GDAŃSK UNIVERSITY 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 2025		Academic year of realisation of subject	2025/2026			
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 Anita Dąbrowicz-Tlałka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	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	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours	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.	[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-educate m.in. in order to improve professional competences	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 apparatus in terms of study in the future. Student recognizes the importance of self-expanding knowledge.	[SU2] Assessment of ability to analyse information

Subject contents

Number series.

Power series, Taylors, Maclaurins and Fourier series.

Functions of two variables, partial derivatives, applications (maxima and minima, gradient, divergence, rotation, potential field).

Double integral, polar coordinates and generalized polar coordinates, applications.

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. Linear differential equations of order n with constant coefficients.

Prerequisites and co-requisites

none

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
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 matematyczna, GiS, Wrocław, 2004. 2. Gewert M., Skoczylas Z.: Równania różniczkowe zwyczajne, GiS, Wrocław, 2004. 3. Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach, cz.I., cz.II. PWN, Warszawa 2006. 4. Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk, 1999.
	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.: Matematyka, cz.IV. WNT, Warszawa, 1995.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Investigate the convergence of a number series ... and determine its type. 2. Using the appropriate power series, calculate the sum of the given series ... 3. Find the local extrema of the function f(x,y). 4. Check if the field ... is potential, if so, determine its potential. 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 method.	
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.