GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics, PG_00052278		
Field of study	Chemical Technology		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2021/2022
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	blended-learning
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 Hanna Guze dr Anita Dąbrowicz-Tlałka mgr inż. Krystyna Dąbrowska	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	60.0	0.0	0.0	0.0	105
	E-learning hours included: 45.0						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15537 Adresy na platformie eNauczanie:						

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	105	5.0	160.0	270

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_U01	Student appreciates the importance of skilful use of the basic mathematical apparatus in the aspect of technical studies and is able to undertake substantive discussion related to the selection of the method for the task he solves. Student is able to integrate the information obtained in a mathematical task, interpret them, draw conclusions and reason opinions.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
K6_W01	Student mentions basic properties of elementary functions. Student knows the methods of solving equations and inequalities containing elementary functions. Student defines the basic concepts and formulas of differential calculus. Student lists basic applications of derivatives for function testing. The student knows the methods of calculating the indefinite integral using e.g. the method of integration by substitution and by parts. Student knows how to use the definite integral to solve problems in the field of geometry. Student knows the basic definitions and theorems related to complex numbers.	[SW1] Assessment of factual knowledge

Subject contents

Functions of one variable and their properties:
The absolute value function definition, solving equations and inequalities with absolute value, graphs of functions with absolute value.
Power functions solving power and polynomial equations and inequalities.
Rational functions solving rational equations and inequalities.
Exponential function properties and graphs, solving exponential equations and inequalities.
Logarithmic functions properties and graphs, solving logarithmic equations and inequalities.
Trigonometric and cyclometric functions properties and graphs, solving trigonometric equations and inequalities.
Limits and continuity:
Infinite sequences. Fundamental definitions of limit of sequence, convergence and divergence, limit theorems. Applications to solving equations .
Differential calculus of functions with one variable and applications of differential calculus of functions with one variable:
Definition of first derivative and differential. Rolls and Lagranges theorems. Higher derivatives and differentials. Monotonicity and local extrema. Convexity, concavity and inflexion points of a function. De lHospitals Thorem. Asymptotes. Applying differential calculus to studying the properties of functions with one variable.
Inegral calculus of functions with one variable antiderivatives:
The process of finding antiderivatives and integration formulas the substitution method of integration and integration by parts. Integration of rational, trigonometric and irrational functions.
Definite integrals in Riemann"s sense:
Newtona-Leibniza Thorem. Integration formulas, the substitution method of integration and integration by parts for definite integrals. Applications of integral calculus in computing areas of plane figures, lengths of arcs, volumes of solids of revolution.
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%
Tests (lecture)	0.0%	6.0%
Midterm exams	0.0%	36.0%
Activity during classes	0.0%	8.0%

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	
Example issues/ example questions/ tasks being completed	1. Find the domain and the set of values of the function f(x)=... . Determine the inverse function of f. 2. Check the continuity of the following function f(x)= . 3. Find local extremes and intervals of monotonicity of the following function f(x)= . 4. Evaluate the indefinite integral of the given rational function . 5. Give three applications of the definite integral with appropriate rules. 6. Find the area of the region bounded by y=, y= , x= and x= . 7. Find in the complex set solutions of the equation	
Work placement	Not applicable	