GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics 1, PG_00041990		
Field of study	Power Engineering, Power Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
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	1	Language of instruction	English
Semester of study	1	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Mathematics Center -> Vice-Rector for Education		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Hanna Guze	
	Teachers	dr Hanna Guze	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	60.0	0.0	0.0	0.0	90

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	90	15.0	45.0	150

Subject objectives

Students obtain competence in using methods of mathematical analysis (single variable calculus) and linear algebra, and knowledge how to solve simple problems that are found in the field of engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] has basic knowledge of mathematics necessary to describe the phenomena related to the processes of energy conversion and transfer; uses information technology to solve mathematical problems	Student names basic properties of elementary functions. Student explains the concept of limit and continuity of functions and gives a graphic interpretation of discontinuity points. Student uses the first and second derivative of a function to analyze its properties. Student uses definite integral to solve geometrical problems. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in technical fields. Student defines the basic concepts of linear algebra and the knows what mathematical tools are used in technical calculation programs.	[SW1] Assessment of factual knowledge
[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	Student combines knowledge of mathematics with knowledge from other fields.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_K01] is aware of the need for training and self-improvement in the profession of energy and the possibility of further education; can think and act in a creative and entrepreneurial manner; can define priorities for the implementation of an individual or group task	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.	[SK2] Assessment of progress of work

Subject contents

Elements of linear algebra.

- Matrices and determinants.
- Inverse matrix.
- Systems of linear equations.

Elementary functions.

- Linear function
- Quadratic function
- Polynomials
- Power function
- Exponential function
- Logarithmic function
- Cyclometric and trigonometric functions

Sequences. Limits and continuity of one-variable functions.

Differential calculus of one variable functions and its applications.

Anti-derivate.

- The substitution method of integration and integration by parts.
- Integration of rational, trigonometric and irrational functions.

Definite and improper integrals

- Geometrical applications and applications to other fields.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written final exam	40.0%	50.0%
Tests and activity in classes	0.0%	50.0%

Recommended reading

Basic literature	George B. Thomas, Jr., Ross L. Finney., Calculus and analytic geometry, Addison-Wesley Publishing Company; 7th edition (January 1988) Sherman K. Stein, Calculus and analytic geometry, McGraw-Hill Book Company, 4th edition, 1987, T.Jankowski, Linear algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2001.
Supplementary literature	Praca zbiorowa pod redakcja B.Wikieł, Matematyka. Podstawy z elementami matematyki wyższej. Wydawnictwo Politechniki Gdanskiej, Gdansk, 2007. M.Gewert, Z.Skoczylas, Analiza matematyczna I - Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS M.Gewert, Z.Skoczylas, Analiza matematyczna I - Przykłady i zadania, Oficyna Wydawnicza GiS K. Jankowska, T. Jankowski, Zbior zadan z matematyki. Wydawnictwo Politechniki Gdanskiej , Gdansk, 2007.
eResources addresses	Adresy na platformie eNauczanie: WIMiO - ET - Mathematics I 2023/24 (H.Guze) - Moodle ID: 31612 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31612

Example issues/ example questions/ tasks being completed

- Solve the system of linear equations.
- Find the inverse matrix (to a given matrix).
- Find limits of given sequence, of given function.
- Find the domian and the range of the function f(x) =... . Calculate the inverse of the function.
- Find the derivative of f(x)= . Find the intervals on which the function is convex and decreasing.
- Sketch the graph of the function f(x)= . Identify any local extrema and points of inflection.
- Evaluate the given integrals.
- Find the volume of a solid of revolution obtained by rotating the graph of the function f(x)= about the OX axis.

Work placement	Not applicable

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