

## SDAŃSK UNIVERSITY 的 OF TECHNOLOGY

## Subject card

Subject name and code	Mathematics II, PG_00024116							
Field of study	Hydrogen Technologies and Electromobility							
Date of commencement of studies	October 2023		Academic year of realisation of subject		2023/2024			
Education level	first-cycle studies		Subject group			Obligatory subject group 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	2		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 Anita Dąbrowicz-Tlałka					
	Teachers		dr inż. Magdalena Łapińska					
			dr Anita Dąbrowicz-Tlałka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	Number of study hours	45.0	60.0	0.0	0.0		0.0	105
	E-learning hours included: 0.0							
Learning activity and number of study hours	earning activity Participation in classes includ plan		۱ didactic Participation in ed in study consultation hours		n Iours	Self-study		SUM
	Number of study hours	105		10.0		85.0		200
Subject objectives	Students obtain competence in the range of using methods of mathematical analysis and knowledge 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 of mathematics – including linear algebra, mathematical analysis, numerical methods – necessary to describe physical and chemical phenomena, as well as the analysis of electrical circuits and automation and robotics systems	Student determines convergence of number series. Student calculates the radius of convergence and the interval of convergence of a power series. Student expands a function in Taylor and Maclaurin series. Student determines the Fourier series of a given function. Student examines functions of several variables, using the concept of a limit, continuity and derivatives. Student determines local and global extremes of functions of two variables. Student uses functions of many variables to study selected properties of scalar and vector fields. Students calculates double integrals, and explains the method of substitution in the double integral. Student applies double integrals in solving geometrical problems. Student demonstrates some techniques for solving ordinary differential equations. Student determines general and particular solutions of certain types of the first-order differential equations. Student finds the right method for solving the second - order ordinary differential equations. Student determines general and particular solutions of the second -order and n-order linear differential equations with constant coefficients. Student recognizes the importance of self-expanding	[SW1] Assessment of factual knowledge			
	[K6_U01] Is able to obtain information from literature, databases and other sources, integrate them, interpret them and draw conclusions and formulate opinions; has the ability to self-	knowledge and takes the challenge of working with a group to solve a problem. Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student recognizes the importance of skillful use of basic mathematical	[SU2] Assessment of ability to analyse information			
	educate m.in. in order to improve professional competences	apparatus in terms of study in the future. Student recognizes the importance of self-expanding knowledge.				
Subject contents	Number series.					
	Power series, Taylors, Maclaurins and Fourier series.					
	Functions or two variables, partial derivatives, applications (maxima and minima, gradient, divergence, rotation, potential field).					
	Ordinary differential equations , definition of the differential equation and its solution, general and particular					
	solution, the Cauchy initial value problem. Variables separable equations. First order linear differential equations of order n with constant coefficients.					
Prerequisites and co-requisites	none					

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Final exam	50.0%	50.0%				
	Midterms	50.0%	40.0%				
	Activity during classes	0.0%	10.0%				
Recommended reading	Basic literature	1. Gewert M., Skoczylas Z.: Analiza 2004. 2. Gewert M., Skoczylas Z.: Równai	matematyczna, GiS, Wrocław,				
		3. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach, cz.l., iz.II. PWN, Warszawa 2006.					
		4. Jankowska K., Jankowski T.: Zac PG, Gdańsk, 1999.	owski T.: Zadania z matematyki wyższej. Wyd.				
	Supplementary literature	1. Leksiński W., Nabiałek I., Żakowski W.: Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa, 2003.					
		2. Żakowski W., Kołodziej W.: Matematyka, cz.II. WNT, Warszawa, 1995.					
	3. Żakowski W, Leksiński W. 1995.		/latematyka, cz.IV. WNT, Warszawa,				
	eResources addresses Adresy na platformie eNauczanie: WEiA - TWiE – s2: 2023/24 (A.Tlałka) - Moodle ID: 35350 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=353						
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	https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35350						
Example issues/ example questions/ tasks being completed	<ol> <li>Investigate the convergence of a number series and determine its type.</li> <li>Investigate the convergence of a number series and determine its type.</li> <li>Using the appropriate power series, calculate the sum of the given series</li> <li>Find the local extrema of the function f(x,y).</li> <li>Check if the field is potential, if so, determine its potential.</li> </ol>						
	5. Using the double integral, calculate the volume of a solid bounded by surfaces						
	6. Find a solution to the differential equation. satisfying given initial conditions.						
7. Solve the following second-order linear differential equations using the appropriate r							
Work placement	Not applicable						