

Subject card

Subject name and code	Analysis for Medical Physicists, PG_00182144						
Field of study	Medical Physics						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
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
	<p>[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.</p>	<p>The student knows:</p> <ul style="list-style-type: none"> 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. 	<p>[SW4] test/exam - oral or written</p>
	<p>[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.</p>	<p>The student is able to:</p> <ul style="list-style-type: none"> 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 	<p>[SU3] text preparation/written work</p>

Subject contents	<p>Sequences and Series</p> <p>Numerical sequences and their limits.</p> <p>Single-Variable Functions</p> <p>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.</p> <p>Multivariable Functions</p> <p>Differential calculus. Extrema of functions, the method of Lagrange multipliers.</p> <p>Vector Analysis</p> <p>Elements of vector analysis: gradient, curl (rotation), and divergence.</p> <p>Integrals</p> <p>Multiple integrals, line integrals, and surface integrals. Gauss's and Stokes' theorems.</p>														
Prerequisites and co-requisites	<p>A. Formal Requirements:</p> <ul style="list-style-type: none"> • Passed course "Mathematics" <p>B. Prerequisites:</p> <ul style="list-style-type: none"> • Knowledge of basic calculus and matrix algebra 														
Assessment methods and criteria	<table border="1" data-bbox="448 1301 1477 1447"> <thead> <tr> <th data-bbox="448 1301 794 1346">Subject passing criteria</th> <th data-bbox="794 1301 1141 1346">Passing threshold</th> <th data-bbox="1141 1301 1477 1346">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1346 794 1379">colloquium</td> <td data-bbox="794 1346 1141 1379">51.0%</td> <td data-bbox="1141 1346 1477 1379">55.0%</td> </tr> <tr> <td data-bbox="448 1379 794 1413">class participation</td> <td data-bbox="794 1379 1141 1413">0.0%</td> <td data-bbox="1141 1379 1477 1413">15.0%</td> </tr> <tr> <td data-bbox="448 1413 794 1447">written exam</td> <td data-bbox="794 1413 1141 1447">51.0%</td> <td data-bbox="1141 1413 1477 1447">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	colloquium	51.0%	55.0%	class participation	0.0%	15.0%	written exam	51.0%	30.0%
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Supplementary literature	not applicable														
eResources addresses															
Example issues/ example questions/ tasks being completed	not applicable														
Work placement	Not applicable														

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