

Bialystok University of Technology									
Field of study	Computer Science							Degree level and programme type	Engineer's degree full-time programme
Specialization/ diploma path	---							Study profile	academic
Course name	Linear Algebra							Course code	FCS-00030
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	30	30						No. of ECTS credits	6
Entry requirements									
Course objectives	The aim of the course is to familiarize students with basic notions, examples, theorems and methods of Linear Algebra. Teaching how to perform operations on matrices, calculate determinants, solve systems of linear equations, perform operations on permutations, perform operations on complex numbers, linear spaces and linear transformations.								
Course content	<p>Lecture:</p> <p>The concept of a group, a group of permutations. Field of complex numbers, Matrices, rank of matrices. Systems of linear equations and the Gaussian elimination method. Determinants and their applications. Linear spaces, subspace of a linear space, Base and dimension of a linear space, Linear transformations, Kernel and image of a linear transformation, Eigenvalues and eigenvectors of a linear transformation.</p> <p>Classes:</p> <p>Operations in the group of permutation, Operations in the field of complex numbers, Operations in the set of matrices, inverse of matrix, rank of matrix, Solving systems of equations by Gaussian elimination method, Calculation of determinants, Applications of determinants, Base and dimension of a linear space, Linear transformations, Kernel and range of a linear transformation, Eigenvalues and eigenvectors of a linear transformation.</p>								
Teaching methods	informative lecture, lecture problem, classic problem method, subject exercises,								
Assessment method	Written exam, two written in-class tests								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	recalls basic notions and theorems of Linear Algebra, illustrates them by examples							K_W01	
LO2	describes problems using matrices and do operations on matrices							K_W01 K_U01	
LO3	recalls properties of permutations and complex numbers, and do operations on these objects							K_W01 K_U01	
LO4	finds the base and dimension of a linear space, kernel and image of a linear transformation							K_U01	
LO5	solves systems of linear equations; student calculates determinants and applies their properties							K_U01	
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed	
LO1	Written exam							L	
LO2	Written exam, written in-class tests							L,C	
LO3	Written exam, written in-class tests							L, C	
LO4	Written exam, written in-class tests							L,C	
LO5	Written exam, written in-class tests							L,C	
Student workload (in hours)								No. of hours	
Calculation	1 - Attendance at lectures -							30	
	2 - Attendance at classes -							30	
	3 - Preparation for classes -							45	
	4 - Preparation for exam -							16	
	5 - Presence during exam -							2	
	6 - Preparation for tests -							25	
	7 - Participation in student-teacher sessions -							2	
TOTAL:								150	
Quantitative indicators								HOURS	No. of ECTS credits
Student workload - activities that require direct teacher participation								64 (7)+(2)+(1)+(5)	2.6
Student workload - practical activities								100 (6)+(3)+(2)	4.0
Basic references	1. T.S. Blyth, E.F. Robertson, Basic linear algebra, Springer, New York, 2002 2. D. C. Lay, Linear algebra and its applications, Pearson/Addison-Wesley, 2006								
Supplementary references	1. T. Jankowski, Linear algebra, Politechnika Gdańska, Gdańsk, 2001 2. P. Liebeck, Vectors and matrices, Pergamon Press, Oxford, 1971 3. D. Poole, Linear algebra: a modern introduction, Thomson Brooks/Cole, Southbank, 2006								
Organisational unit conducting the course	Department of Theoretical Computer Science							Date of issuing the programme	
Author of the programme	dr Marzena Filipowicz-Chomko							Feb. 17, 2022	

L - lecture, C - classes, LC - laboratory classes, P - project, SW - specialization workshop, FW - field work, S - seminar