Study programme(s): Applied Mathematics – Data Science	
Level: master studies	
Course title: Numerical linear algebra 1	
Lecturer: Vladimir R. Kostić	
Status: obligatory	
ECTS: 6	
Requirements:	

Learning objectives
Mastering basic algorithms of numerical linear algebra for large linear systems and thier implementation in MATLAB.

Learning outcomes
Students will be able to use successfully algorithms of numerical linear algebra built-in in MATLAB, to independently solve problems in the field of applied linear algebra and to construct advanced numerical tehcniques for large linear systems and matrix equations.

Syllabus
Theoretical instruction
Basis of iterative methods for solving systems of linear equations. Sparse matrix methods for large linear systems. Classical iterative methods and their paralelization. Projective methods and their paralelization. Solving the problem of least squares. Numerical algorithms for matrix equations (Lyapunov, Riccati). Implementation of algorithms in MATLAB.

Practical instruction
Use of built-in functions in MATLAB for solution of large sparse linear systems and matrix equations arising in applications (dynamical systems, control theory, signal processing, network theory). Implementation of advanced numerical algorithms in MATLAB.

Literature
1. Lloyd N. Trefethen and David Bau, III: Numerical Linear Algebra, SIAM, 1997.
2. James W. Demmel: Applied Numerical Linear Algebra, SIAM, 1997.
3. Yousef Saad: Iterative Methods for Sparse Linear Systems, Second Edition SIAM, 2003.

Weekly teaching load				Other: 0
Lectures: 2	Exercises 3	Other forms of teaching: 0	Student research: 0	

Teaching methodology
Lectures, revisions of the material, active student participation in problem solving, knowledge tests - colloquia.

Grading method (maximal number of points 100)			
Pre-exam obligations	**points**	**Final exam**	**points**
Colloquia	50	written exam	50