

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. Marcin Marciniak				
	Teachers						
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_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
	[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

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
	written exam	51.0%	30.0%
	class participation	0.0%	15.0%
	colloquium	51.0%	55.0%
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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