GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematical analysis II, PG_00037260		
Field of study	Technical Physics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research 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	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Divison Of Dynamical Systems -> Institute Of Applied Mathematics -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Joanna Cyman	
	Teachers	mgr inż. Katarzyna Tessmer dr Joanna Cyman dr Maryna Shcholokova	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	0.0	0.0	0.0	60

E-learning hours included: 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	10.0	80.0	150

Subject objectives

To equip students with the knowledge that supports technical items

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W03] has systematized knowledge of higher mathematics, including algebra, analysis, probability theory and numerical methods, allowing for basic description, understanding and modelling of physical phenomena and some technical processes	The student understands mathematical theorems and applies them when solving problems. The student calculates definite integrals and knows their geometric and physical applications. The student is familiar with functions of multiple variables. They can compute partial and directional derivatives and find extrema of functions of multiple variables. They calculate double and triple integrals and understand the geometric and physical applications of multiple integrals.	[SW1] Assessment of factual knowledge
[K6_U01] learns independently, obtains information from literature, databases and other properly selected sources	Student understands the importance of studying by himself. Student is practising by himself.	[SU2] Assessment of ability to analyse information

Subject contents	Integral calculus of a function of a single variable. The Riemann definite integral and its geometric and physical applications. Improper integrals. Numerical series. The integral test for the convergence of numerical series. Differential calculus of functions of multiple variables. Functions of multiple variables, their limits, and continuity. First-order partial derivatives and the total differential. Directional derivative. Higher-order derivatives and differentials. Derivative of a composite function. Implicit functions. Extrema of functions of multiple variables. Integral calculus of functions of multiple variables. Double and triple integrals. The theorem on the change of variables in multiple integrals. Geometric and physical applications of multiple integrals.
Prerequisites and co-requisites	Student knows basics of differential calculus of the function of one variable.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	50.0%	40.0%
Activity	0.0%	6.0%
Colloquium 2	0.0%	27.0%
Colloquium 1	0.0%	27.0%

Recommended reading

Basic literature	1. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 i 2. Definicje, twierdzenia, wzory. Wrocław, Oficyna Wydawnicza GiS 2024. 2. M. Gewert, Z.Skoczylas, Analiza matematyczna 1 i 2. Przykłady i zadania. Wrocław, Oficyna Wydawnicza GiS 2024. 3. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach 1 i 2. Warszawa, PWN 2015. 4. J. Dymkowska, D. Beger, Rachunek całkowy w zadaniach, Gdańsk, Wydawnictwo Politechniki Gdańskiej 2024.
Supplementary literature	1. J. Topp, Matematyka. Funkcje jednej zmiennej. Gdańsk, Wydawnictwo UG 2016. 2. G. M. Fichtenholz, Rachunek różniczkowy i całkowy. T 1 i 2. Warszawa, PWN 1994.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Find all local extrema of the function of two variables: $f(x,y)=(x-y+1)^2+(2x+y-4)^2$. Using polar coordinates, evaluate the given integral: $\iint\limits_D\frac{y}{x}dxdy\textrm{, gdzie }D\colon x^2+y^2\leq 1,\ 0\leq y\leq x,\ x\geq 0,\ y\geq 0$.
Work placement	Not applicable

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