



Subject card

Subject name and code	, PG_00052066						
Field of study	Nanotechnology						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2020/2021		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research 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			9.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Differential Equations and Mathematical Applications -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Piotr Bartłomiejczyk					
	Teachers	dr hab. Piotr Bartłomiejczyk dr Agnieszka Bartłomiejczyk mgr inż. Katarzyna Tessmer					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	45.0	0.0	0.0	0.0	75
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Matematyka I - ćwiczenia 2020/2021 - Moodle ID: 9802 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=9802 Matematyka I - ćwiczenia 2020/2021 - Moodle ID: 9802 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=9802						
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	75	20.0	130.0	225		
Subject objectives	Students obtain competence in the range of using methods of mathematical analysis 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_W02	Student mentions basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student calculates limits of the sequences and functions Student determines intervals of monotonicity of a given functions and its extrema. Student 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 [SW3] Assessment of knowledge contained in written work and projects				
	K6_U01	Student recognizes the importance of self-expanding knowledge and take the challenge of working with a group to solve a problem.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject				

Subject contents	<p>Functions of one variable and their properties: The absolute value function – definition, solving equations and inequalities with absolute value, graphs of functions with absolute value. 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. Limits and continuity: Infinite sequences. Fundamental definitions of a limit of a sequence, convergence and divergence, limit theorems. Applications to solving equation. 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 inflexion points of a function. De l'Hospital's Thorem. Asymptotes. Applying differential calculus to studying the properties of one variable functions. 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="456 891 794 920">Subject passing criteria</th> <th data-bbox="799 891 1137 920">Passing threshold</th> <th data-bbox="1142 891 1481 920">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 927 794 956">Exam</td> <td data-bbox="799 927 1137 956">50.0%</td> <td data-bbox="1142 927 1481 956">50.0%</td> </tr> <tr> <td data-bbox="456 963 794 992">Colloquium</td> <td data-bbox="799 963 1137 992">50.0%</td> <td data-bbox="1142 963 1481 992">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Exam	50.0%	50.0%	Colloquium	50.0%	50.0%
Subject passing criteria	Passing threshold	Percentage of the final grade										
Exam	50.0%	50.0%										
Colloquium	50.0%	50.0%										
Recommended reading	<p>Basic literature</p>	<p>Basic literature 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>Supplementary literature I. A. Ławrow, Ł. L. Maksimowa „Zadania z teorii mnogości, logiki matematycznej i teorii algorytmów”, PWN, PWN, Warszawa 2004 W. Marek, J. Onyszkievicz „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. Wikieł, 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. Głazunow „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>Matematyka I - ćwiczenia 2020/2021 - Moodle ID: 9802 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=9802 Matematyka I - ćwiczenia 2020/2021 - Moodle ID: 9802 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=9802</p>										

<p>Example issues/ example questions/ tasks being completed</p>	<p>Find the domain and the set of values of the function $f(x)=\dots$. Determine the inverse function of f.</p> <p>Sketch the graph of the function $f(x)=\dots$. Identify any local extrema and points of inflection.</p> <p>Find the area between the two curves $y=\dots$ and $y=\dots$ from $x=\dots$ to $x=\dots$.</p> <p>Find the volume of a solid of revolution obtained by the rotation of the graph of the function $f(x)=\dots$ around the OX-axis.</p> <p>Evaluate the indefinite integral of the given rational function \dots .</p>
<p>Work placement</p>	<p>Not applicable</p>