



Subject card

Subject name and code	Mathematics 1, PG_00041990						
Field of study	Power Engineering, Power Engineering						
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			English		
Semester of study	1	ECTS credits			6.0		
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 Hanna Guze					
	Teachers	dr Hanna Guze					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	60.0	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	15.0	45.0	150		
Subject objectives	Students obtain competence in using methods of mathematical analysis (single variable calculus) and linear algebra, and knowledge how to solve simple problems that are found in the field of engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W01] has basic knowledge of mathematics necessary to describe the phenomena related to the processes of energy conversion and transfer; uses information technology to solve mathematical problems	Student names basic properties of elementary functions. Student explains the concept of limit and continuity of functions and gives a graphic interpretation of discontinuity points. Student uses the first and second derivative of a function to analyze its properties. Student uses definite integral to solve geometrical problems. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in technical fields. Student defines the basic concepts of linear algebra and the knows what mathematical tools are used in technical calculation programs.			[SW1] Assessment of factual knowledge		
	[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	Student combines knowledge of mathematics with knowledge from other fields.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_K01] is aware of the need for training and self-improvement in the profession of energy and the possibility of further education; can think and act in a creative and entrepreneurial manner; can define priorities for the implementation of an individual or group task	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.			[SK2] Assessment of progress of work		

Subject contents	<p>Elements of linear algebra.</p> <ul style="list-style-type: none"> <li>• Matrices and determinants.</li> <li>• Inverse matrix.</li> <li>• Systems of linear equations.</li> </ul> <p>Elementary functions.</p> <ul style="list-style-type: none"> <li>• Linear function</li> <li>• Quadratic function</li> <li>• Polynomials</li> <li>• Power function</li> <li>• Exponential function</li> <li>• Logarithmic function</li> <li>• Cyclometric and trigonometric functions</li> </ul> <p>Sequences. Limits and continuity of one-variable functions.</p> <p>Differential calculus of one variable functions and its applications.</p> <p>Anti-derivate.</p> <ul style="list-style-type: none"> <li>• The substitution method of integration and integration by parts.</li> <li>• Integration of rational, trigonometric and irrational functions.</li> </ul> <p>Definite and improper integrals</p> <ul style="list-style-type: none"> <li>• Geometrical applications and applications to other fields.</li> </ul>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="448 938 794 972">Subject passing criteria</th> <th data-bbox="794 938 1141 972">Passing threshold</th> <th data-bbox="1141 938 1485 972">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 972 794 1005">Written final exam</td> <td data-bbox="794 972 1141 1005">40.0%</td> <td data-bbox="1141 972 1485 1005">50.0%</td> </tr> <tr> <td data-bbox="448 1005 794 1043">Tests and activity in classes</td> <td data-bbox="794 1005 1141 1043">0.0%</td> <td data-bbox="1141 1005 1485 1043">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written final exam	40.0%	50.0%	Tests and activity in classes	0.0%	50.0%
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Recommended reading	Basic literature	<p>George B. Thomas, Jr., Ross L. Finney., Calculus and analytic geometry, Addison-Wesley Publishing Company; 7th edition (January 1988)</p> <p>Sherman K. Stein, Calculus and analytic geometry, McGraw-Hill Book Company, 4th edition, 1987,</p> <p>T.Jankowski, Linear algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2001.</p>										
	Supplementary literature	<p>Praca zbiorowa pod redakcja B.Wikieł, Matematyka. Podstawy z elementami matematyki wyzszej. Wydawnictwo Politechniki Gdanskiej, Gdansk, 2007.</p> <p>M.Gewert, Z.Skoczylas, Analiza matematyczna I - Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS</p> <p>M.Gewert, Z.Skoczylas, Analiza matematyczna I - Przykłady i zadania, Oficyna Wydawnicza GiS</p> <p>K. Jankowska, T. Jankowski, Zbior zadan z matematyki. Wydawnictwo Politechniki Gdanskiej , Gdansk, 2007.</p>										
	eResources addresses	<p>Adresy na platformie eNauczenie:</p> <p>WIMiO - ET - Mathematics I 2023/24 (H.Guze) - Moodle ID: 31612  <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=31612">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=31612</a></p>										
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• Solve the system of linear equations.</li> <li>• Find the inverse matrix (to a given matrix).</li> <li>• Find limits of given sequence, of given function.</li> <li>• Find the domain and the range of the function <math>f(x) = \dots</math>. Calculate the inverse of the function.</li> <li>• Find the derivative of <math>f(x) = \dots</math>. Find the intervals on which the function is convex and decreasing.</li> <li>• Sketch the graph of the function <math>f(x) = \dots</math>. Identify any local extrema and points of inflection.</li> <li>• Evaluate the given integrals.</li> <li>• Find the volume of a solid of revolution obtained by rotating the graph of the function <math>f(x) = \dots</math> about the OX axis.</li> </ul>											

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