



Subject card

Subject name and code	Mathematical methods of physics, PG_00063335						
Field of study	Nanotechnology						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
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	2	ECTS credits			7.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Leszek Wicikowski					
	Teachers	dr inż. Leszek Wicikowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	45.0	0.0	0.0	0.0	75
	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	75		5.0		95.0	175
Subject objectives	The aim of this subject is to obtain the students competence in the range of using the basic methods of mathematical analysis and linear algebra. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W02] has systematic knowledge of higher mathematics, including calculus, linear algebra with elements of geometry, numerical methods, the basics of probability theory.	The student analyzes the properties of the two variables function based on the differential calculus of multiple variables. Student applies double and triple integrals in geometry problems. Student determines general and specific integrals of some types of first and second order differential equations. Student examines the convergence of numerical and power series.			[SW1] Assessment of factual knowledge		
	[K6_U01] can learn independently, obtain information from literature, databases and other properly selected sources	The student appreciates the importance of expanding knowledge independently.			[SU2] Assessment of ability to analyse information		
Subject contents	Functions of two variables: Limit and continuity of a function of several variables. Partial derivatives. Total differential. Taylors formula. Maxima and minima of a function of several variables. Double integrals over rectangles and normal domains. Two dimensional change of variables theorem. Applications of double integrals. Triple integrals over cuboids and normal domains. Three dimensional change of variables theorem. Applications of triple integrals. Number series : Number series. Convergent and divergent series. Convergence tests of the number series. Function series: Power and Fourier series Ordinary differential equations: First order differential equations. General and particular solution. The Cauchy initial value problem. Variables separable, linear, Bernoulli, exact differential equations. Second order linear differential equations with constant coefficients						
Prerequisites and co-requisites	An introductory course in mathematical analysis in the field of functions of one variable						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Exam	50.0%			50.0%		
	Midterm quoloqium	50.0%			50.0%		

Recommended reading	Basic literature	McQuarrie D - Matematyka dla przyrodników i inżynierów, PWN 2006, W. Żakowski, W. Kołodziej, "Matematyka, część II", WNT, Warszawa, 1992 Marian Gewert, Zbigniew Skoczylas, Analiza matematyczna 1 Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2004 Marian Gewert, Zbigniew Skoczylas, Analiza matematyczna 2 Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2005 Marian Gewert, Zbigniew Skoczylas, Równania różniczkowe zwyczajne. Teoria, przykłady, zadania, Oficyna Wydawnicza GiS, Wrocław 2004 G.M. Fichtenholz "Rachunek różniczkowy i całkowy" tom I, II, III. Siewierski "Ćwiczenia z analizy matematycznej z zastosowaniami" tom I, II, PWN, Warszawa 1982, W. Kryszewski, L. Włodarski "Analiza matematyczna w zadaniach" cz. I, II, PWN, Warszawa 1986, W. Stankiewicz "Zadania z matematyki dla wyższych uczelnitechnicznych" część I, II, PWN, Warszawa 1980,
	Supplementary literature	Kazimiera Jankowska, Tadeusz Jankowski, Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1997 Kazimiera Jankowska, Tadeusz Jankowski, Zadania z matematyki wyższej, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1999
	eResources addresses	Adresy na platformie eNauczanie: Matematyczne metody fizyki - Moodle ID: 45524 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45524
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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