Study Program: Mathematics

Type and level of studies: Bachelor studies, II semester

Course name: Analytic geometry

Lecturer:Jelena Z. Vujaković

Status: Compulsory

ECTS: 8

Attendance Prerequisites: none

Course aims

Introduction to the classical elements of analytical geometry.

Course outcome

Mastering the fundamental concepts of analytical geometry and the theory of vector algebra, geometry of curves and surfaces, affine and Euclidean spaces.

Course content

Theoretical part

Vectors in geometry: Vectors in space En (n = 1,2,3). Linear operations on vectors. Coordinates of vectors and points.

Vector algebra: Scalar, vector and mixed product. Duplicate vector product.

Coordinate transformation. Geometry of curves and surfaces in E3:. Parametric representation of curves and surfaces. Reduction of the second order curve to the canonical form. Straight and flat. Rectilinear surfaces. Rotating surfaces. Reduction of the second order surface to the canonical form.

Affine spaces: Affine subspace; the mutual position of two affine subspaces. Affine mappings. Dimension and isomorphism of affine spaces. Straight, flat and hyperplane in affine spaces.

Euclidean spaces: The distance between two points. Isometric transformation; congruence .. Symmetry of a point with respect to subspace. Line, plane. Area and volume.

Transformations: Linear transformations. Affine transformations. Isometric transformations. Isometry group structure.

Quadrics: Second order curves. Affine equivalent second-order curves. Second order planes. Tangent plane of the second order surfaces. Asymptotic cone of the second order surface. Second-order hypersurfaces.

Practical part

Practice is done in accordance with the theoretical part.

Literature

1. M.T.Goodrich, R.Tamassia, D. Mount, Data Structures and Algorithms in C++, John Wiley, 2004, ISBN 0-471-42924-4;
2. T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein, Introduction to Algorithms, The MIT Press, Cambridge, 2001;
3. Kleinberg J., Tardos, E., Algorithm Design, Pearson International Edition, USA, 2006.

Number of active classes				Other classes
Lectures: 3	Practical classes: 3	Other forms of teaching:	Students' research work	

Teaching methods

Frontal, group, interactive.

Assessment (maximum 100 points)

Course assignments	**points**	Final exam	**points**
activity during lectures	**10**	written exam	**30**
practical classes	**-**	oral exam	**30**
term test(s)	**30 (15+15)**	.....	
seminar(s)			
Total	**40**		**60**