Program	Level	Short cycle
	Name of the program	Information Technologies

COURSE

Course title	**Linear Algebra and Analytic Geometry**			
Course code	Semester	Course status	ECTS	Contact hours (L+AE+LE)
IT 250	III	Mandatory course	6	3+3+0
Lecturer				
Course Goals	The course aims to acquire some knowledge about matrices, determinants, systems of linear equations, linear mappings, vectors, and simple geometrical objects such as planes, lines, and some simple surfaces in space.			
Learning Outcomes	After completing this course, students should demonstrate competency in the following skills: - Understand and be able to use matrices and their basic operations; - Analyse the solvability of linear equation systems and be able to find their solutions; - Understand basic concepts of linear operators and their matrix representation; - Overwhelm the techniques of eigenvalues and eigenvectors associated to linear operators in finite dimensional space; - Understand and be able to use vectors and their basic operations; - Understand the basic objects studied in analytic geometry (straight lines, plains, simple surfaces), and their equations, and be able to discuss their relationships; - Be able to apply achieved knowledge to solve particular practical problems in different disciplines in mathematics and information technologies.			

COURSE CONTENT

- Basic of the theory of vector spaces.
- Matrices, operations with matrices, determinants, inverse matrices, matrix equations.
- Systems of linear equations, techniques to solve systems of linear equations.
- Linear operators, associated matrices, eigenvalues and eigenvectors, diagonalization.
- Vectors, basic vector operations, dot, cross, and triple product of vectors, their properties, vector decomposition, the notion of coordinate systems, and coordinate systems transformations (translation and rotation).
- Concept of line and surface equation.Equations of planes and lines in space. Mutual relations between two lines, two planes, and plane and line in space. Basic surfaces in the space.
- Orthogonal sets, dot product, orthogonal projections, Gram-Schmidt orthogonalization method.

LITERATURE

[1] S. H. Freidberg, A. J. Insel, L. E. Spence: Linear algebra, Pearson, 2002.
[2] A. Odžak, S. Odžak: Linearna algebra i analitička geometrija sa primjenama, UNSA, Sarajevo, 2017.
[3] P. Miličić, M. Uščumlić: Zbirka zadataka iz više matematike I, Nauka, Beograd, 1996.
[4] M. M. Dizdarević, A. Odžak, L. Šćeta: Zbirka zadataka iz analitičke geometrije sa osnovama teorije, Univerzitet u Sarajevu, Sarajevo 2021.
[5] A. Muratović-Ribić: Uvod u linearnu algebru, Prirodno-matematički fakultet, UNSA, 2015.
[6] B. Stojanović: Zbirka zadataka iz matematike, Svejtlost, Sarajevo, 1987.
[7] C. L. Byrne, Applied and Computational Linear Algebra: A First Course, University of Massachusetts, Lowell, 2013.
[8] D. C. Lay, Linear Algebra and Its Applications, Pearson, 2015.
[9] G. Strang, Linear algebra and Applications, Wellesley Cambridge Press, 2009.

STUDENT WORKLOAD (hours in a semester)

Lectures	45	Exercises	45	Individual work	60	T o t a l	150

GRADING			**REMARKS**
Criterion	Maximum points	Minimum points	
Midterm exams	50	25	
Final exam	50	25	
T o t a l	100	55	