



Subject card

Subject name and code	Mathematics I, PG_00055861						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2021/2022		
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			10.0		
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 Marcin Szyszkowski				
	Teachers		mgr Danuta Beger dr Marcin Szyszkowski				
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		24.0		121.0	250
Subject objectives	Obtaining competences by a student in using the apparatus of mathematical analysis and equations and applying the acquired knowledge to solve simple problems occurring in engineering fields						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	<p>[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</p>	<p>Student: Can name the basic properties of elementary functions. Solves the equations and inequalities containing elementary functions. Computes the limits of sequences and functions by definition. He knows the definition of a derivative and its applications, finds monotonicity intervals of functions and its extremes. Analyzes properties of a functions based on its first and second derivative. Applies the basic techniques of integration to calculate indefinite an definite integrals Examines the convergence of improper integrals. The student defines the basic the concepts of linear algebra. Defines the basic concepts of matrix calculus. Detetmines the position of the straight lines and planes in space. Uses packages mathematical to carry out calculations and visualization of mathematical concepts.</p>	<p>[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation</p>
	<p>[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</p>	<p>Student can use a computer program to calculate the needed values. He knows what mathematical methods are used in programs for technical calculations.</p>	<p>[SK2] Assessment of progress of work</p>
	<p>[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems</p>	<p>The student joins the knowledge in mathematics with knowledge from others fields.</p>	<p>[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools</p>

Subject contents	<p>Elements of linear algebra. Matrices and determinants. Operations on matrices. Inverse of a matrix. System of linear equations.</p> <p>Analytic geometry in space. vectors, dot product, vector product and applications. Equations of planes and lines in space.</p> <p>Elementary functions.</p> <p>Sequences. Definition. Monotonicity. Limit.</p> <p>Calculus Finding derivative (using formulas). Applications of derivative.</p> <p>Indefinite integral. Integration by parts and by substitution. Integration of rational, trigonometric and irrational functions.</p> <p>Definite integral. Application of definite integral.</p> <p>Improper integrals. Applications.</p> <p>Complex numbers.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 1097 794 1126">Subject passing criteria</th> <th data-bbox="799 1097 1141 1126">Passing threshold</th> <th data-bbox="1145 1097 1482 1126">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1133 794 1162">Tests during the semester</td> <td data-bbox="799 1133 1141 1162">50.0%</td> <td data-bbox="1145 1133 1482 1162">60.0%</td> </tr> <tr> <td data-bbox="453 1169 794 1198">other (activity, homework)</td> <td data-bbox="799 1169 1141 1198">0.0%</td> <td data-bbox="1145 1169 1482 1198">5.0%</td> </tr> <tr> <td data-bbox="453 1205 794 1234">Exam</td> <td data-bbox="799 1205 1141 1234">50.0%</td> <td data-bbox="1145 1205 1482 1234">35.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Tests during the semester	50.0%	60.0%	other (activity, homework)	0.0%	5.0%	Exam	50.0%	35.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Jurkiewicz T., Skoczylas Z., Algebra liniowa 1, GiS, Wrocław 2006 2. Leja F., Rachunek różniczkowy i całkowy, PWN, Warszawa 1965 3. Mostowski A., Stark M., Elementy algebry wyższej, PWN, Warszawa 1968 4. Jankowska K., Jankowski T., Zbiór zadań z matematyki, Wydawnictwo PG, Gdańsk 1998 5. Wikeł B., Podstawy z elementami matematyki wyższej, Wydawnictwo PG, Gdańsk 2007 													

	Supplementary literature	<p>1. Fichtenholtz G. M., Rachunek różniczkowy i całkowy, t. 1-2, PWN, Warszawa 1962</p> <p>2. Jankowska K., Jankowski T., Zbiór zadań z matematyk wyższej, Wydawnictwo PG, Gdańsk 2004</p> <p>3. Krysicki W., Włodarski W., Analiza matematyczna w zadaniach, cz.1, PWN, Warszawa 1994</p> <p>4. Krysicki W., Włodarski W., Analiza matematyczna w zadaniach, cz.2, PWN, Warszawa 1994</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>1. Solve a system of equations. 2. Find the inverse matrix. 3. Plane given by 3 points in space. 4. Radius of convergence of a power series. 5. Examine the intervals of monotonicity and extremes of a function. 6. Calculate the indefinite integral (eg of a rational function). 7. Calculate the improper integral. 8. Solve the matrix equation eg. np. $3X - AX = B$ jeżeli $A = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$, $B = \begin{bmatrix} -1 & -3 \\ 2 & -1 \end{bmatrix}$.</p>	
Work placement	Not applicable	