

Computational Geometry (COMP 5008)

Winter Semester 2015

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Course webpage: <http://cg.scs.carleton.ca/~michiel/5008.html>

Course objectives: Computational Geometry is concerned with the design of efficient techniques for the computer-based representation and manipulation of geometric objects. The field has been in existence for about forty years and has blossomed into a mature body of efficient algorithmic techniques. This has not only led to a solid theoretical understanding of the complexity of geometric problems, but also to the development of several efficient and widely-used software libraries for a wide variety of basic geometric problems. These techniques have the potential to bring about significant design and performance improvements in applied fields such as Computer-Aided Design and Manufacturing, Cartography, Geographic Information Systems, and Materials Science.

Topics covered include: Convex hull algorithms, Triangulations of point sets, Euler's formula for planar graphs, with applications, the k-set problem, Point location in planar subdivisions, Multi-level data structures (range trees, segment trees, interval trees, priority search trees), Plane sweep algorithms, Voronoi diagrams and Delaunay triangulations, Lower envelopes and Davenport-Schinzel sequences, Computing the diameter of a point set, Algorithms for geometric optimization problems, Triangulations of polygons.

Undergraduate Academic Advisor: The undergraduate advisor for the School of Computer Science is available in Room 5302C HP, by telephone at 520-2600, ext. 4364 or by email at undergraduate_advisor@scs.carleton.ca. The advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and the Writing Tutorial Services.

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.

Unauthorized Co-operation or Collaboration:

- Students are encouraged to collaborate on assignments, but at the level of discussion only. When writing down the solutions, they must do so in their own words.
- Past experience has shown conclusively that those who do not put adequate effort into the assignments do not learn the material and have a probability near 1 of doing poorly on the exams.

Equity Statements: You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

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/>

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/>

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 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/> You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <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://www1.carleton.ca/registrar/forms/>