Study Program: Mathematics	

Type and level of studies: Bachelor studies
Course name: Linear Algebra
Lecturer: Milena M. Lekić
Status: Compulsory
ECTS: 8
Attendance Prerequisites: none

Course aims

Acquiring basic knowledge about linear algebra.

Course outcome

Grasping the fundamental concepts of linear algebra regarding the theory of matrices and determinants, systems of linear equations, Euclidean and unitary spaces and linear operators.

Course content

Vector spaces: Vector space: definition, examples and basic properties. Linear dependence and linear independence of vectors. Vector space basis. Vector space dimension. Vector coordinates. Sum and direct sum of vector subspaces Product of vector spaces. Space quotient. Linear mappings and dimensions. Isomorphism theorems. Linear forms.

Matrices and determinants. Systems of linear equations: Introduction of matrices and types of matrices. Vector space matrix. Product matrix. Changing the base of a vector space and changing the coordinates of a vector. Changing the linear mapping matrix when changing the base. Determinants (definition and calculation). Regular matrix. Inverse matrix. Matrix rank. Hermite's canonical form of the matrix. Elementary transformations. Systems of linear equations. Gaussian procedure. Kronecker-Capelli theorem. Kramer's theorem. Homogeneous systems of linear equations.

Structure of linear operators: Invariant subspace and eigenvector of a linear operator. Characteristic polynomial. Cayley-Hamilton theorem. Minimal polynomial of a linear operator. Diagonalization of a linear operator. Jordan's normal form of a linear operator. Conjugate operators and types of operators in Euclidean spaces. Symmetric linear operator. Orthogonal operators. Polar decomposition of a linear operator. Similarity in Euclidean space.

Practical part: exercises, other forms of teaching, research work.

Solving problems which are in accordance with the theoretical teaching.

Literature

1.   Кочинац Љубиша, "Линеарна алгебра и аналитичка геометрија", 2.исправљено и допуњено издање, Ниш, Просвета, 1997

2.   Љубиша Кочинац, Славиша Ђорђевић," Збирка задатака из линеарна алгебре и аналитичке геометрије" , Ниш, 1999

3.   Г. Калајџић, "Линеарна алгебра", 5. издање, Математички факултет, Београд, 2007.

Number of active classes				Other classes
Lectures: 3	Practical classes: 3	Other forms of teaching:		

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 tests	30 (15+15)	....	
Seminars	10		
Total	**40**		**60**