

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Discrete mathematics, PG_00047546									
Field of study	Automatic Control, Cybernetics and Robotics									
Date of commencement of studies	October 2022		Academic year of realisation of subject			2022/2023				
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study				
Mode of study	Full-time studies		Mode of delivery			at the university				
Year of study	1		Language of instruction			Polish				
Semester of study	2		ECTS credits			4.0				
Learning profile	general academic profile		Assessment form			assessment				
Conducting unit	Department of Decision Systems and Robotics -> Faculty of Electronics, Telecommunications and Informatics									
Name and surname	Subject supervisor		dr inż. Mariusz Domżalski							
of lecturer (lecturers)	Teachers		dr inż. Marius	inż. Mariusz Domżalski						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM		
of instruction	Number of study hours	15.0	15.0	0.0	0.0		0.0	30		
	E-learning hours included: 0.0									
Learning activity and number of study hours	Learning activity Participation ir classes includ plan		I didactic Participation in consultation hours		Self-study SUM		SUM			
	Number of study hours	30		4.0		66.0		100		
Subject objectives	 Assimilation of knowledge of set theory, mathematical logic, data structures (trees) and graph theory. Learning algorithms of graph coloring and searching for the shortest path in the graph. 									
Learning outcomes	Course out	Course outcome			Subject outcome			Method of verification		
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issue related to the field of study			Student got knowledge on set theory, mathematical logic, data structures (trees) and graph theory. Student learned basic algorithms for searching in data structures (trees), graph coloring and searching for the shortest path in graphs. Student got prepared for analysing simple algorithms and implementation of the presented algorithms in practice.			[SK2] Assessment of progress of work [SU1] Assessment of task fulfilment			
	[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn		of discrete mathematics including set theory, logic and basic graph algorithms. Student is able to use appropriate external sources to solve discrete mathematics problems.			[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment				

Subject contents	 Set theory. Set operations. Venn diagrams. Mathematical induction. Logic and propositional calculus. Basic logical operations and truth tables. Quantifiers. Relations. Types of relations – reflexive, symmetric, antisymmetric, transitive. Equivalence relations, ordering relations. Functions. Injective, surjective and bijective functions. Invertible function. Function composition. Introduction to graph theory. Subgraphs, isomorphic and homeomorphic graphs. Planar graphs. Trees. Binary trees. Traversing binary trees. Binary search trees Introduction to Computational Complexity Graph coloring. Discrete optimization methods for searching the cheapest path in the flow graph. Eulerian path problems. Hamiltonian circuit problem. 					
Prerequisites and co-requisites						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Tests	50.0%	90.0%			
	Homework	50.0%	10.0%			
Recommended reading	Basic literature	 A.Szepietowski, Matematyka Dyskretna, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2006. S.S. Epp, Discrete Mathematics with Applications, Brooks Cole, 2003. K.A. Ross, C.R.B. Wright, Discrete Mathematics, Pearson, 2002. 				
	Supplementary literature	Resources available in the internet.				
	eResources addresses	Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed	 Find the truth table of a given logic function. Use mathematical induction to show that 5 divides 7ⁿ - 2ⁿ, for any natural number n. What properties has the relation "x is greater than y" for real numbers x and y. Decide whether a given graph is planar. Find the shortest path in a given graph. 					
Work placement	Not applicable					

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