Study programme(s): Computer Science

Level: master

Course title: Geometric Algorithms

Lecturer: Miloš Stojaković

Status: elective

ECTS: 6

Requirements: Introduction to Algorithms, Discrete Structures 1

Learning objectives

Students should understand and grasp the basic properties of discrete geometric objects in 2D and 3D, as well as the standard algorithms that deal with these geometric objects.

Learning outcomes

Minimum: At the end of the course, it is expected that a student is familiar with the concept of computer processing of elementary discrete-geometric data structures.

Desirable: At the end of the course, it is expected that a successful student is able to find a suitable algorithm for a given discrete geometric problem, to modify and adjust a standard algorithm if needed.

Syllabus

Computing convex hull, line segment intersection, doubly-connected edge list. Point sets and polygons. Art gallery problems, guarding, triangulations. Range searching.

Voronoi diagrams, generalizations. Delaunay triangulations. Convex hulls in 3-space. Binary space partitions, quadtrees. Robot motion planning.

Literature

- M. de Berg, M. van Kreveld, M. Overmars, O. Schwarzkopf*, Computational Geometry,* Springer Berlin Heidelberg, 2008.
- J. Matoušek, *Lectures on discrete geometry,* Springer, 2002.

Weekly teaching load				
Lectures: 2	Exercises: 2	Practical Exercises: 0	Student research: 0	Other: **0**

Teaching methodology

Blackboard lectures, blackboard exercises.

Grading method (maximal number of points 100)

Pre-exam obligations	**points**	**Final exam**	**points**
Colloquia	**30**	*Oral exam*	**70**