

Syllabus - CS 164/266 - Computational Geometry

Michael T. Goodrich

<http://www.ics.uci.edu/~goodrich/teach/geom/>

- **Course description.** Algorithms and data structures for geometric computation and graphics programming. Fundamental problems of computational geometry such as convex hulls, Voronoi diagrams, Delaunay triangulations, polygon partitioning, arrangements, geometric searching, hidden surface elimination, motion planning.
- **Coursework.** Coursework will consist of homeworks, quizzes, a midterm, and a final exam. The overall grade will be determined 30% from the quizzes, 20% from homework, 25% from the midterm, and 25% from the final. Group work on homeworks is permitted, but each student must list his or her collaborators in writing for each problem. If a student turns in a solution without listing the others who helped produce this solution, this act will be considered cheating (for it is plagiarism). Late homework assignments will not be accepted, but for the overall total homework score, the lowest homework score will be dropped.
- **Quiz/Exam policy.** Quiz and exam performance must be 100% individual effort; no collaboration is allowed on exams. Any collaboration or copying on quizzes or exams will be considered cheating. In addition to the procedures of the [ICS Cheating Policy](#), students caught cheating on an exam or quiz will be given a failing grade.
- **Laptop policy.** Laptops may be brought to class, but should remain **closed** during lectures and exams, unless necessary to accommodate a disability. [Here's one reason why.](#) [Here is another.](#)
- **Textbook.** de Berg, Cheong, van Kreveld, and Overmars, *Computational Geometry: Algorithms and Applications*, Springer, 2008, 3rd edition.

Tentative Schedule

- **Week 1:**
 - Introduction. Convex hulls.
 - Reading: Chapter 1.
- **Week 2:**
 - Line segment intersections. Doubly-connected edge list. Boolean operations.
 - Reading: Chapter 2.
- **Week 3:**
 - Polygon triangulation.
 - Reading: Chapter 3.
- **Week 4:**
 - Linear programming.
 - Reading: Chapter 4.
- **Week 5:**
 - Range searching.
 - Reading: Chapter 5.
- **Week 6:**
 - Point location.
 - Reading: Chapter 6.
- **Week 7:**
 - Voronoi diagrams.
 - Reading: Chapter 7.
- **Week 8:**
 - Arrangements and Duality.
 - Reading: Chapter 8.
- **Week 9:**
 - Delaunay triangulations. 3-D convex hulls.
 - Reading: Chapters 9 and 11.

- **Week 10:**

- Geometric data structures.
- Reading: Chapter 10.

Copyright © 2023 [Michael T. Goodrich](#), as to all lectures. Students are prohibited from selling (or being paid for taking) notes during this course to or by any person or commercial firm without the express written permission of the professor teaching this course or from Disabled Services Center (DSC).