



Subject card

Subject name and code	Mathematics II, PG_00024047						
Field of study	Automation, Robotics and Control Systems						
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 Magdalena Musielak					
	Teachers	dr Anita Dąbrowicz-Tlałka mgr Katarzyna Kujawska dr Magdalena Musielak					
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						
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		100.0	200
Subject objectives	Students obtain competence in the range of using methods of mathematical analysis and linear algebra 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_K02] can work in a group taking on different roles in it	Student recognizes the importance of self-expanding 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.	[SK1] Assessment of group work skills [SK2] Assessment of progress of work
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions	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.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
[K6_W01] has basic knowledge in the field of mathematics including algebra, geometry, mathematical analysis, probabilistics, numerical methods - necessary to describe and analyze 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. 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 linear differential equations with constant coefficients.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	
Subject contents	Function sequences and series. Number series. Power series, Taylors, Maclaurins and Fourier series. Functions of two variables, partial derivatives, applications (maxima and minima). Double integral, 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. Second order linear differential equations with constant coefficients.		
Prerequisites and co-requisites	- active participation in tutorial - passing written tests and colloquiums		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written and oral exam	50.0%	50.0%
	Midterm written and oral colloquium	50.0%	50.0%
Recommended reading	Basic literature	1. Gewert M., Skoczylas Z.: Analiza matematyczna 2. 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. Leksiński W., Nabiałek I., Żakowski W.: Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa, 2003.	
	Supplementary literature	1. Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk, 1999. 2. Żakowski W., Kołodziej W.: Matematyka, cz.II. WNT, Warszawa, 1995. 3. Żakowski W., Leksiński W.: Matematyka, cz.IV. WNT, Warszawa, 1995.	
	eResources addresses	Adresy na platformie eNauczanie: WEiA - ARiSS - Matematyka II - 2023/2024 (M.Musielak) - Moodle ID: 36984 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36984	

<p>Example issues/ example questions/ tasks being completed</p>	<ol style="list-style-type: none"> 1. Compute the sum of the given series with general term a_n. 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 .
<p>Work placement</p>	<p>Not applicable</p>