GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of Algorithm Analysis, PG_00047660		
Field of study	Informatics		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	3.0
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 hab. inż. Michał Małafiejski	
	Teachers	dr hab. inż. Michał Małafiejski prof. dr hab. inż. Marek Kubale	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
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 in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	15.0	30.0	75

Subject objectives

The aim is to make students sensitive to the problems of efficiency of algorithms and to aware them of computational barrier.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] Knows and understands the basic processes occurring in the life cycle of devices, facilities and systems specific to a given field of study.	Knows algorithmic processes	[SW1] Assessment of factual knowledge
[K6_U07] can apply methods of process and function support, specific to the field of study	Knows how to improve the complexity of algorithms	[SU2] Assessment of ability to analyse information
[K6_W05] Knows and understands, to an advanced extent, methods of supporting processes and functions, specific to the field of study	The student knows functions of computational complexity.	[SW1] Assessment of factual knowledge

Subject contents

1. Algorithmic and non-algorithmic problems 2. Turing machine 3. The concept of computational complexity 4. Implementation and programming 5. Analysis of recursive algorithms, algorithms "divide and conquer" 6. Analysis of recursive algorithms, algorithms "one step back" 7. Fast matrix multiplication 8. Non-deterministic algorithms 9. Classes P and NP 10. NP-complete problems 11. Proofs of NP-completeness 1 12. Proofs of NP-completeness 2 13. Absolute approximation algorithms 14. Relative approximation algorithms 15. Polynomial approximation schemes

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium 1	50.0%	50.0%
Midterm colloquium 2	50.0%	50.0%

Recommended reading

Basic literature	M. Kubale: Łagodne wprowadzenie do analizy algorytmów, WPG, Gdańsk, 2014. M. Kubale: Introduction to Computational Complexity and Algorithmic Graph Coloring, WGTN, Gdańsk, 1998.

	Supplementary literature	M.R. Garey, D..S Johnson: Computers and Intractability. A Guide to the Theory of NP-Completeness, Freeman, San Francisco, 1979.
	eResources addresses	Adresy na platformie eNauczanie: PODSTAWY ANALIZY ALGORYTMÓW - Moodle ID: 8531 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=8531
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	