GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Differential equations in Physics and Technology, PG_00037294		
Field of study	Technical Physics		
Date of commencement of studies	October 2023	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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Atomic, Molecular and Optical Physics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Maciej Demianowicz	
	Teachers	dr hab. inż. Maciej Demianowicz	

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

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	4.0	36.0	100

Subject objectives

Students become acquainted with methods of solving most popular differential equations encountered in physics and technics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W03] Has systematized knowledge of higher mathematics, including algebra, analysis, probability theory and numerical methods, allowing for basic description, understanding and modelling of physical phenomena and some technical processes.	The student has a deep and structured knowledge in the field of the theory of differential equations and knows how to apply it to physics and technology.	[SW1] Assessment of factual knowledge
[K6_W02] Has systematized knowledge of the basics of physics, including mechanics, thermodynamics, electricity and magnetism, optics, atomic and particle physics, solid-state physics, nuclear and elementary particle physics.	The student has a deep and structured knowledge in the field of the theory of differential equations and knows how to apply it to physics and technology.	[SW1] Assessment of factual knowledge
[K6_U02] Can analyze and solve simple scientific and technical problems, based on possessed knowledge, using analytical, numerical, simulation and experimental methods.	The student is able to solve scientific and technical problems requiring the ability to solve (mainly analyticaly) differential equations	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

Subject contents

1. First-order ordinary differential equations.

2. Second-order ordinary linear differential equations.

3. Systems of first-order ordinary linear differential equations.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Good knowledge of mathematical analysis.</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>Grade</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. N. M. Matwiejew, Metody całkowania równań różniczkowych zwyczajnych, PWN, Warszawa, 1970

2. W. W. Stiepanow, Równania różniczkowe, PWN, Warszawa, 1956</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">None.</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Present properties of the Wronskian of solutions of the second-order linear differential equations.

2. Present the method of generalized power series.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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