

GDAŃSK UNIVERSITY

Subject card

Subject name and code	, PG_00041828							
Field of study	Ocean Engineering, Ocean Engineering							
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	Part-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	Subject supervisor		dr Leszek Ziemczonek					
of lecturer (lecturers)	Teachers		dr Leszek Ziemczonek					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	Number of study hours	30.0	40.0	0.0	0.0		0.0	70
	E-learning hours included: 0.0							
	Adresy na platformie eNauczanie: WOiO - n.stac Matematyka 1 2020/21 (L.Ziemczonek) - Moodle ID: 6717 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6717							
Learning activity and number of study hours	Learning activity	Participation in classes include plan	n didactic led in study	Participation in consultation hours		Self-study		SUM
	Number of study hours	70		10.0		145.0		225
Subject objectives	The aim of this subject is for the student to obtain the competence in using the basic methods of mathematical analysis, and to be able to use this knowledge to solve simple theoretical and practical problems that are found in the field of engineering.							

Learning outcomes	Course outcome	Subject outcome	Method of verification	
	[K6_U02] can work individually and in a team, communicate through various techniques in professional environment and also record, analyse, and present the results of work, can estimate the time needed to complete a given task	Student recognizes the importance of self-expanding knowledge and take the challenge of working with a group to solve a problem. The student combines knowledge of mathematics with knowledge from other fields. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in future.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment	
	[K6_W01] has a basic knowledge in maths, including algebra, elements of logics, geometry, mathematical analysis, theory of probability necessary to describe and analyse the operation of machines and ocean-technology objects	Student is able to: - name basic properties of elementary functions - solve equations and inequalities involving elementary functions - calculate limits of functions and use the concept of limit to determine continuity - compute derivatives of algebraic and trigonometric functions using the definition of the derivative and the differentiation rules - analyze properties of functions based on its first and second derivatives - apply the Fundamental Theorem of Calculus, and integration methods to find definite and indefinite integrals - apply the definite integral to find areas, volumes, and the length of an arc. - compute improper integrals - solve problems with complex numbers - solve problems in basic analytical geometry.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge	

Subject contents	Single variable functions and their properties
	Absolute value - definition, equations and inequalities, graphs of functions
	Power, Exponential, Logarithmic, Trigonometric, Inverse trigonometric functions - graphs, properties, equations and inequalites
	Sequences
	Limit of a function and continuity
	Definitions and theorems regarding limits and continuity
	Derivatives of single variable functions, and their applications
	Definition of the derivative and differential
	Higher order derivatives
	Rolle and Mean Value Theorems
	Monotonicity and local extreme values of a function
	Concavity and inflection points
	Asymptotes
	Curve sketching
	L'Hospital's Rule
	Optimization - global extreme values
	Integrals of single variable functions - indefinite integral
	Basic integration methods - by substitution, by parts
	Integration by partial fractions, trigonometric substitution
	Definite integral - Riemann
	Fundamental Theorem of Calculus (Newton-Leibniz Theorem)
	Integration by parts, by substitution
	Applications: areas between curves, volumes of revolution, arc length.
	Improper integrals
	Definitions, types

	Analytic geometry in space Vectors: definition, properties Scalar and vector products: properties, applications				
	Line and plane in space: definitions, distance between, angle between				
	Complex numbers				
	Algebraic, polar, exponential forms, conjugate, modulus				
	Roots of complex numbers, solving equations with complex numbers				
Prerequisites and co-requisites	No requirements.				
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade		
and criteria	Midterm colloquium	50.0%	50.0%		
	Written exam	50.0%	50.0%		
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 T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2006 			
		T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1. Przykłady i zadania. Oficyna Wydawnicza GIS, Wrocław 2006			
		K. Jankowska, T. Jankowski, Zbiór zadań z matematyki, Wydawnictwo PG, Gdańsk 2008			
	K. Jankowska, T. Jankowski, Zadania z matematyki w Wydawnictwo PG, Gdańsk 2008		nia z matematyki wyższej,		
		K. Jankowska, T. Jankowski, Funk wielokrotne. Geometria analityczna	cje wielu zmiennych. Całki , Wydawnictwo PG, Gdańsk 2008		
	Supplementary literature	W. Leksiński, I. Nabiałek, W. Żakow twierdzenia, przykłady, zadania. Wł	∕ski, Matematyka. Definicje, ∖T, Warszawa 2006		
	eResources addresses	WOiO - n.stac Matematyka 1 2020/21 (L.Ziemczonek) - Moodle ID: 6717 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6717			

Example issues/ example questions/ tasks being completed	1) Assign local extrema of function: y = x ² e ^{-x}
	2) Find asymptotes of function:
	$f(x) = x - 2 \operatorname{arctgx}$
Work placement	Not applicable