GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics I, PG_00055733		
Field of study	Mechanical and Medical 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
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	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 mgr Katarzyna Kiepiela	

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: 0.0

Adresy na platformie eNauczanie:
WIMiO - IMM - Matematyka I 2021/2022 (A.Niewulis) - Moodle ID: 18456 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18456

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	24.0	121.0	250

Subject objectives

The aim of this subject is to obtain the student's competence in the range of using the basic methods of mathematical analysis. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] he/she is able to use analytic and modelling methods to formulate and solve engineering tasks related to the mechanical-medical area	The student is able to apply the mathematical methods for analysis to solve problems in the field of mechanical and medical engineering.	[SU2] Assessment of ability to analyse information
[K6_U01] he/she is able to acquire knowledge and self-studying, he/she is able to find needed information in specialist books, databases and other sources, he/she is able to integrate information and draw conclusions, he/she is able to communicate by using different technics in work and outside	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student combines knowledge of mathematics with knowledge from other fields.	[SU1] Assessment of task fulfilment
[K6_W01] he/she has mathematics skills related to linear algebra and applied mathematics to model a given mechanical system, manufacturing process or technical device	Student applies the basic properties of derivatives. Student analyzes the properties of functions with the use of its first and second derivatives. Student applies basic formulas and techniques of integration to calculate indefinite integrals.	[SW1] Assessment of factual knowledge

Subject contents	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, fundamental definitions of a limit of a sequence, convergence and divergence, limit theorems. Single variable calculus: definition of the derivative, Rolle's and Lagrange's theorems and their applications, L'Hospital's Rule, higher order derivatives, monotonicity and local/global extrema, concavity, inflection points, applications of single variable differential calculus to curve sketching, related rates and approximation problems, applications of differential calculus to other fields. Fundamental Theorem of Calculus: definite and indefinite integral, basic integration formulas, integration by substitution, by parts, by partial fractions, Integration of rational functions, trigonometric and irrational, applications of integral calculus to other fields. Elements of linear algebra: matrices, determinants and their properties, systems of linear equations. Basic definitions and properties of vectors. Scalar, vector, mixed product - applications.
Prerequisites and co-requisites	No recomendations
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
midterm colloquium	50.0%	50.0%
exam	50.0%	50.0%

Recommended reading	Basic literature	G.M. Fichtenholz, Rachunek różniczkowy i całkowy,Tom 1, Wydawnictwo Naukowe PWN, Warszawa 2002 , B.Wikieł, Matematyka, Podstawy z elementami matematyki wyższej, Wydawnictwo Politechniki Gdańskiej Gdańsk 2009, K.Jankowska, J.Jankowski, Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej Gdańsk 2003, W. Krysicki, L. Włodarski Analiza matematyczna w zadaniach część I, PWN, Warszawa 1986.
	Supplementary literature	M.Gewert, Z.Skoczylas, Analiza matematyczna 1, Przykłady i zadania, GiS, Wrocław 2000, R.Leitner, W.Matuszewski, Z.Rojek, Zadania z matematyki wyższej, cz. 1, WNT,Warszawa 1992, W.Żakowski, Ćwiczenia problemowe dla politechnik, WNT, Warszawa, 1991.
	eResources addresses	WIMiO - IMM - Matematyka I 2021/2022 (A.Niewulis) - Moodle ID: 18456 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18456
Example issues/ example questions/ tasks being completed	1. Prove that this sequence is monotonic a_n=(n^2+1)/n!. 2. Evaluate the limit of a given sequence $a_n=(3n^2+6n)^{1/2}-3^{1/2}n$. 3. Find the limit of the function f(x)= x sin(1/x) in the zero point. 4. Evaluate the indefinite integral of the given rational function $f(x)=(x+3)(x^3+3x^2+4x+2)$. 5. Find local extremes and intervals of monotonicity of the following function $f(x)=(x^2+4x+1)e^x$.	
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.