GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Numerical Methods, PG_00038088		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology	
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Mirosław Wołoszyn
	Teachers	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	30.0	0.0	0.0	0.0	45

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	45	4.0	26.0	75

Subject objectives

The purpose of the course is for the student to master the numerical methods used in engineering calculations.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W01	The student uses numerical methods in engineering work.	[SW1] Assessment of factual knowledge
K6_U05	The student uses computer tools for numerical calculations.	[SU4] Assessment of ability to use methods and tools

Subject contents

Course content – lecture

Computer arithmetic and round-off error, floating-point representation. Numerical matrix algebra: systems of linear algebraic equations, Gauss elimination, Gauss - Jordan elimination, LU decompostion, computation of the inverse matrix, iterative methods. Nonlinear algebraic equations: one equation: bisection, regula-falsi method, secant method, Newtons method, system of equations: fixed-point iterations, Newtons method. Function interpolation: Lagrange polynomials. Numerical differentiation of a function of one variable, backward, centered, and forward differences. Approximation of functions: least-squares n polynomials. Numerical integration of one-dimensional integrals: Newton-Cotes rules, Romberg integration, Gauss-Legendre quadrature, singular integrands, integrals over infinite domains. Initial-value problems for ordinary differential equations: polynomial approximation, Euler method.

Course content – exercises

The student solves problems using numerical methods. They solve systems of linear equations, nonlinear equations, use interpolation and approximation, calculate integrals, and solve ordinary differential equations.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
tasks from lectures	60.0%	12.0%
tests and work on exercises	60.0%	88.0%

Recommended reading

Basic literature	C. Pozrikidis: Numerical Computation in Science and Engineering,Oxford University Press 1998.
Supplementary literature	James F. Epperson: An introduction to numerical methods and analysis. Wiley, 2013
eResources addresses	

Example issues/ example questions/ tasks being completed

The solution of equations by Gauss, LU, GS. Lagrange interpolation function method. Approximation of the function sin (x) using the mean square approximation. Calculation of integrals by Simpson. The solution of nonlinear equations using Newton's method. The solution of differential equations using Euler's method.

Practical activites within the subject	Not applicable

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