Level: bachelor

Course title: Analytic geometry for students of informatics (I144)

Status: obligatory

ECTS: 6

Requirements: none

Learning objectives

Introducing students to basics of analytic geometry.

Learning outcomes

Students should be able to solve basic problems of planimetry and stereometry using the techniques of analytic geometry, and to employ the knowledge gained in the course in modelling simpler real problems.

Syllabus

Theoretical instruction

Geometry of linear spaces. Dividing line segments. Centre of mass. Convex combination of vectors, convex hull. Scalar product, norm, orthogonality of vectors. Angle between two vectors. Orthogonal projection onto a subspace. Determinant as a signed measure. Plane analytic geometry. Point and line in plane (various forms of the equation of line). Two lines in plane. Conics. Lines and conics. Tangents and normals on a conic. Affine transformations of the plane and their matrix representations. Analytic geometry in 3D Euclidean space. Three kinds of products of vectors. Point, line and plane in space (various forms of the equation of line and plane). Sphere, planes and lines. Tangent plane and a normal onto a sphere. Affine transformations of 3D Euclidean space and their matrix representations.

Practical instruction

Vectors. Vector calculus. Solving various geometric problems using vectors. Solving geometric problems in plane. Solving geometric problems in 3D Euclidean space.

Weekly teaching load				Other: 0
Lectures: 2	Exercises: 2	Other forms of teaching: 0	Student research: 0	