



Subject card

Subject name and code	Mathematics 1, PG_00041990						
Field of study	Power Engineering						
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			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						
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_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		
	[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_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		

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="448 943 794 976">Subject passing criteria</th> <th data-bbox="794 943 1141 976">Passing threshold</th> <th data-bbox="1141 943 1485 976">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 976 794 1010">Tests and activity in classes</td> <td data-bbox="794 976 1141 1010">0.0%</td> <td data-bbox="1141 976 1485 1010">50.0%</td> </tr> <tr> <td data-bbox="448 1010 794 1043">Written final exam</td> <td data-bbox="794 1010 1141 1043">40.0%</td> <td data-bbox="1141 1010 1485 1043">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Tests and activity in classes	0.0%	50.0%	Written final exam	40.0%	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 wyższej. 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, Zbiór zadań z matematyki. Wydawnictwo Politechniki Gdanskiej , Gdansk, 2007.</p>										
	eResources addresses	Adresy na platformie eNauczanie:										
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>											
Work placement	Not applicable											