



Subject card

Subject name and code	Mathematics I, PG_00043608						
Field of study	Environmental Engineering						
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		8.0		
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 Cezary Mrozicki				
	Teachers		mgr Małgorzata Kula mgr Justyna Woron dr Cezary Mrozicki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	45.0	0.0	0.0	0.0	90
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2020/2021 (C. Mrozicki) - Moodle ID: 6926 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6926 WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2020/2021 (C. Mrozicki) - Moodle ID: 6926 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6926 WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2020/2021 (C. Mrozicki) - Moodle ID: 6926 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6926						
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	90		10.0		216.0	316
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_W01] has knowledge in the field of mathematics, including: linear algebra, mathematical analysis and elements of mathematical statistics, probability theory, applications of mathematics, including mathematical methods and numerical methods, necessary for: 1) description and analysis of hydrological phenomena; 2) description and analysis of meteorological phenomena; 3) solving project tasks of the sanitary industry;	The student lists the basic properties of elementary functions. The student solves equations and inequalities containing elementary functions. The student interprets geometrically the study of graphs of functions using the concept of limit and continuity of functions. The student defines the basic concepts of differential calculus of one variable. The student analyses the properties of functions on the basis of an examination of its first and second derivatives. The student applies the basic rules and techniques of integration to calculate indefinite integrals.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K6_U01] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions	The student combines knowledge of mathematics with knowledge from other fields.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
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, exponential, logarithmic, trigonometric and cyclometric functions – properties and graphs, solving equations and inequalities.</p> <p>Limits and continuity: Infinite sequences. Fundamental definitions of limit of sequence, convergence and divergence, limit theorems. Applications to solving equation.</p> <p>Differential calculus of functions with one variable and applications of differential calculus of one variable functions: Definition of 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 Theorem. Taylor's Theorem. Asymptotes. Applying differential calculus to study the properties of one variable functions.</p> <p>Integral calculus of functions with one variable – indefinite integral: Basic methods and ways of integration - integration by parts and substitution. Integration of rational functions, trigonometric and irrational.</p>		
Prerequisites and co-requisites	There are no preliminary or additional requirements.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	65.0%
	Written exam	50.0%	35.0%
Recommended reading	Basic literature	<p>Pod redakcją B. Wikiel, Matematyka. Podstawy z elementami matematyki wyższej. Wydawnictwo PG, Gdańsk 2009 W. Kryszicki, L. Włodarski, Analiza matematyczna w zadaniach 1, Wydawnictwo Naukowe PWN, Warszawa 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Przykłady i zadania. Oficyna Wydawnicza GIS, Wrocław 2008 K. Jankowska, T. Jankowski, Zbiór zadań z matematyki, Wydawnictwo PG, Gdańsk 2008</p>	
	Supplementary literature	W. Leksiński, I. Nabiałek, W. Żakowski, Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa 2006	

	eResources addresses	<p>WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2020/2021 (C. Mrozicki) - Moodle ID: 6926 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6926</p> <p>WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2020/2021 (C. Mrozicki) - Moodle ID: 6926 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6926</p> <p>WILiŚ - Inżynieria Środowiska - sem. 1- Matematyka 2020/2021 (C. Mrozicki) - Moodle ID: 6926 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6926</p>
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Investigate the monotonicity of the sequence (a_n). 2. Enter the properties of the function $f(x) = \dots$ 3. Calculate the derivative of the function $f(x) = \dots$ 4. Determine the indefinite integral of the function $f(x) = \dots$ 	
Work placement	Not applicable	