GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Discrete Mathematics, PG_00047646						
Field of study	Informatics						
Date of commencement of studies	October 2021		Academic year of realisation of subject	2021/2022			
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 Algorithms and Systems Modelling -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Paweł Obszarski					
	Teachers	mgr inż. Robert Ostrowski mgr inż. Andrzej Jastrzębski dr Paweł Obszarski dr inż. Joanna Raczek					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Matematyka Dyskretna (Discrete Mathematics) Lato 2022 - Moodle ID: 21973 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=21973						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM		
	Number of study hours	60	3.0	37.0	100		
Subject objectives	Obtaining skills in formulating thesis using formal mathematical language. Ability of expressing relations, dependencies and configurations in a strict abstract form. Understanding clue of reasoning and proofs construction.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W41] Knows and understands, to an advanced extent, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining	Understands elements of graph theory and combinatorics crucial in data analysis.	[SW1] Assessment of factual knowledge
[K6_K02] is ready to critically assess possessed knowledge and acknowledge the importance of knowledge in solving cognitive and practical problems	Learns about various mathematical models and how to use them in practice.	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
[K6_W01] Knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	Knows numerous algorithmic issues from set theory, combinatorics and graph theory.	[SW1] Assessment of factual knowledge
[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	Knows how to use in practice knowledge from graph theory, set theory and others.	[SU4] Assessment of ability to use methods and tools

Subject contents

Algebra of sets. Propositional calculus. Predicate calculus. Mathematical Induction. Binary relations: equivalence relations, the principle of abstraction, cleanup, closure transitive and equivalence. Counting and generating combinatorial objects (functions, locations, divisions - the number of Stirling). Congruence arithmetic modulo n (the Chinese remainder theorem, Fermat, Euclid's algorithm, the government element in the multiplicative group modulo n). Graph theory - notation, basic concepts, eulerian graphs, the problem of the Chinese postman, hamiltonian graphs, the traveling salesman problem, ownership of trees, planarity. Coloring graphs. Asymptotic of numeric functions - symbols O () with (). Recursive relationships - methods: guessing disturbing, "complicate and simplify" generating functions.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Test 1.	50.0%	45.0%
Classes activity	0.0%	10.0%
Test 2	50.0%	45.0%

Recommended reading

Basic literature	[1] K. A. Ross, C. R. B. Wright, *Matematyka dyskretna*, PWN, Warszawa 1996. [2] R. L. Graham, D. E. Knuth, O. Patashnik, *Matematyka konkretna*, PWN, Warszawa 1996.
Supplementary literature	[3] W. Lipski, W. Marek, *Analiza kombinatoryczna*, PWN, Warszawa 1986. [4] H. Rasiowa, *Wstęp do matematyki współczesnej*, PWN, Warszawa 1984. [5] Robin J. Wilson, *Wprowadzenie do teorii grafów*, PWN, Warszawa 2000.
eResources addresses	Matematyka Dyskretna (Discrete Mathematics) Lato 2022 - Moodle ID: 21973 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=21973

Example issues/ example questions/ tasks being completed

Data are n balls, each of which weighs 10 g, except for one that weighs 9 g or 11 g using k weighing (weight balance) must decide which ball has a different weight, and whether it is lighter or heavier from the other. Determine the maximum value which n can assume at a given angle as a function f (k). Introduce weighting algorithm for any k and n = f (k).

Work placement

Not applicable