



Subject card

Subject name and code	Mathematics I, PG_00060447						
Field of study	Mechanical and Naval Engineering						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Part-time studies	Mode of delivery			blended-learning		
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 inż. Magdalena Łapińska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	27.0	36.0	0.0	0.0	0.0	63
	E-learning hours included: 27.0						
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	63		17.0		170.0	250
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_U01] is able to acquire information from specialized literary sources, databases and other resources, essential for solving engineering tasks; is able to compile the obtained information pieces and to interpret them, additionally is able to form conclusions and present justified opinion		Student uses gained knowledge in basic mathematics to analyse results of experiments and justify solutions to engineering problems.		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K6_W01] possesses mathematical knowledge within the range of linear algebra and mathematical analysis useful in characterising and interpreting mechanical systems, technological processes and operational properties of devices		Student mentions basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student uses the basic operations on complex numbers. Student defines basic notions of matrix calculus. Student uses basic notions and formulas of matrix calculus in solving systems of linear equations. 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.		[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		

Subject contents	<p>Course content – lecture Functions of one variable:</p> <ul style="list-style-type: none"> • definitions, graphs, properties • absolute value, equations and inequalities • polynomials, rational functions, power functions, trigonometric and inverse trigonometric functions, exponential and logarithmic functions • equations and inequalities involving these functions <p>Complex numbers</p> <p>Elements of linear algebra:</p> <ul style="list-style-type: none"> • matrices, their properties and operations on matrices • determinants. Inverse of a square non-singular matrix • dot product, cross product, their properties and its applications • the triple scalar product and applications. <p>Systems of linear equations.</p> <ul style="list-style-type: none"> • Cramer patterns • the rank of the main and completed matrix • Kronecker-Capelli theorem. <p>Single variable calculus - derivative:</p> <ul style="list-style-type: none"> • first order derivative • Rolle's and Lagrange's theorems and their applications • L'Hospital's Rule • monotonicity and local/global extrema (optimization problems) • higher order derivatives • concavity, inflection points • applications of single variable differential calculus <p>Single variable calculus - integral</p> <ul style="list-style-type: none"> • definite and indefinite integral, Fundamental Theorem of Calculus • basic integration formulas • integration by substitution, by parts, by partial fractions • applications of integral calculus 																	
Prerequisites and co-requisites																		
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="448 1585 794 1630">Subject passing criteria</th> <th data-bbox="794 1585 1141 1630">Passing threshold</th> <th data-bbox="1141 1585 1477 1630">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1630 794 1664">Aktywność na zajęciach</td> <td data-bbox="794 1630 1141 1664">0.0%</td> <td data-bbox="1141 1630 1477 1664">19.0%</td> </tr> <tr> <td data-bbox="448 1664 794 1697">Exam</td> <td data-bbox="794 1664 1141 1697">50.0%</td> <td data-bbox="1141 1664 1477 1697">50.0%</td> </tr> <tr> <td data-bbox="448 1697 794 1731">Active learning during lectures</td> <td data-bbox="794 1697 1141 1731">0.0%</td> <td data-bbox="1141 1697 1477 1731">7.0%</td> </tr> <tr> <td data-bbox="448 1731 794 1765">Tests</td> <td data-bbox="794 1731 1141 1765">0.0%</td> <td data-bbox="1141 1731 1477 1765">24.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Aktywność na zajęciach	0.0%	19.0%	Exam	50.0%	50.0%	Active learning during lectures	0.0%	7.0%	Tests	0.0%	24.0%
Subject passing criteria	Passing threshold	Percentage of the final grade																
Aktywność na zajęciach	0.0%	19.0%																
Exam	50.0%	50.0%																
Active learning during lectures	0.0%	7.0%																
Tests	0.0%	24.0%																
Recommended reading	<p>Basic literature</p> <ul style="list-style-type: none"> - E. Mieloszyk : Macierze, wyznaczniki i układy równań, Wydawnictwo PG, 2000 - K. Jankowska, T. Jankowski : Zadania z matematyki wyższej, Wydawnictwo PG, 2010 - K. Jankowska, T. Jankowski : Zbiór zadań z matematyki, Wydawnictwo PG, 2010. 																	

	Supplementary literature	<p>- R. Leitner : Zarys matematyki wyższej I i II, Wydawnictwo Naukowo-Techniczne Warszawa 1999</p> <p>- W. Krywicki, L. Włodarski : Analiza matematyczna w zadaniach, Wydawnictwo Naukowe PWN</p> <p>- W. Stankiewicz : Zadania z matematyki dla wyższych uczelni technicznych, Wydawnictwo Naukowe PWN</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. . Find the domain and the set of values of the function $f(x) = \dots$ 2. Find solutions of the equation ... in the set of complex numbers. 3. Determine the matrix inverse to the matrix... 4. Discuss the solvability of the given system of equations 5. Find the derivative of $f(x) =$ 6. identify any local extrema and points of inflection of the function $f(x) = \dots$ 7. Use the definite integral to determine the volume of the solid formed by the rotation of the curve ... around the axis oX. 	
Practical activities within the subject	Not applicable	

Document generated electronically. Does not require a seal or signature.