

M086	Linear Algebra I	L	S	E	ECTS 6
		2	0	2	

The aim of the course. Adoption of the fundamental concepts and methods of linear algebra, providing the knowledge of the matrix theory and understanding of the manipulation with vectors in the plane and space, together with the manipulation of basic examples of vector spaces.

Prerequisites. Not required.

Course content.

1. Concept of the field and of vector space. Examples of vector spaces, vectors in plane and space, norm of vectors in plane and space and inner product of vectors. Linear dependence and independence of vectors.
2. Matrices and operations with matrices. Regular matrices. Determinant. Left and right basis and coordinate systems. Elementary transformations. Adjoint matrix. Rank of a matrix.
3. Systems of linear equations. Solvability and structure of the set of solutions. Equation of line and plane. Kronecker-Capelli theorem. Homogenous systems of linear equations. Particular solution. Gauss elimination. Cramer's rule.

EXPECTED LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	Describe the structure of vector space.
2.	Define the concept of vector in plane and in space.
3.	Apply operations with vectors in problem solving.
4.	Perform matrix calculations.
5.	Determine the regularity of a square matrix.
6.	Describe necessary and sufficient conditions under which a system of linear equations has a solution.
7.	Distinguish and apply methods for solving systems of linear equations and provide a geometric interpretation of the solvability of such systems in plane and space.
8.	Provide a mathematical proof of procedures and formulas used in the course.

RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ESTIMATION OF THE LEARNING OUTCOMES.

Organization of the educational process	ECTS	Learning outcomes**	Student activities*	The method of estimate	Points	
					Min	max
Lecture attendance	1	1-8	Lecture attendance, discussion, team work and independent work on given tasks	Attendance sheets, tracking activities	0	4
Written exam (preliminary exam)	2	1-8	Preparing for written exam	Evaluation	25	48
Final exam	3	1-8	Repetition of the subject matter	Oral exam	25	48
Total	6				50	100

Teaching and evaluation of knowledge. Attending lectures and exercises is required. The exam consists of written and oral part, and can be taken after completion of lectures and exercises. During the semester students can take preliminary exams that replace the written examination.

Can the course be taught in English: Yes.

Basic literature:

1. D. Bakić, Linearna algebra, Školska knjiga, Zagreb, 2008.

Additional literature:

1. R. Scitovski, Geometrija ravnine i prostora, reviewed materials available at the web pages of Department of mathematics, University of Osijek, 2011.
2. N. Bakić, A. Milas, Zbirka zadataka iz linearne algebre, PMF-Matematički odjel Sveučilišta u Zagrebu, 1995.
3. N. Elezović, A. Aglič, Linearna algebra: zbirka zadataka, Element, Zagreb, 1999.
4. H. Anton, R. Rorres, Elementary linear algebra, John Wiley & Sons, Danvers, 2000.