



Subject card

Subject name and code	Mathematics I, PG_00049098						
Field of study	Materials Engineering, Materials Engineering, Materials 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			blended-learning		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Mathematics Center -> Vice-Rector for Education						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Anna Niewulis					
	Teachers	dr Anna Niewulis mgr Katarzyna Kiepiela					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	30.0	0.0	0.0	0.0	45
	E-learning hours included: 14.0 Adresy na platformie eNauczanie: IM sem.1 - Matematyka I 2021/2022 (A.Niewulis) - Moodle ID: 13687 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13687						
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	45	10.0	70.0	125		
Subject objectives	The aim of this subject is to obtain the student's competence in the range of using the basic methods of algebra. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W01	Student uses methods of mathematical description of phenomena in the physical / mechanical / chemical processes.			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K6_K01	Student combines knowledge of mathematics with knowledge from other fields.			[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice		
	K6_U05	Student recognizes the importance of self-expanding knowledge.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	<p>Elements of linear algebra: Matrices (definition, types of matrices, matrix operations). Determinants and their properties. Rank of a matrix. Matrices, their properties and operations on matrices. Inverse of a square non-singular matrix.</p> <p>Systems of linear equations : Systems of linear equations. Cramer's theorem. Rank of matrix. Kronecker-Capelly theorem.</p> <p>Analytic geometry: Basic vectors definitions and properties. Eigenvectors and eigenvalues. Dot product, cross product, their properties and its applications. The triple scalar product and applications. Equations of lines and planes in 3-space. The distance from a point to a plan. Angles between planes and lines.</p> <p>Complex numbers. Algebraic, trigonometric, exponential form, operations, exponentiation (Moivre formula), finding roots of complex numbers. Operations on complex numbers.</p>								
Prerequisites and co-requisites									
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1048 794 1077">Subject passing criteria</th> <th data-bbox="799 1048 1137 1077">Passing threshold</th> <th data-bbox="1142 1048 1469 1077">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1084 794 1106">Colloquium</td> <td data-bbox="799 1084 1137 1106">50.0%</td> <td data-bbox="1142 1084 1469 1106">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Colloquium	50.0%	100.0%
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Recommended reading	Basic literature	<p>G.M. Fichtenholz "Rachunek różniczkowy i całkowy" tom I, II, III</p> <p>R.Leitner, W. Matuszewski, Z. Rojek "Zadania z matematyki wyższej"</p> <p>K. Dobrowolska "Matematyka dla studiów technicznych dla pracujących" tom I,II, PWN , Warszawa 1981,</p> <p>L. Siewierski "Ćwiczenia z analizy matematycznej z zastosowaniami" tom I, II, PWN, Warszawa 1982,</p> <p>W. Stankiewicz "Zadania z matematyki dla wyższych uczelni technicznych" część I, II, PWN, Warszawa 1980,</p> <ol style="list-style-type: none"> 1. Gewert M., Skoczylas Z., Algebra liniowa 1, Definicje, twierdzenia wzory, Wydawnictwo GiS, Wrocław 2. Gewert M., Skoczylas Z., Algebra liniowa 2, Definicje, twierdzenia wzory, Wydawnictwo GiS, Wrocław 3. K. Jankowska, T. Jankowski, Zbiór zadań z matematyki, PG Gdańsk 4. Banaś J., Podstawy matematyki dla ekonomistów, Wydawnictwa Naukowo-Techniczne, Warszawa 5. Matłoka M., Wojcieszyn B., Matematyka z elementami zastosowań w ekonomii, Wydawnictwo Wyższej Szkoły Bankowej w Poznaniu 							

	Supplementary literature	<p>K. Jankowska, T. Jankowski "Zbiór zadań z matematyki wyższej", Wyd. PG, Gdańsk 1999,</p> <p>B. Gdowski, E. Pluciński "Zadania z rachunku wektorowego i geometrii analitycznej", PWN, Warszawa 1982</p> <p>I. Dziubiński, L. Siewierski "Matematyka dla wyższych szkół technicznych", PWN, Warszawa 1984,</p>
	eResources addresses	IM sem.1 - Matematyka I 2021/2022 (A.Niewulis) - Moodle ID: 13687 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13687
Example issues/ example questions/ tasks being completed	<p>Find an equation for the plane satisfying the given conditions:</p> <p>a) passes through the z- axis and the point P, b) passes through the point P and is perpendicular to the line l.</p> <p>Discuss the relation between the line l and the plane S.</p> <p>Find the rank of the matrix A.</p>	
Work placement	Not applicable	

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