University of Gdańsk

Subject card

Subject name and code	Mathematical Methods in Bioinformatics - Integral Calculus, PG_00193518						
Field of study	Bioinformatics						
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			
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	credit			
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.						

<table>
<tr><td>Learning outcomes</td><td>
<table>
<tr><th>Course outcome</th><th>Subject outcome</th><th>Method of verification</th></tr>
<tr><td>[BIOINL3_U03] Graduate applies mathematical and statistical methods to describe phenomena and analyze data; has the ability to perform data analysis in professional databases used in bioinformatics</td><td>The student is able to:

Compute integrals using basic integration methods.
Apply integral calculus to solve specific problems in geometry, physics, and natural sciences.</td><td>[SU3] text preparation/written work</td></tr>
<tr><td>[BIOINL3_W03] Has sufficient knowledge of mathematical and statistical methods in order to describe and model biological phenomena and processes</td><td>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.</td><td>[SW1] oral statement/ conversation/discussion
[SW3] text preparation/written work</td></tr>
<tr><td>[BIOINL3_W02] Has advanced scientific knowledge necessary to understand the basic processes in living organisms.</td><td>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.</td><td>[SW1] oral statement/ conversation/discussion
[SW3] text preparation/written work</td></tr>
</table>
</td></tr>
<tr><td>Subject contents</td><td>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.).</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td></td><td>51.0%</td><td>100.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td></td></tr>
<tr><td>Supplementary literature</td><td></td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.