University of Gdańsk

Subject card

Subject name and code	Numerical algorithms, PG_00143576		
Field of study	Informatics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	Bachelor's 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	4	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	dr inż. Łukasz Kuszner	

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
[INFL3_U01] can apply mathematical knowledge to formulate, analyze and solve problems related to computer science	The student is able to solve a large system of linear equations using appropriate methods The student is able to verify the correctness of the obtained results and indicate the causes of errors The student is able to apply the known interpolation and approximation methods to work with practical data processing issues The student is able to learn and understand the numerical algorithm and apply it in practice	[SU2] presentation/project/paper/ report [SU5] implementation of a problem task [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
[INFL3_W01] has knowledge in mathematics including issues of mathematical analysis and linear algebra with geometry and numerical methods	the student knows the iterative method and examples of its application the student knows methods of solving linear equations the student knows the issues of interpolation and approximation the student knows the error types numerical data processing	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>1. Numerical errors
2. Systems of linear equations
3. Nonlinear equations
4. Interpolation
5. Approximation
6. Numerical integration</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>• Object-oriented programming
• Linear algebra
• Discrete mathematics 1
• Discrete mathematics 2
• Algorithms and data structures I</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td></td><td>51.0%</td><td>50.0%</td></tr><tr><td></td><td>51.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>T. Ratajczak, Metody numeryczne. Przykłady i zadania, Wydawnictwo Politechniki Gdanskiej, 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).</td></tr>
<tr><td>Supplementary literature</td><td>Wojciech Kordecki, Karol Selwat, Metody numeryczne dla informatyków, Helion, Gliwice, 2020</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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