GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics, PG_00054682		
Field of study	Biotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
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	Polish
Semester of study	1	ECTS credits	9.0
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 Anita Dąbrowicz-Tlałka	
	Teachers	dr Anita Dąbrowicz-Tlałka dr Hanna Guze dr Lech Kujawski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	45.0	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	10.0	125.0	225

Subject objectives	Students obtain competence in the range of using methods of mathematical analysis and linear algebra and knowledge how to solve simple problems that can be found in the field of engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W01	Student mentions basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student gives the definition of basic notions of differential calculus. Student uses basic notions and formulas of differential calculus. Student determines intervals of monotonicity of a given functions and its extrema. Students calculates antiderivatives using the substitution method of integration and integration by parts. Student applies definite integrals to solving geometrical problems. Student uses the basic operations on complex numbers.	[SW1] Assessment of factual knowledge
K6_U01	Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents

The sets of numbers and set notation. Basic mathematics symbols.

Functions of one variable:

- definitions, graphs, properties, continuity, limits
- absolute value, equations and inequalities
- polynomials, rational functions, power functions, trigonometric and inverse trigonomertic functions, exponential and logarithmic functions
- equations and inequalities involving these functions
- applications to mathematical modeling

Infinite number sequences, limits and continuity of functions

- boundedness and monotonicity
- limits
- continuity of functions, types of discontinuities and their interpretation

Single variable calculus:

- definition of the derivative
- Rolle's and Lagrange's theorems and their applications
- L'Hospital's Rule
- monotonicity and local/global extrema (optimization problems)
- higher order derivatives
- concavity, inflection points
- applications of single variable differential calculus to curve sketching, related rates and approximation problems
- applications of differential calculus to other fields (e.g. chemistry, physics, biology)
- definite and indefinite integral, Fundamental Theorem of Calculus
- basic integration formulas
- integration by substitution, by parts, by partial fractions
- applications of integral calculus to other fields

Complex numbers

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	50.0%	50.0%
Midterm exams	0.0%	40.0%
Activity during classes	0.0%	10.0%

Recommended reading

Basic literature	- Praca zbiorowa pod redakcją Wikieł B.: Matematyka - Podstawy z elementami matematyki wyższej. PG, Gdańsk 2007; - M. Gewert, Z. Skoczylas : Analiza matematyczna 1, Oficyna Wydawnicza GiS 2008; - K. Jankowska, T. Jankowski : Zbiór zadań z matematyki, Wydawnictwo PG, 2010.
Supplementary literature	- G.M. Fichtenholz : Rachunek różniczkowy i całkowy I, PWN 1985; - R. Leitner : Zarys matematyki wyższej I i II, Wydawnictwo Naukowo-Techniczne Warszawa 1999; - L. Maurin, M. Maczyński, T. Traczyk : Matematyka - podręcznik dla studentów wydziałów chemicznych, PWN 1975. - W. Żakowski, G. Decewicz : Matematyka I I II, Wydawnictwo Naukowo-Techniczne, Warszawa 1991.
eResources addresses	Podstawowe https://enauczanie.pg.edu.pl/moodle/course/view.php?id=21851 - Course with information for students and educational materials. Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Find the domian and the set of values of the function f(x) =.... 2. Find the derivative of f(x)= 3. Sketch the graph of the function f(x)= . Identify any local extrema and points of inflection. 4. Find solutions of the equation ... in the set of complex numbers. 5. Use the definite integral to determine the volume of the solid formed by the rotation of the curve ... around the axis oX.
Work placement	Not applicable

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