be reached if there is a problem and should contain details about what to do to compile, run, and test your code. This e-mail address and phone number should also be on the CD cover in case the CD is unreadable or missing files that are needed to run...

**Final Due Date:** 6 pm Wed April 8, 2015. I will be outside the School of Computer Science Office to pick up the optional assignment. Can be handed in earlier to secretaries in the Office who will place it in my personal mailbox. IF YOU INTEND TO SUBMIT, MAKE SURE I KNOW ABOUT IT.

**Web:** <http://www.scs.carleton.ca/~lalonde> (my page), and <http://www.scs.carleton.ca/~lalonde/comp4501> (course page).

## **University Policies**

### **Student Academic Integrity Policy**

Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar.

### **Plagiarism**

As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science.

### **Unauthorized Co-operation or Collaboration**

Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

### **Academic Accommodations for Students with Disabilities**

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable) at <http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines>

### **Religious Obligation**

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www2.carleton.ca/equity/>

### **Pregnancy Obligation**

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www2.carleton.ca/equity/>

### **Medical Certificate**

The following is a link to the official medical certificate accepted by Carleton University for the deferral of final examinations or assignments in undergraduate courses. To access the form, please go to <http://www.carleton.ca/registrar/forms>