Subject card

Subject name and code	Mathematical methods of physics , PG_00027637					
Field of study	Mathematics					
Date of commencement of studies	October 2026		Academic year of realisation of subject		2028/2029	
Education level	first-cycle studies		Subject group		Optional subject group 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	3		Language of instruction		Polish	
Semester of study	6		ECTS credits		4.0	
Learning profile	general academic profile		Assessment form		exam	
Conducting unit	Department of Probability Theory and Biomathematics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology					
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Wojda			
	Teachers					

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	To familiarize the student with with the mathematical methods used in physics

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_K02	Students understand the need to popularize the application of differential equations in fields such as physics.	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness
	K6_U08	Student knows how to calculate determinants and knows their property; can give a geometric interpretation of the determinant and understands its relationship with the mathematical analysis	[SU1] Assessment of task fulfilment
	K6_W03	Student understands the construction of mathematical theories, mathematical formalism can be used to construct and analyze simple mathematical models in other sciences	[SW2] Assessment of knowledge contained in presentation
	K6_U05	Student applies theorems and methods of differential calculus of functions of one and several variables	[SU4] Assessment of ability to use methods and tools
	K6_K01	knows the limits of his own knowledge and understands the need for further education	[SK2] Assessment of progress of work

Subject contents	Course content – lecture 1. Calculation of selected integrals useful in physics. 2. Mathematical description of physical phenomena: mathematical pendulum, free vibrations and suppressed harmonic oscillator, motion of a material point. 3. Fourier transform and Fourier series. 4. Formulating the initial-boundary problems of mathematical physics: mass diffusion, electric current conduction, wave phenomena. 5. Elements of tensor calculus.

Prerequisites and co-requisites	Differential equations I Partial differential equations		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tests	50.0%	60.0%
	exam	50.0%	40.0%
Recommended reading	Basic literature	1. J. Rybicki: Metody matematyczne fizyki, Politechnika Gdańska, 1987. 2. A. Zagórski: Metody matematyczne fizyki, Oficyna Wydawnicza Politechniki Warszawskiej, 2014. 3. A.N.Tichonow, A.A.Samarski: Równania fizyki matematycznej, PWN 1963.	
	Supplementary literature	1. F.W. Byron, R.W. Fuller: Matematyka w fizyce klasycznej i kwantowej. PWN,1975. 2. W.A. Majewski: Metody Matematyczne Fizyki I. skrypt Uniwersytet Gdański, 1990. 3. E. Karaśkiewicz: Zarys teorii wektorów i tensorów. PWN, 1964.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	What are the free vibrations of the harmonic oscillator?		
Practical activites within the subject	Not applicable		

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