

CS 6463-004 AT: Computational Geometry

Fall 06

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Course Description:

This course will survey a list of geometric algorithms and geometric data structures. Techniques from Computational Geometry are applied in areas such as Databases, Sensor Networks, Visualization, Geographic Information Systems (GIS), VLSI, Robotics, Computer Graphics, and Computer Vision. Many geometric algorithms are elegant and clever, and have esthetical value on their own. The material of the course will be tailored to the interests of the participants. Some of the question that will be addressed are:

- How to efficiently [compute the shortest path of a robot in a room full of obstacles](#).
- How to place security guards (or cameras) in an art gallery.
- Given a map of rivers and a map of roads, [find all the points where a road crosses a river](#).
- How to [simplify a map, or a curve of a function](#), without losing too much of the information.
- Efficient ways to [compare shapes](#), for pattern recognition purposes.
- Robustness issues - how to avoid numerical errors that mislead the algorithm.

Please visit the [resources page](#) for links to demos and other relevant resources. A good introduction to some computational geometry problems can be found [here](#).

Prerequisites:

Undergraduate Analysis of Algorithms, or consent of the instructor. Please feel free to contact the instructor at carola AT cs.utsa.edu if you have questions.

Time & Place:

Tuesdays, Thursdays 3:30pm - 4:45pm, HSS 3.02.30

Textbooks:

Required:

Computational Geometry: Algorithms and Applications, (2nd Edition), M. deBerg, M. vanKreveld, M. Overmars, O. Schwarzkopf, Springer-Verlag, 2000, ISBN 3-540-65620-0

Optional:

- Computational Geometry in C (2nd edition), J. O'Rourke, Cambridge University Press, 2001, ISBN 0521649765
- Lecture notes by David Mount, available [here](#) (an older version with different topics is available [here](#))

Instructor:

[Carola Wenk](#)

SB 4.01.36

E-mail: carola AT cs.utsa.edu

Phone: 458-4501

Office hours: TR 5:00pm - 6:30pm and by appointment

Last modified by Carola Wenk, carola @ cs.utsa.edu , 08/03/2012 22:50:35