

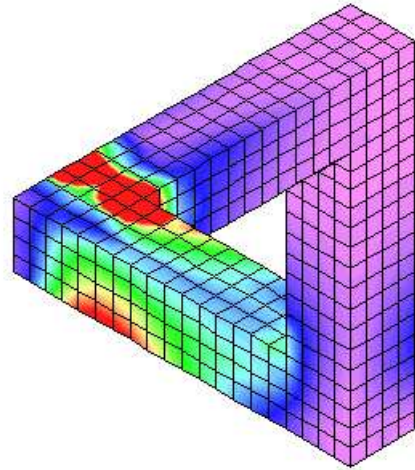
COT5520: COMPUTATIONAL GEOMETRY

SYLLABUS

"Geometry is the science of correct reasoning on incorrect figures."
George Polya (1887 to 1985)

BASIC INFO

- **Course number:** COT5520
- **Semester:** Fall 2008
- **Schedule:** Tue 10:40am-11:30am
Thu 10:40am-12:35pm
- **Location:** MCCB1108
- **Catalog number:** 7317
- **Credit hours:** 3
- **Professor:** Alper Üngör
CSE 534
ungor@cise.ufl.edu
<http://www.cise.ufl.edu/~ungor>
- **Office hours:** Tue 11:30am-1:30pm (Alper)
- **Web-page:** <http://www.cise.ufl.edu/~ungor/courses/fall108>



MAIN THEME

Computational geometry is the field of theoretical computer science devoted to design, analysis, and implementation of algorithms and data structures to solve geometric problems. It has numerous application domains including computer graphics, visualization, robotics, computational biology, data mining, parallel computing, and scientific computing. This course will survey the fundamental concepts in geometric algorithms and data structures. Topics that will be covered include:

<i>Convex hulls</i>	<i>Plane-sweep algorithms</i>
<i>Triangulations</i>	<i>Geometric data structures</i>
<i>Range searching</i>	<i>Point location</i>
<i>Voronoi diagrams</i>	<i>Delaunay triangulations</i>
<i>Randomized algorithms</i>	<i>Arrangements</i>
<i>Nearest neighbors</i>	<i>Surface simplification</i>
<i>Morse theory</i>	<i>Robot motion planning</i>
<i>Protein modeling</i>	<i>Visibility graphs</i>

COURSEWORK

Grades will be based on homeworks (30%), a semester project (40%), a final exam (30%).

- **Homework:** There will be 4-5 homework assignments, each consisting of 4-6 problems.
- **Project:** It could be a survey paper, a programming project, or a research on an open problem. A one-page project proposal should be submitted by mid-semester. Final project reports are due to the second last week of the semester.
- **Exam:** There is no mid-term exam but one final exam. It will be in class on Dec 4 2008, Thursday.
- **Attendance:** Class participation is strongly encouraged as bonus points will be awarded.

COURSE MATERIAL

- **Textbook:** *Computational Geometry: Algorithms and Applications*. Mark de Berg, Marc van Kreveld, Mark Overmars, and Otfried Schwarzkopf, (Springer-Verlag, 2nd edition, 2000).
- **Other recommended books:**
 1. *Algorithms in Combinatorial Geometry*. H. Edelsbrunner, (Springer-Verlag, 1987).
 2. *Geometry and Topology for Mesh Generation*. H. Edelsbrunner, (Cambridge Univ. Press, 2001).
 3. *Computational Geometry: An Introduction Through Randomized Algorithms*. K. Mulmuley, (Prentice-Hall, 1994).
 4. *Computational Geometry: An Introduction*. F. Preparata and M. Shamos, (Springer-Verlag, 1985).
 5. *Computational Geometry in C*. J. O'Rourke, (Cambridge Univ. Press, 1994).
 6. *Introduction to Algorithms (2nd ed)*. T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, (MIT Press and McGraw-Hill, 2001).
- **Conferences:** SoCG, CCCG, JCD CG, WCG, SODA, STOC, ISAAC, LATIN, ...
- **Journals:**
 1. *CGTA: Computational Geometry: Theory and Applications*
 2. *DCG: Discrete & Computational Geometry*
 3. *IJCGA: Int. Journal of Computational Geometry and Applications*
- Also watch the class web page for other survey and research papers, links, etc.

OTHER ISSUES

- **Announcements:** Students are responsible following the announcements on the course web-page (<http://www.cise.ufl.edu/~ungor/courses/fall108>). Schedule updates regarding the homeworks, exams and office hours will appear on the web-page.
- **Accommodations for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.
- **The University's Honesty Policy:** All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.
The following links contain additional information relating to academic honesty:
 - <http://lss.at.ufl.edu/services/turnitin/resources.html>
 - <http://www.dso.ufl.edu/judicial>

