



Subject card

Subject name and code	Mathematics, PG_00052278						
Field of study	Chemical Technology						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2022/2023	
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-Tlałka				
	Teachers		dr Hanna Guze dr Anita Dąbrowicz-Tlałka				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	60.0	0.0	0.0	0.0	105
	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	105		5.0		160.0	270
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 knows the methods of solving equations and inequalities containing elementary functions. Student defines the basic concepts and formulas of differential calculus. Student lists basic applications of derivatives for function testing. The student knows the methods of calculating the indefinite integral using e.g. the method of integration by substitution and by parts. Student knows how to use the definite integral to solve problems in the field of geometry. Student knows the basic definitions and theorems related to complex numbers.			[SW1] Assessment of factual knowledge	
	K6_U01		Student appreciates the importance of skilful use of the basic mathematical apparatus in the aspect of technical studies and is able to undertake substantive discussion related to the selection of the method for the task he solves. Student is able to integrate the information obtained in a mathematical task, interpret them, draw conclusions and reason opinions.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information	

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"> <thead> <tr> <th data-bbox="453 1068 794 1097">Subject passing criteria</th> <th data-bbox="799 1068 1141 1097">Passing threshold</th> <th data-bbox="1145 1068 1473 1097">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1104 794 1133">Activity during classes</td> <td data-bbox="799 1104 1141 1133">0.0%</td> <td data-bbox="1145 1104 1473 1133">10.0%</td> </tr> <tr> <td data-bbox="453 1140 794 1169">Midterm exams</td> <td data-bbox="799 1140 1141 1169">0.0%</td> <td data-bbox="1145 1140 1473 1169">40.0%</td> </tr> <tr> <td data-bbox="453 1176 794 1205">Written exam</td> <td data-bbox="799 1176 1141 1205">50.0%</td> <td data-bbox="1145 1176 1473 1205">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Activity during classes	0.0%	10.0%	Midterm exams	0.0%	40.0%	Written exam	50.0%	50.0%
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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