

## Subject card

Subject name and code	Fundamentals of Algorithm Analysis, PG_00047660								
Field of study	Informatics								
Date of commencement of studies	October 2020		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	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	Subject supervisor		prof. dr hab. inż. Marek Kubale						
of lecturer (lecturers)	Teachers	prof. dr hab. inż. Marek Kubale mgr inż. Andrzej Jastrzębski							
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								
	Adresy na platformie eNauczanie:								
Learning activity and number of study hours	Learning activity	Participation in dida classes included in plan				Self-study SUM		SUM	
	Number of study hours			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	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.								

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	Supplementary literature	M.R. Garey, DS Johnson: Computers and Intractability. A Guide to the Theory of NP-Completeness, Freeman, San Francisco, 1979.				
	eResources addresses					
Example issues/ example questions/ tasks being completed						
Work placement	Not applicable					

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