GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics II, PG_00024116		
Field of study	Electrical Engineering		
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 Anna Niewulis	
	Teachers	dr Anna Niewulis mgr Katarzyna Kiepiela mgr Justyna Woroń	

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 ordinary differential equations 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_U01	Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student understands the need of lifelong learning and improving their engineering knowledge	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	K6_W01	Student tests canvergence of number series. Student uses power series in order to compute sums of number series. Student determines a Fourier series of a given functions. Student analyses properties of a given function of two variables using differential calculus of several variables functions. Students calculates double integrals, and explains the metod of substitution of variables in the double integral. Student applies double integrals to solve geometrical problems. Student demonstrates some techniques of solving ordinary differential equations.	[SW1] Assessment of factual knowledge
	K6_K02	Student is able to work individually and in a group, knows how to estimate the time needed to carry out the task, and is able to implement the work schedule.	[SK3] Assessment of ability to organize work [SK1] Assessment of group work skills

Subject contents	Number series and function series. Number series. Convergent and divergent series. Convergence tests of the number series. Function series. Region of convergence. Power series. Radius and interval of convergence. Taylor s and Maclaurin s series. Integration and differentiation of power series. Examples of applications - approximate calculation of integrals. Fourier series. Only sinus or only cosinus series. Functions of two or more variables. Domains, partial derivatives, increment of a function and total differential. Maxima and minima of a function of two variables. Directional derivative and gradient. Implicit functions. Double integral over a rectangle or a normal region. Change of variables in the double integral. Polar coordinates. Applications of double integrals. Ordinary differential equations. First order differential equations. General and particular solution. The Cauchy initial value problem. Variables separable, linear, Bernoulli"s equations. Second order linear differential equations with constant coefficients - methods of solving.
Prerequisites and co-requisites	Knowledge of the subject: Mathematics I.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	50.0%	50.0%
Midterm colloquium	50.0%	50.0%

Recommended reading

Basic literature	1. Gewert M., Skoczylas Z "Analiza matematyczna 2." Wrocław: GiS, 2004. 2. Gewert M., Skoczylas Z "Równania różniczkowe zwyczajne" Wrocław: GiS, 2004. 3. Jurewicz T., Skoczylas Z. "Algebra liniowa 2." Wrocław: GiS, 2004. 4. Krysicki W., Włodarski L. "Analiza matematyczna w zadaniach, cz. I i II." Warszaw: PWN, 2006.
Supplementary literature	1. Lassak M. "Matematyka dla studiów technicznych." Warszawa: Supremum, 2004. 2. Leksiński W., Nabiałek I., Żakowski W. "Matematyka. Definicje, twierdzenia, przykłady, zadania." warszawa: WNT. 2003.
eResources addresses	Adresy na platformie eNauczanie: WEiA - Et. - Matematyka II - 2023/2024 (A.Niewulis) - Moodle ID: 36570 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36570

Example issues/ example questions/ tasks being completed

1. Give the definition of the sum of the series.
2. Check whether the given series is convergent using the ratio test, the root test.. the comparison test or the integral test.
3. Compute partial differentials of the second order for the given function f(x,y).
4. Find extreme values of the function f(x,y).
5. Compute the double integral of the given function f(x,y) over the region D.
6. Find a particular solution of the differential equation ... satisfying the given initial conditions ….
7. Find the general solution of the differential equation …. by the method of variation of parameters.

Work placement	Not applicable