University of Gdańsk

Subject card

Subject name and code	Differential Equations, PG_00204255						
Field of study	Mathematics						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2028/2029			
Education level	Bachelor's 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	3		Language of instruction	Polish			
Semester of study	5		ECTS credits	5.0			
Learning profile	academic		Assessment form	exam			
Conducting unit	Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Tomasz Człapiński, prof. UG				
	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		3.0	62.0	125	
Subject objectives	The student learns the basics of the theory of ordinary differential equations.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[MATL3_W02] knows and understands at an advanced level selected concepts, methods and theorems of mathematical analysis, differential equations and measure theory, as well as basic examples both illustrating specific concepts in this field and allowing to refute false hypotheses or invalid reasoning	The student knows the definitions of selected types of differential equations and theorems concerning ways of solving them or determining the existence of their solutions.	[SW4] test/exam - oral or written
[MATL3_U06] can formulate definitions and theorems in an understandable manner, both orally and in writing, and present correct mathematical reasoning on the learned topics	The student is able to prove selected theorems concerning solving selected differential equations or investigating their properties.	[SU4] test/exam - oral or written
[MATL3_U02] is able to correctly use the concepts of mathematical analysis, differential equations and measure theory, is able to apply the theorems and methods of these fields and is able to interpret the obtained results	The student is able to use appropriate methods to determine solutions of selected types of differential equations.	[SU3] text preparation/written work
[MATL3_W07] knows and understands at an advanced level the role and importance of proof in mathematics, as well as the concept of the importance of assumptions	The student understands the proofs of theorems concerning the determination of solutions of selected differential equations or the study of their properties and understands the meaning of the assumptions of these theorems.	[SW4] test/exam - oral or written

Subject contents

1. Linear differential equations, equations with separable variables, other elementarily integrable equations.
2. Existence and uniqueness of the solution of the initial value problem.
3. Arzela-Ascoli theorem and Peano's theorem on the existence of solutions.
4. Theory of linear systems, systems with constant coefficients.
5. N-th order linear equations, equations with constant coefficients.
6. Boundary value problems for second-order linear equations.
7. Basic concepts and theorems on the stability of linear systems.
8. Euler's method for initial value problems.

Prerequisites and co-requisites

Mathematical Analysis 1,2,3

Linear Algebra

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
observation of the student's attitude	51.0%	0.0%
exam	51.0%	50.0%
test	51.0%	45.0%
activty	51.0%	5.0%

Recommended reading

Basic literature	1. J. Muszyński, A. D. Myszkis, Równania różniczkowe zwyczajne,PWN. 2. J. Ombach, Wyklady z równań różniczkowych, Wydawnictwo UJ. 3. Z. Kamont, Równania różniczkowe zwyczajne, Wydawnictwo UG. 4. A. Pelczar, J. Szarski, Wstęp do teorii równań różniczkowych, PWN
Supplementary literature	none
eResources addresses	

Example issues/ example questions/ tasks being completed	not included
Work placement	Not applicable

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