

Subject card

Subject name and code	Mathematical methods in Bioinformatics - integral calculus, PG_00156229						
Field of study	Bioinformatics						
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		
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		2.0		
Learning profile	academic		Assessment form				
Conducting unit	Institute of Theoretical Physics and Astrophysics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Adrian Kołodziejski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	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	30		0.0		20.0	50
Subject objectives	The aim of the classes is to introduce students to the tools for studying and analyzing single-variable functions provided by integral calculus, and to present applications of these tools in the analysis of specific physical and natural phenomena.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOINL3_W03] Has sufficient knowledge of mathematical and statistical methods in order to describe and model biological phenomena and processes	The student knows: Concept of an antiderivative (indefinite integral) and definite integral. Basic methods for calculating integrals: integration by parts, substitution, universal substitutions. Fundamental applications of integral calculus in geometry and describing physical and natural models.	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
	[BIOINL3_U03] Graduate applies fundamental mathematical and statistical methods to describe phenomena and analyze data; has the ability to perform basic data analysis in professional databases used in bioinformatics	The student is able to: Compute integrals using basic integration methods. Apply integral calculus to solve specific problems in geometry, physics, and natural sciences.	[SU3] text preparation/written work
	[BIOINL3_W02] Has the scientific knowledge necessary to understand the basic processes in living organisms.	The student knows: Concept of an antiderivative (indefinite integral) and definite integral. Basic methods for calculating integrals: integration by parts, substitution, universal substitutions. Fundamental applications of integral calculus in geometry and describing physical and natural models.	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
Subject contents	Definition of an antiderivative and indefinite integral, formulas for integrals of elementary functions, integral of a sum of functions and product of a function by a constant. Methods for computing indefinite integrals: by parts and by substitution, integration of rational functions. Definite integral, properties, formulas for integration by parts and by substitution. Applications of the definite integral: geometric (formulas for arc length, areas of surfaces, and volumes of solids of revolution), physical (calculating distance, work, etc.).		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	100.0%
Recommended reading	Basic literature		
	Supplementary literature		
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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