GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics I, PG_00043608		
Field of study	Environmental Engineering		
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 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	8.0
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 Cezary Mrozicki	
	Teachers	mgr Justyna Woroń mgr Małgorzata Kula dr Cezary Mrozicki	

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

Adresy na platformie eNauczanie:

WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2021/2022 (C. Mrozicki) - Moodle ID: 18684
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18684

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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	216.0	316

Subject objectives

Students obtain competence in the range of using methods of mathematical analisis 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] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions	The student combines knowledge of mathematics with knowledge from other fields.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [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
[K6_W01] has knowledge in the field of mathematics, including: linear algebra, mathematical analysis and elements of mathematical statistics, probability theory, applications of mathematics, including mathematical methods and numerical methods, necessary for: 1) description and analysis of hydrological phenomena; 2) description and analysis of meteorological phenomena; 3) solving project tasks of the sanitary industry;	The student lists the basic properties of elementary functions. The student solves equations and inequalities containing elementary functions. The student interprets geometrically the study of graphs of functions using the concept of limit and continuity of functions. The student defines the basic concepts of differential calculus of one variable. The student analyses the properties of functions on the basis of an examination of its first and second derivatives. The student applies the basic rules and techniques of integration to calculate indefinite integrals.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

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, exponential, logarithmic, trigonometric and cyclometric functions – properties and graphs, solving equations and inequalities.

Limits and continuity:
Infinite sequences.
Fundamental definitions of limit of sequence, convergence and divergence, limit theorems.
Applications to solving equation.

Differential calculus of functions with one variable and applications of differential calculus of one variable functions:
Definition of first derivative and differential.
Roll's and Lagrange's theorems.
Higher derivatives and differentials.
Monotonicity and local extrema.
Convexity, concavity and inflexion points of a function.
De l'Hospital's Theorem. Taylor's Theorem.
Asymptotes.
Applying differential calculus to study the properties of one variable functions.

Integral calculus of functions with one variable – indefinite integral:
Basic methods and ways of integration - integration by parts and substitution.
Integration of rational functions, trigonometric and irrational.

Prerequisites and co-requisites

There are no preliminary or additional requirements.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	50.0%	35.0%
Midterm colloquium	50.0%	65.0%

Recommended reading

Basic literature	Pod redakcją B. Wikieł, Matematyka. Podstawy z elementami matematyki wyższej. Wydawnictwo PG, Gdańsk 2009 W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach 1, Wydawnictwo Naukowe PWN, Warszawa 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Przykłady i zadania. Oficyna Wydawnicza GIS, Wrocław 2008 K. Jankowska, T. Jankowski, Zbiór zadań z matematyki, Wydawnictwo PG, Gdańsk 2008
Supplementary literature	W. Leksiński, I. Nabiałek, W. Żakowski, Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa 2006

	eResources addresses	WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2021/2022 (C. Mrozicki) - Moodle ID: 18684 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18684 WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2021/2022 (C. Mrozicki) - Moodle ID: 18684 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18684 WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2021/2022 (C. Mrozicki) - Moodle ID: 18684 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18684
Example issues/ example questions/ tasks being completed	1. Investigate the monotonicity of the sequence (a_n). 2. Enter the properties of the function f (x) = ... 3. Calculate the derivative of the function f (x) = ... 4. Determine the indefinite integral of the function f (x) = ...	
Work placement	Not applicable	