



## Subject card

Subject name and code	MATHEMATICS, PG_00053078						
Field of study	Chemistry						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2020/2021		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Full-time studies		Mode of delivery		blended-learning		
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		mgr Dorota Garbowska				
			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: 45.0						
	Adresy na platformie eNauczanie:						
	WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tlałka) - Moodle ID: 5821 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a> WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tlałka) - Moodle ID: 5821 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a> WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tlałka) - Moodle ID: 5821 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a> WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tlałka) - Moodle ID: 5821 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a>						
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		10.0		110.0	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_K01] understands the need for lifelong learning, can inspire and organize the process of teaching other people	Student recognizes the importance of self-expanding knowledge.	[SK2] Assessment of progress of work
	[K6_U04] can use professional vocabulary, can prepare and communicate technical information in the form of text documents, spreadsheets, charts and technological schema	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
	[K6_W01] has basic knowledge of selected areas of mathematics, including: algebra, differential calculus and integral calculus, functions of two variables, elements of analytical geometry, elements of vector analysis, differential equations and probability theory, and knowledge of physics: basic equations and concepts and physical laws, including the knowledge necessary to predict the course of physical phenomena and to solve various technical problems	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
Subject contents	<p>Functions of one variable and their properties:  The absolute value function definition, solving equations and inequalities with absolute value, graphs of functions with absolute value.  Power functions solving power and polynomial equations and inequalities.  Rational functions solving rational equations and inequalities.  Exponential function properties and graphs, solving exponential equations and inequalities.  Logarithmic functions properties and graphs, solving logarithmic equations and inequalities.  Trigonometric and cyclometric functions properties and graphs, solving trigonometric equations and inequalities.  Limits and continuity:  Infinite sequences. Fundamental definitions of limit of sequence, convergence and divergence, limit theorems. Applications to solving equations .  Differential calculus of functions with one variable and applications of differential calculus of functions with one variable:  Definition of first derivative and differential. Rolls and Lagranges theorems. Higher derivatives and differentials. Monotonicity and local extrema. Convexity, concavity and inflexion points of a function. De l'Hospital's Theorem. Asymptotes. Applying differential calculus to studying the properties of functions with one variable.  Integral calculus of functions with one variable antiderivatives:  The process of finding antiderivatives and integration formulas the substitution method of integration and integration by parts. Integration of rational, trigonometric and irrational functions.  Definite integrals in Riemann's sense:  Newton-Leibniz Theorem. Integration formulas, the substitution method of integration and integration by parts for definite integrals. Applications of integral calculus in computing areas of plane figures, lengths of arcs, volumes of solids of revolution.  Complex numbers.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm exams	50.0%	32.0%
	Activity during classes	50.0%	7.0%
	Quizzes	50.0%	11.0%
	Written exam	40.0%	50.0%
Recommended reading	<p>Basic literature</p> <ul style="list-style-type: none"> <li>- Praca zbiorowa pod redakcją Wiktora B.: Matematyka - Podstawy z elementami matematyki wyższej. PG, Gdańsk 2007;</li> <li>- M. Gewert, Z. Skoczylas : Analiza matematyczna 1, Oficyna Wydawnicza GiS 2008;</li> <li>- K. Jankowska, T. Jankowski : Zbiór zadań z matematyki, Wydawnictwo PG, 2010.</li> </ul>		

	Supplementary literature	<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	<p>WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tłalka) - Moodle ID: 5821  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a></p> <p>WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tłalka) - Moodle ID: 5821  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a></p> <p>WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tłalka) - Moodle ID: 5821  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a></p> <p>WCh - Bt, Ch, ChB, TCh - s1: 2020/21 (A.Tłalka) - Moodle ID: 5821  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=5821</a></p>
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Find the domain and the set of values of the function <math>f(x)=\dots</math> . Determine the inverse function of <math>f</math>.</li> <li>2. Check the continuity of the following function <math>f(x)=\dots</math> .</li> <li>3. Find local extremes and intervals of monotonicity of the following function <math>f(x)=\dots</math> .</li> <li>4. Evaluate the indefinite integral of the given rational function .</li> <li>5. Give three applications of the definite integral with appropriate rules.</li> <li>6. Find the area of the region bounded by <math>y=</math>, <math>y=</math>, <math>x=</math> and <math>x=</math> .</li> <li>7. Find in the complex set solutions of the equation</li> </ol>	
Work placement	Not applicable	