

Subject card

Subject name and code	Numerical Algorithms, PG_00198019						
Field of study	Informatics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2028/2029		
Education level	Bachelor's 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	3		Language of instruction		Polish Polish		
Semester of study	6		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Łukasz Kuszner				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		0.0		65.0	125
Subject objectives	The aim of the course is to familiarize students with numerical methods, their applications and problems arising during such calculations						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems	Student knows the iterative method and examples of its application. Student knows methods for solving linear equations. Student can apply the learned methods to solve a design problem.	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[INFOL3_U06] is able to select and apply appropriate IT methods and tools to solve complex problems, is able to use acquired knowledge by appropriately selecting sources and information derived from them, and perform evaluation, critical analysis, and synthesis of this information	Student understands the concepts of interpolation and approximation. Student understands the types of errors that arise during calculations, observes their occurrence, and applies methods to limit and control them. Student is able to find papers on a specific problem and apply selected elements to solve the assigned homework.	[SU5] implementation of a problem task
	[INFOL3_W03] knows and understands advanced concepts in the field of algorithms and data structures, formal languages, automata theory and computational complexity, and artificial intelligence	Student knows and is able to apply methods for representing matrices in computer memory, including sparse matrix representations. Student will understand the impact of the chosen method on the computational and memory complexity of the implemented algorithm.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
Subject contents	1. Numerical errors 2. Systems of linear equations 3. Nonlinear equations 4. Interpolation 5. Approximation 6. Numerical integration		
Prerequisites and co-requisites	1. Object-oriented programming 2. Linear algebra 3. Algorithms and data structures		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture - exam	51.0%	50.0%
	laboratory - evaluation of project problems	51.0%	50.0%
Recommended reading	Basic literature	T. Ratajczak, Metody numeryczne. Przykłady i zadania, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2007. Z. Fortuna, B. Macukow, J. Wąsowski, Metody numeryczne, WNT, Warszawa 2006. David Monniaux, The pitfalls of verifying floating-point computations. ACM Transactions on Programming Languages and Systems (TOPLAS), ACM, 2008, 30 (3).	
	Supplementary literature	Wojciech Kordecki, Karol Selwat, Metody numeryczne dla informatyków, Helion, Gliwice, 2020	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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