

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Mathematics II, PG_00060451								
Field of study	Mechanical and Naval Engineering								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2023/2024			
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	2		ECTS credits			8.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Mathematics Center -> Vice-Rector for Education								
Name and surname	Subject supervisor dr Anita Dąbrowicz-Tlałka								
of lecturer (lecturers)	Teachers dr inż. Wojciech Włodarski dr Anita Dąbrowicz-Tlałka								
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Proiec	t	Seminar	SUM	
of instruction	Number of study hours	18.0	27.0	0.0	9.0	-	0.0	54	
	E-learning hours inclu	E-learning hours included: 0.0							
Learning activity and number of study hours	Learning activity	activity Participation in didac classes included in s plan		Participation in consultation hours		Self-study		SUM	
	Number of study hours	54		15.0		131.0		200	
Subject objectives	he 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 engineering.								
Learning outcomes	Course out	Subject outcome			Method of verification				
	[K6_W01] possesses mathematical knowle the range of linear al mathematical analys characterising and in mechanical systems, technological proces operational propertie	The student determines the eigenvectors and eigenvalues of the matrix The student analyzes the properties of an implicit function and a function of two variables based on the differential calculus of functions of several variables. The student determines the gradient, divergence and rotation as well as the field potential. The student uses double and triple integrals in geometric applications. The student demonstrates selected techniques for solving ordinary differential equations (first-order linear differential equations, Bernoulli equations with constant coefficients).			[SW1] Assessment of factual knowledge				
	[K6_U01] is able to acquire information from specialized literary sources, databases and other resources, essential for solving engineering tasks; is able to compile the obtained information pieces and to interpret them, additionally is able to form conclusions and present justified opinion		Student uses gained knowledge in basic mathematics to analyse results of experiments .			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task			

Subject contents	
	<ul> <li>Vectors and eigenvalues.</li> <li>Functions of two variables:</li> </ul>
	- Domain and partial derivatives.
	- Second degree surfaces.
	- Differential of a function of two variables.
	- Local extremes.
	- Gradient, divergence, rotation.
	<ul> <li>Implicit function.</li> <li>Double integrals:</li> </ul>
	- Rules for determining the limits of integration normal and regular region in R2.
	- Change of variables in double integral, Jacobian.
	- Polar coordinates.
	- Applications of double integral.
	Triple integrals:
	- Rules for determining the limits of integration normal and regular region in R3.
	- Change of variables in triple integral, Jacobian.
	- Cylindrical and spherical coordinates.
	- Rules for determining the limits of integration normal and regular areas.
	- Applications of the triple integral.
	Differential equations:
	- Differential equations with separated variables.
	- Linear differential equations (constant variation method, prediction method).
	- Bernoulli equation.
	- Linear differential equations of the second order with constant coefficients (method of changing constants, prediction method).

Prerequisites and co-requisites

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Class activity and online assignments	0.0%	10.0%			
	Tests	0.0%	40.0%			
	Written exam	50.0%	50.0%			
Recommended reading	Basic literature	<ul> <li>- M. Gewert, Z. Skoczylas : Analiza matematyczna 2, Oficyna Wydawnicza GiS, Wrocław;</li> <li>- K. Jankowska, T. Jankowski : Zadania z matematyki wyższej, Wydawnictwo PG, 2010;</li> <li>- K. Jankowska, T. Jankowski : Funkcje wielu zmiennych - Całki wielokrotne - Geometria analityczna, Wydawnictwo PG, 2010;</li> <li>- E. Mieloszyk : Macierze, wyznaczniki i układy równań, Wydawnictwo</li> </ul>				
	Supplementary literature	PG, 2000; G.M. Fichtenholz : Rachunek różniczkowy i całkowy, t. 2, Wydawnictwo				
		W. Krysicki, L. Włodarski : Analiza matematyczna w zadaniach II, Wydawnictwo Naukowe PWN W. Stankiewicz : Zadania z matematyki dla wyższych uczelni technicznych, Wydawnictwo Naukowe PWN				
	eResources addresses	Adresy na platformie eNauczanie: WIMiO - BMiO s.2: 2023/24 (A.Tlałka) Matematyka (niestacjonarne) - Moodle ID: 35751 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35751				
Example issues/ example questions/ tasks being completed	<ol> <li>Find local extrema of the given function f (x, y) =</li> <li>Calculate the double integral over the indicated area D.</li> <li>Using cylindrical or spherical coordinates, calculate the given triple integral</li> <li>Determine the potential of the vector field</li> <li>Using the prediction method, solve the first and second order linear differential equations.</li> </ol>					
Work placement	Not applicable					

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