GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics, PG_00048797		
Field of study	Green Technologies		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2020/2021
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	10.0
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 Anna Niewulis	
	Teachers	dr Anna Niewulis	

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: 45.0

Adresy na platformie eNauczanie:
ZIELONE TECHNOLOGIE [2020/21] - Moodle ID: 6425
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6425

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	150.0	250

Subject objectives

Students obtain competence in using methods of mathematical analysis (single variable calculus) and knowledge how to solve simple problems that are found in the field of engineering, in particular connected to green technologies and enviroment protection.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K01] understands the need for learning throughout life, can inspire and organize the learning process of others. Is aware of his/ her own limitations and knows when to ask the experts, can properly identify priorities for implementation, critically evaluate his knowledge	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, is able to draw conclusions and reason opinions.	[SK2] Assessment of progress of work [SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice
[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes	Student combines knowledge of mathematics with knowledge from other fields. Student uses methods of mathematical description of phenomena in the physical and chemical processes.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K6_W01] has a basic knowledge from some branches of mathematics and physics useful for formulating and solving simple problems in the field of environmental technologies and modern analytical methods	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 the future.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents

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

IFunctions 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

- arithmetic and geometric
- explicit and recursive formulas
- boundedness, monotonicity, limits

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

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium	50.0%	39.0%
e-Test	50.0%	5.0%
Tests and Activity	50.0%	6.0%
Written exam	50.0%	50.0%

Recommended reading

Basic literature	• "Matematyka - Podstawy z elementami matematyki wyższej"pod redakcją Barbary Wikieł, Wydawnictwo PG, Gdańsk 2009 • K. Jankowska, T. Jankowski, "Zbiór zadań z matematyki", cz. 1, PG Gdańsk • 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
Supplementary literature	• R. Leitner, "Zarys matematyki wyższej I i II", WNT • W. Krysicki, L. Włodarski, "Analiza matematyczna w zadaniach I", PWN
eResources addresses	ZIELONE TECHNOLOGIE [2020/21] - Moodle ID: 6425 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6425

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 the absolute extrema of f(x)=… on the interval … .
5. Calculate ∫ …dx.

Work placement

Not applicable