Course Information

Instructor: Steph Durocher  
Office: EITC E2-412  
Lectures: 10:30 am – 11:45 am Monday and Wednesday in EITC E2-350

Prerequisites. An upper-year undergraduate course in algorithm analysis such as COMP 3170 is required, as is a course in discrete mathematics such as COMP 2130. Students are expected to have a strong background in theoretical computer science (e.g., a grade of A or A+ in COMP 3170). Students are expected to be familiar with intermediate topics in design and analysis of algorithms, data structures, and discrete mathematics, including sorting, searching, big Oh notation, trees, logic, graph theory, and set theory. Only an introductory knowledge of geometry is required (e.g., trigonometry and familiarity with common geometric identities). Consent of the instructor is required for undergraduate students.

Course Description and Syllabus. COMP 7750 is intended as an advanced course in theoretical computer science and as an introduction to computational geometry. Possible topics to be covered include:

- convex hulls
- Voronoi diagrams and Delaunay triangulations
- point location
- range searching
- geometric data structures
- kinetic data structures
- geometric intersection
- guarding, art galleries, and visibility graphs
- geometric packing, covering, and partitioning
- duality
- arrangements of lines and circles
- unit disc graphs and proximity graphs
- minimum enclosing discs, width, and diameter
- facility location


The textbook will be available from the University of Manitoba bookstore.

Important Dates.

- September 14 first class
- October 7 project proposal due
- October 12 Thanksgiving – no class
- October 14 midterm exam
- November 11 Remembrance Day – no class
- November 18 last day for withdrawal
- November 30, December 2, 7, 9 project presentations
- December 9 project report due
- December 9 last class
- December 16 final exam

Fall 2015, ROASS document
**Grading.** All students will be required to complete three assignments, a midterm exam, and a final exam. Graduate students will also be required to complete a course project. Grades will be calculated according to the following table:

- assignments: 30%
- midterm exam: 15%
- final exam: 30%
- course project: 25%

**Assignments.** Three assignments will be distributed in class during the term. You will have one week to complete each assignment. Solutions must be submitted by the end of class on the due date. To permit the prompt distribution of solutions and return of marked assignments, *late assignments will not be accepted*. Please write your name and student number on all submitted material.

**Examinations.** There will be a midterm exam held in class on October 14 and a final exam held during the December exam period from 10:30 am – 12:00 pm on December 16.

**Course Project.** The purpose of the course project is for students to select and explore a topic in computational geometry, to study a current research problem in that topic, to make a new contribution on that topic (see below), and to present the results, in both a written report and a class presentation. The nature of the project can vary; examples include:

- writing a survey paper on a current topic in computational geometry,
- writing code to implement and compare the performance of algorithms for solving a problem in computational geometry, or
- exploring possible solutions to an open problem on a given topic in computational geometry.

As part of the project, graduate students will be asked to submit a preliminary project proposal, an interim progress report, a final written report, and to give a class presentation. Students may choose to complete the project individually or in groups of two.

**Assigned Reading.** In addition to reading assignments from the textbook, journal and conference publications will be assigned as reading (approximately one article per topic). Students will be expected to discuss and answer questions (in class and in examinations) related to the material contained in these assigned articles.

**Academic Integrity.** Students are encouraged to discuss course concepts and the general interpretation of homework problems with other students in the class. No written record should be taken from such discussion. Each student must work on the final solution of assignment problems independently. On a cover page, each student must list the names of people with whom he or she has discussed the assignment solution. Following conventions for citing reference materials in scientific writing is mandatory. Submitting the work of another person as your own constitutes academic misconduct. Any course work that does not follow these guidelines will be considered plagiarism and will be reported to the Faculty of Science. Students are to abide by the university’s policies regarding academic dishonesty which can be found on this web site:

http://webapps.cc.umanitoba.ca/calendar11/Academic%20Regulations.pdf