

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Numerical Methods, PG_00063886								
Field of study	Informatics								
Date of commencement of studies	October 2025		Academic year of realisation of subject			2027/2028			
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	3		Language of instruction			Polish			
Semester of study	5		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form		assessment				
Conducting unit	Department Of Algorithms And Systems Modelling -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej								
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Grzegorz Fotyga						
	Teachers		dr hab. inż. Grzegorz Fotyga						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	^o roject Sen		SUM	
	Number of study hours	15.0	0.0	15.0	15.0		0.0	45	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes include plan	n didactic led in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	45		7.0		48.0		100	
Subject objectives	The primary objective of the course is to teach student how to analyze and apply basic numerical analysis metods, and how to implement numerical algorithms using high-level programming languages.								

Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn	Student analyzes problems, creates basic numerical algorithms and estimates numerical errors of the received solutions. Analyzes sources, identifies types of numerical errors and their propagation.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment				
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	The student knows and understands the basics of numerical analysis used to solve engineering problems, in particular such issues as: solving systems of linear equations, nonlinear equations, approximation, interpolation, numerical integration.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge				
	[K6_U08] while identifying and formulating specifications of engineering tasks related to the field of study and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering work n	The student solves engineering problems using numerical methods that are adequate to the complexity of the problem. Students will be able to assess the computational complexity of the methods used and identify sources of possible numerical errors.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment				
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	The student is able to critically analyze and evaluate existing solutions using both theoretical knowledge acquired during lectures and practical knowledge acquired during projects and laboratory classes.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task				
Subject contents	 Introduction to numerical methods. Floating point representation of numbers. Types of errors and their sources. Well and ill conditioned numerical problems. Stability of numerical algorithms. Solving linear systems using direct and iterative methods. Solving of equations of one variable. Interpolaction using Lagrange, Chebyshew and trigonometric polynomials. Cubic spline interpolation. Numerical integration. Numerical differentiation. Solving of systems of nonlinear equations. Introduction to solving differential equations. 						
Prerequisites and co-requisites							
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and chilena	Midterm colloquium	50.0%	40.0%				
	Practical exercise	50.0%	30.0%				
Recommended reading	Basic literature	[1] Burden R.L., Faires J.D. , Numerical Analysis, Prindle, Weber & Schmidt, Boston 1981.					
	Supplementary literature	No requirements					
	Resources addresses Adresy na platformie eNauczanie:						
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						

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