Faculty of Science and Mathematics / Mathematics /

Prerequisites	no
Aims	Standard course of Linear algebra for students of mathematics. Includes theory of finite-dimensional vector spaces, matrices, systems of linear equations and linear mappings in finite-dimensional vector spaces (including spectral theory).
Lecturer / Teaching assistant	Vladimir Jaćimović, Dušica Slović
Metdod	lectures, seminars, consultations
Week 1, lectures	Groups and fields. Vector spaces. Definition. Examples. Vector subspaces. Linear span.
Week 1, exercises	Groups and fields. Fields of real and complex numbers. Geometric vectors in the plane.
Week 2, lectures	Linearly dependent and independent vectors. Base and dimension of vector spaces. Isomorfism of vector spaces.
Week 2, exercises	Vector spaces. R^n and C^n. Vector subspaces. Linear span.
Week 3, lectures	Matrices. Gauss method for solving linear systems of equations. Matrices of elementary transforms.
Week 3, exercises	Linearly dependent and independent vectors. Base and dimension of vector spaces. Problems and examples in R^n. Subspaces in R^n. Systems of linear equations.
Week 4, lectures	Determinants of square matrices. Rank of matrix.
Week 4, exercises	Gauss method for solving systems of linear equations. Matrices. Matrices of elementary transforms.
Week 5, lectures	Inverse matrix. Regular and singular matrices. Matrices of change of bases. Equivalent matrices.
Week 5, exercises	Determinant and rank of matrix.
Week 6, lectures	Systems of linear equations. Existence and uniqueness of solution. General solution. Kronecker Capelli theorem. Cramers' rule.
Week 6, exercises	Inverse matrix. Regular and singular matrices. Matrices of coordinate change.
Week 7, lectures	1st test
Week 7, exercises	1st test
Week 8, lectures	Empty week.
Week 8, exercises	Empty week.
Week 9, lectures	Linear mappings in vector spaces. Definition. Examples. Kernel and image of linear mapping.
Week 9, exercises	Homogeneous and nonhomogeneous systems of linear equations. Methods of solving. Existence and uniqueness of solution. Cramers' rule.
Week 10, lectures	Matrix of linear mapping. Similar matrices. Inverse mapping. Rank of linear mapping.
Week 10, exercises	Linear mappings in vector spaces. Kernel and image of linear mapping. Examples: operators of projection, rotation and differentiation of polynomials.
Week 11, lectures	Invariant subspaces of linear mapping. Eigenvalues and eigenvectors. Eigenspaces.
Week 11, exercises	Matrix of linear mapping. Inverse mapping. Rank of linear mapping.
Week 12, lectures	Fundamental theorem of algebra. Characteristic polynomial of linear mapping. Polynomials of matrices/operators. Hamilton-Cayley theorem.
Week 12, exercises	Eigenvalues and eigenvectors of linear mapping. Characteristic polynomial of linear mapping.
Week 13, lectures	Jordan form and cannonical base of nilpotent linear mapping.
Week 13, exercises	Method of calculation of eigenvectors. Eigenspaces.
Week 14, lectures	Jordan form of linear mapping. Examples.
Week 14, exercises	Jordan form of linear mapping. Similar matrices.
Week 15, lectures	2nd test
Week 15, exercises	2nd test
Student obligations	
Consultations	1 hour/week (lectures) + 1 hour/week (seminars)
Workload	4 hours/week lectures + 3 hours/week seminars + 4 hours/week homework = 11 hours/week. Total: 11 hours/week x 16 weeks = 176 hours

Literature	
Examination metdods	attendance (5 points), homework (5x1 points), 2 tests (2x30 points), one corrective test, final exam (30 points), corrective final exam, 2 brief oral exams (optional – 2x5 points)
Special remarks	The language of instruction is Serbo-Croat. Lectures can be given in English or Russian language.
Comment	
Learning outcomes	