GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematical methods of physics , PG_00027637		
Field of study	Mathematics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Wojda	
	Teachers		

Lesson types and methods of instruction

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

Adresy na platformie eNauczanie:

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

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.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Differential equations I
Partial differential equations</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>tests</td><td>50.0%</td><td>60.0%</td></tr>
<tr><td>exam</td><td>50.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">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.</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">What are the free vibrations of the harmonic oscillator?</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
</table>

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