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 and Analytic Geometry 2**							**Course code**	**FCS-00060**
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	**Semester**	2
	30	30			15			**No. of ECTS credits**	**6**
Entry requirements									
Course objectives	The aim of the course is to familiarize students with more advanced notions, theorems and methods of Linear Algebra, and their connections with Analytic Geometry.								
Course content	Classes and lectures: Direct sum of linear spaces, quotient spaces. Linear endomorphisms, eigenvalues and eigenvectors, Jordan normal form. Dual vector space, dual basis, dual linear map. Bilinear forms. Quadratic forms, Lagrange reduction method, real quadratic forms, Jacobi method and Sylvester criterion. Euclidean spaces, Gram–Schmidt process. Inner product spaces. Affine spaces. Conic sections and quadric surfaces. Applications of Linear Algebra. Specialization workshop: Eigenvalues and eigenvectors of linear endomorphisms, Jordan form of a matrix, bilinear forms, quadratic forms, Conic sections and quadric surfaces								
Teaching methods	informative lecture, lecture problem, classic problem method, programming, subject exercises,								
Assessment method	Lecture: written test Classes: two written in-class tests Specialization workshop - evaluation of reports								

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 and Anallytic Geometry, illustarates them by examples	K_W01
LO2	presents correct mathematical reasonings using tools of Linear Algebra and Analytic Geometry	K_W01 K_U12
LO3	finds eigenvalues and eigenvectors of a matrix, checks the diagonalizability of a matrix	K_W01 K_U01
LO4	applies Gram–Schmidt process, finds orthogonal projection on a subspace, forms direct sums of linear spaces, forms quotient spaces	K_W01 K_U01
LO5	finds canonical form of quadratic forms, checks if a matrix is positive (negative) definite	K_W01 K_U01

Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	written test	L
LO2	written in-class tests, evaluation of reports	C, SW
LO3	written in-class tests, evaluation of reports	C, SW
LO4	written in-class tests, evaluation of reports	C, SW
LO5	written in-class tests, evaluation of reports	C, SW

Student workload (in hours)	**No. of hours**
Calculation	
1 - Attendance at lectures -	30
2 - Attendance at classes -	30
3 - Preparation for classes -	40
4 - Preparation for tests -	15
5 - Preparation for test -	15
6 - Participation in specialization workshop -	15
7 - Participation in student-teacher sessions -	5
TOTAL:	**150**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	80 (7)+(1)+(2)+(6)	3.2
Student workload – practical activities	100 (2)+(3)+(4)+(6)	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 3. D. Poole, Linear algebra: a modern introduction, Thomson Brooks/Cole, Southbank, 2006
Supplementary references	1. T. Jankowski, Linear algebra, Politechnika Gdańska, Gdańsk, 2001 2. P. Liebeck, Vectors and matrices, Pergamon Press, Oxford, 1971
Organisational unit conducting the course	Department of Mathematics — **Date of issuing the programme**
Author of the programme	dr Krzysztof Piekarski — Feb. 17, 2022

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