

Subject card

Subject name and code	Mathematics - recapitulatory lecture, PG_00155617						
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	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		dr Tomasz Linowski Paulina Janowicz				
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_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		
	[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: 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		

Subject contents	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		
Prerequisites and co-requisites	Knowledge of mathematics at the high school level (basic level)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	100.0%
Recommended reading	Basic literature	n	
	Supplementary literature	n	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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