



## Subject card

Subject name and code	Mathematics, PG_00060834						
Field of study	Chemical Technology						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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	15.0		150.0	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] has knowledge in mathematics, including the solution of equations and inequalities involving elementary functions, differential and integral calculus, elements of vector analysis, statistics, optimisation and numerical methods, has basic knowledge in selected branches of physics, useful for the description and analysis of technological processes	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] is able to acquire information from literature, databases and other appropriately selected sources, also in English; is able to integrate information obtained, interpret it and make conclusions, formulate and justify opinions	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.			[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyze 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"> <li>• definitions, graphs, properties, continuity, limits</li> <li>• absolute value, equations and inequalities</li> <li>• polynomials, rational functions, power functions, trigonometric and inverse trigonometric functions, exponential and logarithmic functions</li> <li>• equations and inequalities involving these functions</li> <li>• applications to mathematical modeling</li> </ul> <p>Infinite number sequences, limits and continuity of functions</p> <ul style="list-style-type: none"> <li>• boundedness and monotonicity</li> <li>• limits</li> <li>• continuity of functions, types of discontinuities and their interpretation</li> </ul> <p>Single variable calculus:</p> <ul style="list-style-type: none"> <li>• definition of the derivative</li> <li>• Rolle's and Lagrange's theorems and their applications</li> <li>• L'Hospital's Rule</li> <li>• monotonicity and local/global extrema (optimization problems)</li> <li>• higher order derivatives</li> <li>• concavity, inflection points</li> <li>• applications of single variable differential calculus to curve sketching,</li> <li>• applications of differential calculus to other fields (e.g. chemistry, physics, biology)</li> </ul> <p>Definite and indefinite integral, Fundamental Theorem of Calculus</p> <ul style="list-style-type: none"> <li>• basic integration formulas</li> <li>• integration by substitution, by parts, by partial fractions</li> <li>• applications of integral calculus to other fields</li> </ul> <p>Complex numbers.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1256 794 1290">Subject passing criteria</th> <th data-bbox="794 1256 1139 1290">Passing threshold</th> <th data-bbox="1139 1256 1485 1290">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1290 794 1323">Activity during lectures and classes</td> <td data-bbox="794 1290 1139 1323">0.0%</td> <td data-bbox="1139 1290 1485 1323">10.0%</td> </tr> <tr> <td data-bbox="456 1323 794 1357">Midterm exams</td> <td data-bbox="794 1323 1139 1357">50.0%</td> <td data-bbox="1139 1323 1485 1357">45.0%</td> </tr> <tr> <td data-bbox="456 1357 794 1391">Written exam</td> <td data-bbox="794 1357 1139 1391">50.0%</td> <td data-bbox="1139 1357 1485 1391">45.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Activity during lectures and classes	0.0%	10.0%	Midterm exams	50.0%	45.0%	Written exam	50.0%	45.0%
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	eResources addresses	<p>Podstawowe</p> <p><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298</a> - E-course on the eNauczanie platform with course materials and exercises for students. The e-course also has an organizational character related to the subject.</p> <p>Adresy na platformie eNauczanie:</p> <p>WCh - Bt, Ch, TCh, ZT s1: 2023/24 (A.Tłałka) - Moodle ID: 31298  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298</a></p> <p>WCh - Bt, Ch, TCh, ZT s1: 2023/24 (A.Tłałka) - Moodle ID: 31298  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298</a></p> <p>WCh - Bt, Ch, TCh, ZT s1: 2023/24 (A.Tłałka) - Moodle ID: 31298  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31298</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></li> <li>2. Find the derivative of <math>f(x) = \dots</math></li> <li>3. Sketch the graph of the function <math>f(x) = \dots</math>. Identify any local extrema and points of inflection.</li> <li>4. Find solutions of the equation <math>\dots</math> in the set of complex numbers.</li> <li>5. Use the definite integral to determine the volume of the solid formed by the rotation of the curve <math>\dots</math> around the axis <math>oX</math>.</li> </ol>	
Work placement	Not applicable	