Subject card

Subject name and code	Fundamentals of Algorithm Analysis, PG_00047660						
Field of study	Informatics						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
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		prof. dr hab. inż. Marek Kubale				
	Teachers		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_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
	[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_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

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 2	50.0%	50.0%
	Midterm colloquium 1	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:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	