



Subject card

Subject name and code	Mathematics, PG_00054682						
Field of study	Biotechnology						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	first-cycle 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			9.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Mathematics Center -> Vice-Rector for Education						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Anita Dąbrowicz-Tlalka					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	45.0	0.0	0.0	0.0	90
	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	90		10.0		125.0	225
Subject objectives	Students obtain competence in the range of using methods of mathematical analysis and linear algebra and knowledge how to solve simple problems that can be found in the field of engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W01	Student mentions basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student gives the definition of basic notions of differential calculus. Student uses basic notions and formulas of differential calculus. Student determines intervals of monotonicity of a given functions and its extrema. Students calculates antiderivatives using the substitution method of integration and integration by parts. Student applies definite integrals to solving geometrical problems. Student uses the basic operations on complex numbers.			[SW1] Assessment of factual knowledge		
	K6_U01	Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		

Subject contents	<p>The sets of numbers and set notation. Basic mathematics symbols.</p> <p>Functions of one variable:</p> <ul style="list-style-type: none"> • definitions, graphs, properties, continuity, limits • absolute value, equations and inequalities • polynomials, rational functions, power functions, trigonometric and inverse trigonometric functions, exponential and logarithmic functions • equations and inequalities involving these functions • applications to mathematical modeling <p>Infinite number sequences, limits and continuity of functions</p> <ul style="list-style-type: none"> • boundedness and monotonicity • limits • continuity of functions, types of discontinuities and their interpretation <p>Single variable calculus:</p> <ul style="list-style-type: none"> • definition of the derivative • Rolle's and Lagrange's theorems and their applications • L'Hospital's Rule • monotonicity and local/global extrema (optimization problems) • higher order derivatives • concavity, inflection points • applications of single variable differential calculus to curve sketching, related rates and approximation problems • applications of differential calculus to other fields (e.g. chemistry, physics, biology) • definite and indefinite integral, Fundamental Theorem of Calculus • basic integration formulas • integration by substitution, by parts, by partial fractions • applications of integral calculus to other fields <p>Complex numbers</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1" data-bbox="453 1061 1485 1200"> <thead> <tr> <th data-bbox="453 1061 794 1093">Subject passing criteria</th> <th data-bbox="794 1061 1139 1093">Passing threshold</th> <th data-bbox="1139 1061 1485 1093">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1093 794 1124">Written exam</td> <td data-bbox="794 1093 1139 1124">50.0%</td> <td data-bbox="1139 1093 1485 1124">50.0%</td> </tr> <tr> <td data-bbox="453 1124 794 1155">Midterm exams</td> <td data-bbox="794 1124 1139 1155">0.0%</td> <td data-bbox="1139 1124 1485 1155">40.0%</td> </tr> <tr> <td data-bbox="453 1155 794 1200">Activity during classes</td> <td data-bbox="794 1155 1139 1200">0.0%</td> <td data-bbox="1139 1155 1485 1200">10.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written exam	50.0%	50.0%	Midterm exams	0.0%	40.0%	Activity during classes	0.0%	10.0%
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Recommended reading	<p>Basic literature</p>	<p>- Praca zbiorowa pod redakcją Wikieł B.: Matematyka - Podstawy z elementami matematyki wyższej. PG, Gdańsk 2007;</p> <p>- M. Gewert, Z. Skoczylas : Analiza matematyczna 1, Oficyna Wydawnicza GiS 2008;</p> <p>- K. Jankowska, T. Jankowski : Zbiór zadań z matematyki, Wydawnictwo PG, 2010.</p>													
	<p>Supplementary literature</p>	<p>- G.M. Fichtenholz : Rachunek różniczkowy i całkowy I, PWN 1985;</p> <p>- R. Leitner : Zarys matematyki wyższej I i II, Wydawnictwo Naukowo-Techniczne Warszawa 1999;</p> <p>- L. Maurin, M. Maczyński, T. Traczyk : Matematyka - podręcznik dla studentów wydziałów chemicznych, PWN 1975.</p> <p>- W. Żakowski, G. Decewicz : Matematyka I i II, Wydawnictwo Naukowo-Techniczne, Warszawa 1991.</p>													
	eResources addresses	Adresy na platformie eNauczanie:													
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Find the domain and the set of values of the function $f(x) = \dots$ 2. Find the derivative of $f(x) = \dots$ 3. Sketch the graph of the function $f(x) = \dots$. Identify any local extrema and points of inflection. 4. Find solutions of the equation \dots in the set of complex numbers. 5. Use the definite integral to determine the volume of the solid formed by the rotation of the curve \dots around the axis oX. 														

Work placement	Not applicable
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