



Subject card

Subject name and code	Mathematics II, PG_00049096							
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		7.0			
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 Anna Niewulis					
	Teachers		mgr Katarzyna Kiepiela					
			dr Anna Niewulis					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar		
	Number of study hours	30.0	45.0	0.0	0.0	0.0		
	E-learning hours included: 30.0							
Adresy na platformie eNauczanie: IM sem.1 - Matematyka II - 2021/2022 (A.Niewulis) - Moodle ID: 13688 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13688">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13688</a>								
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study		
	Number of study hours	75		10.0		90.0		
		175						
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_U05		Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process.		[SU3] Assessment of ability to use knowledge gained from the subject			
	K6_K01		Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem.		[SK5] Assessment of ability to solve problems that arise in practice			
	K6_W01		Student uses methods of mathematical description of phenomena in the physical / mechanical / chemical processes.		[SW3] Assessment of knowledge contained in written work and projects			

Subject contents	<p>Functions of one variable and their properties:          Power functions – solving power and polynomial equations and inequalities.          Rational functions – solving rational equations and inequalities.          Exponential function – properties and graphs, solving exponential equations and inequalities.          Logarithmic functions – properties and graphs, solving logarithmic equations and inequalities.          Trigonometric and cyclometric functions – properties and graphs, solving trigonometric equations and inequalities.</p> <p>Limits and continuity:          Infinite sequences.          Fundamental definitions of a limit of a sequence, convergence and divergence, limit theorems.          Applications to solving equation.</p> <p>Differential calculus of one variable functions and its applications:          Definition of a first derivative and differential.          Roll's and Lagrange's theorems.          Higher derivatives and differentials.          Monotonicity and local extrema.          Convexity, concavity and inflection points of a function.          De l'Hospital's Thorem.          Asymptotes.          Applying differential calculus to studying the properties of one variable functions.</p> <p>Integral calculus of one variable functions – antiderivatives:          The process of finding antiderivatives and integration formulas – the substitution method of integration and integration by parts.          Integration of rational, trigonometric and irrational functions.          Definite integrals in Riemann's sense:          Newton-Leibniz Thorem.          Integration formulas, the substitution method of integration and integration by parts for definite integrals.          Applications of integral calculus in computing areas of plane figures, lengths of arcs, volumes of solids of revolution.</p>									
Prerequisites and co-requisites										
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="446 842 774 878">Subject passing criteria</th><th data-bbox="774 842 1140 878">Passing threshold</th><th data-bbox="1140 842 1486 878">Percentage of the final grade</th></tr> </thead> <tbody> <tr> <td data-bbox="446 878 774 914">Colloquium</td><td data-bbox="774 878 1140 914">50.0%</td><td data-bbox="1140 878 1486 914">40.0%</td></tr> <tr> <td data-bbox="446 914 774 945">Exam</td><td data-bbox="774 914 1140 945">50.0%</td><td data-bbox="1140 914 1486 945">60.0%</td></tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Colloquium	50.0%	40.0%	Exam	50.0%	60.0%
Subject passing criteria	Passing threshold	Percentage of the final grade								
Colloquium	50.0%	40.0%								
Exam	50.0%	60.0%								
Recommended reading	<p>Basic literature</p>	<p><b>Basic literature</b></p> <p>G.M.Fichtenholz „Rachunek różniczkowy i całkowy tom I, II, PWN, Warszawa 1964;          H. Rasiowa „Wstęp do matematyki współczesnej”, PWN, Warszawa          W. Jankowski „Matematyka. Podręcznik dla wydziałów elektrycznych i mechanicznych politechnik”, PWN, Warszawa 1967          W. Leksiński, I. Nabiałek, W. Żakowski „Matematyka. Definicje, twierdzenia, przykłady, zadania”-podręczniki akademickie , Wyd. NT, Warszawa 1994          W. Krysicki, L. Włodarski „Analiza matematyczna w zadaniach” część I, PWN, Warszawa 1986          W. Stankiewicz „Zadania z matematyki dla wyższych uczelni technicznych”, cz.I, PWN, Warszawa 1980          L. Maurin, M. Mączyński, T. Traczyk „Matematyka, podręcznik dla studentów wydziałów chemicznych”, Tom I, PWN, Warszawa 1975          K. Dobrowolska, praca zbiorowa „Matematyka dla studiów technicznych dla pracujących” Tom I, PWN, Warszawa 1981</p>								
	<p>Supplementary literature</p>	<p><b>Supplementary literature</b></p> <p>I. A. Ławrow, Ł. L. Maksimowa „Zadania z teorii mnogości, logiki matematycznej i teorii algorytmów”, PWN, PWN, Warszawa 2004          W. Marek, J. Onyszkiewicz „Elementy logiki i teorii mnogości w zadaniach”, PWN, Warszawa          R. Grzymkowski „Matematyka, zadania i odpowiedzi”, podręczniki akademickie, Wyd. Pracowni Komputerowej Jacka Skalmierskiego, Gliwice 2002          B. Winiel, praca zbiorowa, „Matematyka. Podstawy z elementami matematyki wyższej”, Wyd. PG, Gdańsk 2009          M. Gewert, Z. Skoczylas „Analiza matematyczna 1, Przykłady i zadania”, Oficyna Wydawnicza Gis, Wrocław 2005          K. Jankowska, T. Jankowski „Zbiór zadań z matematyki”, Wyd. PG, Gdańsk 2000          K. Jankowska, T. Jankowski „Zadania z matematyki wyższej”, Wyd. PG, Gdańsk 1999          J. Głązunow „Matematyka wyższa, zbiór zadań z analizy funkcji jednej zmiennej”, Wyd. Elbląskiej Uczelni Humanistyczno-Ekonomicznej, Elbląg 2006          M. Lassak „Zadania z analizy matematycznej”, Wyd. Wspierania Procesu Edukacji, Warszawa 2003</p>								
	<p>eResources addresses</p>	<p>IM sem.1 - Matematyka II - 2021/2022 (A.Niewulis) - Moodle ID: 13688  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13688">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13688</a></p>								

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Find the domain and the set of values of the function . Determine the inverse function of <math>f</math>.</li> <li>2. Find the derivative of the function</li> <li>3. Find local extremes and intervals of monotonicity of the following function</li> <li>4. Determine indefinite integrals of the following functions</li> <li>5. Give three applications of the definite integral with appropriate rules.</li> <li>6. Find the volume of a solid obtained by rotating around the axis OX the graph of the function</li> <li>7. Solve the logarithmic equation (exponential)</li> <li>8. Find the area between the two curves</li> </ol>
Work placement	Not applicable