Introduction to Computational Geometry

7.5 ECTS

Short description

The course covers the basic methods of computational geometry by using examples from diverse fields that make use of geometric algorithms. These are line segment intersection, polygon triangulation, point location, Voronoi diagrams, arrangements, Delaunay triangulations, duality, geometric data structures, convex hulls, quadtrees and range searching.

Location and dates

4th quarter.

Aim of the course

Certain problems that are demonstrably difficult in general can be solved efficiently when they are geometric. After a successful completion of the course the student will be able to independently study such geometric algorithms at a more advanced level and be able to use them in other areas of research.

Target group

Graduate and advanced undergraduate students in mathematics and computer science.

Entry requirements

Basic undergraduate mathematics and computer science topics. Some familiarity with algorithmic thinking, elementary data structures for insertion/deletion/search, elementary probability theory.

Course organizer

Ömer Egecioglu (omer@cs.ucb.edu, omere@chalmers.se) and Peter Hegarty (hegarty@chalmers.se)

Teaching staff

Ömer Egecioglu (University of California).

Course programme
Line segment intersection, polygon triangulation, point location, Voronoi diagrams, arrangements, Delaunay triangulations, duality, geometric data structures, convex hulls, quadtrees, range searching.

These correspond roughly to chapters 1-10 of the textbook.

**Lectures**

14 double hours.

**Exam**

Homeworks and a take-home exam.

**Literature**

Textbook for the course is:

**Registration**

Please contact the course organizers for information.