University of Gdańsk

Subject card

Subject name and code	Mathematics - Recapitulatory Lecture, PG_00193509		
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	1	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 Tomasz Linowski	
	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 course is to systematize high school mathematics knowledge, supplementing it to the advanced level with particular emphasis on the skills of analyzing properties and presenting functions.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	The student is able to: Recognize the domain, range, and basic properties of a function based on its graph Sketch the graph of a function based on its formula or a table of values Identify the type of elementary function appearing in a problem and apply knowledge of its properties to solve the problem.	[SU3] text preparation/written work [SU4] test/exam - oral or written
[BIOINL3_W03] Has sufficient knowledge of mathematical and statistical methods in order to describe and model biological phenomena and processes	The student knows: The concept of a function, its domain, and range Basic properties of functions: injectivity, monotonicity, invertibility Types of elementary functions and their basic properties Different ways of presenting functions	[SW1] oral statement/ conversation/discussion

<table>
<tr><td>Subject contents</td><td>Number sets and their subsets, operations on setsConcept of a function, domain, codomain, numerical functions, function formula, graph, monotonicity, injectivity

Overview of elementary functions and their propertiesLinear function, its formula and graph, slope and monotonicity, relationship between slope and angle of inclination of a line, zero point, linear equations, systems of two linear equations
Quadratic function, its formula and graph, general form and vertex form of the equation, vertex coordinates of the parabola, sketching the graph based on the vertex form, roots, factored form of the equation, Vieta's formulas, formulas for binomial multiplication, quadratic equations and inequalities
Polynomials: degree of a polynomial, operations on polynomials, divisibility of polynomials, polynomial division theorem with remainder, polynomial long division and Horner's method, roots of polynomials, Bezout's theorem (ordinary and generalized), multiplicity of roots, factored form, Newton's binomial, solving polynomial equations and inequalities, grouping method, theorem about rational roots of polynomials with integer coefficients
Rational functions: homographic function, its domain, range, graph and asymptotes, operations on rational expressions, rational equations and inequalities
Exponential functions: powers with natural, integer, and rational exponents, formulas for operations with powers with the same base or exponent, definition of a power with a real exponent (intuitive), graph of exponential function and its codomain, base and monotonicity
Logarithmic functions: definition of logarithm, formulas for operations with logarithms, logarithmic function as the inverse function to the exponential function, graph of logarithmic function and its domain, zero point, base of logarithm and monotonicity
Trigonometric functions: definition of trigonometric functions of an acute angle in a right triangle, definition of trigonometric functions for any angle, periodicity, graphs, signs in different quadrants, reduction formulas, trigonometric identities, trigonometric equations and inequalities
Inverse trigonometric functions: definition of inverse trigonometric functions as inverses of trigonometric functions on restricted domains, properties and graphsSketching graphs of functions, transforming graphs, analyzing function properties based on graphs

Elements of analytic geometry: Equations of curves in the XY-plane, lines, conic sections, equations of surfaces in the XYZ-space, quadrics

Systems of equations with multiple variables and their geometric interpretation</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of mathematics at the high school level (basic level)</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 rowspan="3">Recommended reading</td><td>Basic literature</td><td>n</td></tr>
<tr><td>Supplementary literature</td><td>n</td></tr>
<tr><td>eResources addresses</td><td></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>
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