

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Mathematics II, PG_00044220							
Field of study	Engineering Management							
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023			
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	2		ECTS credits		5.0			
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 Lech Kujawski					
	Teachers		dr Lech Kujawski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0		60
	E-learning hours inclu	ided: 0.0						
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	60		8.0		57.0		125
Subject objectives	The aim of this subject is to obtain the students competence in the range of using the basic methods of mathematical analysis and linear algebra. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of management and economics.							

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W11] has the basic knowledge of mathematics, physics and chemistry necessary to solve technical problems	Student combines knowledge of mathematics with knowledge from other fields. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student names the basic rules and techniques of integration to calculate indefinite, definite and improper integrals. Student knows the methods of using definite integral to solve geometrical problems. Student names properties of a given function of two variables based of differential calculus of several variables functions. Student names properties of double integrals, and explains the method of substitution in the double integral. Student knows the methods of using double integrals to solve geometrical and economical problems. Student names some chosen techniques of solving ordinary differential equations. Student knows the definition of convergence of number series. Student knows the method pf using power series in order to compute sums of number series. Student is able to process the accuired information, analyze and	[SW1] Assessment of factual knowledge
	[K6_U01] interprets and analyses the phenomena and processes taking place in the economy and organisation using basic theoretical knowledge of economics, management and science	interpret it, draw conclusions and reason opinions. Student applies the basic rules and techniques of integration to calculate indefinite, definite and improper integrals. Student uses definite integral to solve geometrical problems. Student analyses properties of a given function of two variables using differential calculus of several variables functions. Student calculates double integrals, and applies the method of substitution in the double integral and knows its basic applications. Student demonstrates some chosen techniques of solving ordinary differential equations. Student analyzes convergence of number series. Student uses power series in order to compute sums of number series.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information

Subject contents	The process of finding antiderivatives and integration formulas the methods of substitution and integration by parts. Integration of rational, trigonometric and irrational functions.					
	Fundamental Theorem of Calculus. Methods of evaluations of definite integrals. Integration formulas, the methods of substitution and integration by parts for definite integrals. Improper integrals. Selected applications of definite integrals.					
	Functions of two variables: Partial derivatives. Total differential. Taylors formula. Maxima and minima of a function of several variables.					
	Integral calculus of functions of several variables - double integral . Iterated integrals. Change of varia a double integral, polar coordinates. First order differential equations. Second order and higher order linear differential equations with cons coefficients.					
	Number series: Convergent and divergent series. Convergence tests of the number series.					
	Power series: Radius and interval of convergence of power series.					
Prerequisites and co-requisites	Knowledge of the subject: Mathematics I.					
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Midterm tests	0.0%	44.0%			
	Written exam	50.0%	50.0%			
	Class work	0.0%	6.0%			
Recommended reading	Basic literature	<ul> <li>Gurgul H., Suder M., Matematyka dla kierunków ekonomicznych, Oficyna a Wolters Kluwer business, Warszawa</li> <li>Jankowska K., Jankowski T., Zbiór zadań z matematyki, Wydawnictwo PG, Gdańsk</li> </ul>				
		- Jankowska K., Jankowski T., Funkcje wielu zmiennych - Całki wielokrotne - Geometria analityczna, Wydawnictwo PG, Gdańsk				
	Supplementary literature	Banaś J., Podstawy matematyki dla ekonomistów, Wydawnictwa Naukowo-Techniczne, Warszawa				
		Gewert M., Skoczylas Z., Analiza matematyczna 1, Przykłady i zadania, Wydawnictwo GiS, Wrocław				
		Gewert M., Skoczylas Z., Analiza matematyczna 2, Definicje, twierdzenia wzory, Wydawnictwo GiS, Wrocław				
		Gewert M., Skoczylas Z., Analiza matematyczna 2, Przykłady i zadania, Wydawnictwo GiS, Wrocław				
		Sozański B., Dziedzic I., Algebra i analiza w zagadnieniach ekonomicznych, Wydawnictwo Bila, Rzeszów				
	eResources addresses	Adresy na platformie eNauczanie:				
		WZiE - Zarządzanie Inżynierskie - Matematyka II 2022/23 (M.Kujawski) - Moodle ID: 29881 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29881				

Example issues/ example questions/ tasks being completed	Show the series convergence and find its sum.
	Find the integral of the rational function
	Find the improper integral or demonstrate its discrepancy.
	Find the local extremes of the function $f(x, y) =$
	Using the double integral, determine the area of the area delimited by the curves
	Solve the differential equation using the constant variation method.
	Find the general solution of the third order differential equation using the prediction method.
Work placement	Not applicable

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