University of Gdańsk

Subject card

Subject name and code	Analysis for Medical Physicists, PG_00182144		
Field of study	Medical Physics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	Bachelor's 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	5.0
Learning profile	academic	Assessment form	exam
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Adam Rutkowski, prof. UG	
	Teachers	mgr Jędrzej Stempin dr hab. Adam Rutkowski, prof. UG	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	45.0	0.0	0.0	0.0	75

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	75	0.0	75.0	150

Subject objectives

Introduction to the analysis of functions of one and many real variables as a fundamental tool for the analysis of physical phenomena.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_U01] He can formulate, analyse, and solve complex problems in physics and medicine, using mathematical formalism, based on the physical phenomena, principles, and theories he has learned.	The student is able to: calculate the limits of sequences and functions determine the derivatives of functions of one variable apply differential calculus to study the behavior of functions calculate integrals using integration by parts and substitution determine local extrema and conditional local extrema of functions of several variables calculate line integrals and surface integrals analyze the properties of vector fields	[SU3] text preparation/written work
	[FIZMEDL3_W03] Knows and understands at an advanced level the most important topics of higher mathematics, including statistics, to the extent necessary for the quantitative description, understanding and modelling of physical and medical processes.	The student knows: the concept of the limit of a numerical sequence, the concepts of the limit and continuity of a function of one real variable, the basic rules of differential calculus, the concept of a Taylor series, methods for integrating functions of one variable, applications of integral calculus, methods for finding extrema of functions of many variables, and the Lagrange multipliers method, elements of vector analysis, the concepts of gradient, curl, and divergence of a vector field, multiple integrals, line integrals, and surface integrals, the theorems of Gauss and Stokes.	[SW4] test/exam - oral or written

Subject contents	Sequences and Series Numerical sequences and their limits. Single-Variable Functions Limit and continuity. Differential calculus. Taylor series. Integration of a single-variable function, indefinite and definite integrals. Methods of calculating integrals. Applications of integral calculus. Multivariable Functions Differential calculus. Extrema of functions, the method of Lagrange multipliers. Vector Analysis Elements of vector analysis: gradient, curl (rotation), and divergence. Integrals Multiple integrals, line integrals, and surface integrals. Gauss's and Stokes' theorems.
Prerequisites and co-requisites	A. Formal Requirements: • Passed course "Mathematics" B. Prerequisites: • Knowledge of basic calculus and matrix algebra

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
colloquium	51.0%	40.0%
written exam	51.0%	55.0%
class participation	0.0%	5.0%

Recommended reading

Basic literature	not applicable
Supplementary literature	not applicable
eResources addresses	

Example issues/ example questions/ tasks being completed	not applicable
Work placement	Not applicable

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